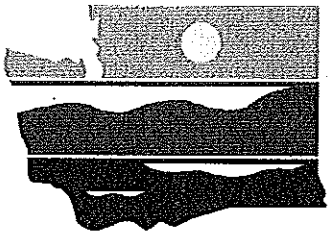

DEPARTMENT OF
ECOLOGY
State of Washington

CONCISE EXPLANATORY STATEMENT

for the Amendments to the

The Model Toxics Control Act (MTCA)
Cleanup Regulation

Chapter 173-340 WAC

APPENDIX C

Comments on the 2000 Proposal

Prepared by:

Washington State Department of Ecology
Toxics Cleanup Program

Publication Number: 01-09-043 (Appendix C)

February 12, 2001

Publication and Contact Information

This report is available on the Department of Ecology's website at
https://fortress.wa.gov/ecy/publications/SummaryPages/0109043.html

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Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

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o Eastern Regional Office, Spokane	509-329-3400

To request materials in a format for the visually impaired, please call Ecology's Toxic Cleanup Program at 360-407-7170. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

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101	Richard T. Bremer Env. Coordinator	Tosco Refining Company	P.O. Box 8 Ferndale, WA 98248	Letter	1
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Washington State Department of Ecology
Toxics Cleanup Program
Attention: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, Washington 98504-7600

September 3, 2000

Dear Trish:

Re: MTCA Cleanup Regulation, Chapter 173-340 WAC
August, 2000
Comments on Proposed Amendments

I am submitting the following technical review comments on the recently released proposed amendments to the MTCA Cleanup Regulation. Citations are given to Chapter 173-340 WAC sections and to pages in the Document Highlighting Changes that was included in Ecology's review package. Feel free to contact me to discuss any of the comments provided below.

2001

1. See 173-340-720(9)(d)(ii), page 185. The reference to subsection (10)(c)(v)(A) should apparently be renumbered as (9)(c)(v)(A). The subsection referenced addresses cleanup levels based on short-term or acute toxic effects. The next to last sentence appears to be misworded: "...the true proportion of samples that exceed the ground water cleanup level shall be less than ninety percent". This language would, for example, allow 85 percent of all samples to exceed a cleanup level based on short-term or acute toxic effects. Compare to the language on page 209 at 173-340-740(7)(d)(ii): "...the true proportion of samples that ***do not*** exceed the soil cleanup level shall ***not*** be less than ninety percent", which is likely the language intended for 173-340-720(9)(d)(ii) as well.

2002

2. See 173-340-740(3), page 198. For protection of human health, both acute (short-term exposures) and chronic (long-term exposures) threats are to avoided. The

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MTCA Cleanup Regulation includes general language to that effect (see, for example, 173-340-740(3)(b)(iii)(B)), but does not recognize that the equation for deriving cleanup levels based on noncarcinogenic threats (see Equation 740-1) does not appropriately reflect parameter values representative of acute (short-term) exposure scenarios. The single equation for calculating cleanup levels for noncarcinogenic threats may not be protective for both acute and chronic threats (see Calabrese et al., 1997; see also the derivations of acute-threat cleanup levels for the Everett Smelter Site, based on the paper by White, 1999). Where applicable, a separate evaluation of potential acute health threats should be performed. That evaluation should consider types of acute threats (e.g., mortality differs from mild and reversible gastrointestinal upset) and tolerable risks (e.g., practically zero tolerable risk for mortality but some non-zero acceptance of mild, reversible effects) when making choices for assigning parameter values (e.g., one-day or single event soil ingestion rates, absorption fractions, and so on). In the current rule there appears to be an assumption that protection against chronic effects will also provide protection against acute effects. Calabrese et al. (1997) demonstrate that this is not necessarily the case, since chronic exposure scenarios consider long-term average conditions for exposure that do not account for short-term higher exposure conditions. Equation 740-1 reflects only the longer-term average scenarios. I recommend that the Cleanup Regulation take note of this fact and not imply that the single equation for noncarcinogenic threats is necessarily protective against acute threats.

Similar comments may be relevant for sections of the Cleanup Regulation addressing other contaminated media.

2003 3. See 173-340-745(5), pages 215-221. For the single scenario of soil exposures at sites meeting the criteria for industrial cleanup standards, the exposure frequency to be used in calculating cleanup standards differs depending on whether the contaminants of concern are petroleum hydrocarbons or not. Equations 745-1 and 745-2 use a frequency of exposure of 0.4, while Equation 745-3 (and 745-4 and 745-5) uses a value of 0.7. No explanation or rationale is given to support this difference. The frequency of exposure parameter would appear to be related to behaviors of the persons potentially exposed, and not to the contaminants occurring at a site. Absent a clear explanation supporting such a differentiation in exposure frequencies, I recommend that Ecology make this parameter value consistent for industrial soils cleanup level calculations.

2004 4. See 173-340-747(10)(e), page 241. A residual saturation screening level defines a value in soil above which there is a potential for the accumulation of free product on or in ground water. (This term should probably be added to the definitions section of the Cleanup Regulation). When comparing a derived residual saturation screening level to a soil cleanup level derived from other bases (e.g., protection of

human health threats or ground water protection), the stricter soil level should be used as a cleanup level. The language in the cited section appears to be reversed. If the residual saturation screening level exceeds (i.e., has a higher concentration than) the soil concentration (other bases), then no adjustment is required. The current language only makes sense if "exceeds" is read as equivalent to "is stricter than", which is not the most common reading of the language. I recommend the following language: "If the residual saturation screening level is greater than the soil concentration, then the soil concentration is protective for the potential occurrence of free product on or in ground water. If the residual saturation screening level is less than the soil concentration, then the soil concentration shall be adjusted downward to the screening level to be protective".

Sincerely,

Gregory L. Glass

Gregory L. Glass

cc: Pete Kmet, Ecology/TCP

References

Calabrese, Edward J., Edward J. Stanek, Robert C. James, and Stephen M. Roberts, 1997. Soil Ingestion: A Concern for Acute Toxicity in Children. Environmental Health Perspectives 105, 1354-1358.

White, Jim W., 1999. Office of Environmental Health Assessment Services, Washington State Department of Health. Hazards of Short-Term Exposure to Arsenic Contaminated Soil. Included as Attachment B1-3 in Volume II, Integrated Final Cleanup Action Plan and Final Environmental Impact Statement for the Upland Area, Everett Smelter Site, Everett, Washington, issued by the Washington State Department of Ecology, November 19, 1999.

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September 2, 2000

Director, Department of Ecology
P O Box 4775
Olympia, WA. 98504-7775

Re: Ad seeking comments on State Regulations

Dear Sir,

2005

On record I am a moderate and have on occasion supported Republicans, Independents, and Democrats. It is fortunate I will not have to relive my life in a generation of idiocy and reduced integrity.

We are currently involved in a struggle for power under the guise of idealism: I.E. "Salmon is the Avenue; the destination is Personal Power." Required reading for every political candidate:" The Great Salmon Hoax" by Buchal and "Environmental Overkill," "What's Become of Common Sense?" by former Governor Dr. Dixie Lee Ray, absolutely the best Governor this state ever had and not re-elected because she called a spade, a spade.

Irrigating farmers cannot take one extra drop out of the Columbia, while our present Secretary of Interior stated his one hope was to eliminate one major dam from this river.

We are all environmentalists and realize we must protect our heritage and those who abuse this privilege should be prosecuted. However; there are many, particularly urban, individuals who are totally sincere on these subjects but totally misinformed on all facets of the problems.

It's frightening to hear how mad a majority of Washington's farming communities are. Grady Auvil, an icon and great contributor in the Washington fruit industry was quoted in the press before he died at age 94 that "we are going to have a Revolution in this country and one is needed." That should never have been published.

The most important part of the environment is the "Human Economy." Every farmer should write, but doesn't, as too busy earning a living and going broke because of total added costs "Control and Regulate": Licenses, permits, fees, etc. "All taxation without representation." Plus "the determining agency" gets more just by grossly upping the fee by fiat (not like 2 ½ % per year for inflation). A farmer spends $30,000 on his underground tanks to comply with the environmental regulations then a new regulator comes in two years later and says the rules are reinterpreted and you must do this. The same has happened for cooling water in cold storages which merely is the same water coming out that went in, just coursing a normal pipe to concentrate the coolant.

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In conclusion, a free market economy with necessary checks and balances has given a better standard of living for a greater percent of its population that any socialist nation, yet we have too many socialist inclined who would change us.

I do not want to denigrate our many public servants who are dedicated to a free market economy and are needed to keep both sides, government and private in line.

My opposition also continues to Right Wing Extremists, and from day one out of the service in 1945 I have vigorously supported Civil Rights after seeing the frustrations of our mess attendants, some of whom actually today might have been an Admiral or General.

Respectfully submitted,

Francis G. Crane

Francis G. Crane
Capt., USNR, Ret.
30+ years Naval Air Ready Reserve Officer
15 years Director-Rainier National Bank
Cornell University-B.S. 1938
Former Chairman-Seattle Federal Reserve Bank-Seattle, WA
Retired lifetime (with detours) fruit grower

1 Enclosure

cc: 1 to Spokane office ✓

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Ecology Seeks Comments on State Regulations

The Washington State Department of Ecology (Ecology) invites you to attend a public hearing to comment on the proposed changes to the:

- Model Toxics Control Act (MTCA) Cleanup rule (Chapter 173-340 WAC), the
- Public Participation Grant rule (Chapter 173-321 WAC), and the
- Remedial Action Grant rule (Chapter 173-322 WAC)

September 7, 2000 - Thursday

6:00 p.m.

Department of Ecology - Eastern Regional Office
N. 4601 Monroe St., Suite 100
Second Floor Conference Room
Spokane, WA

This hearing is part of the public notice of the proposed changes to these rules. The current proposal reflects changes based on comments received during the previous comment period for the November 1999 proposal. You are invited to provide written or oral comment at the hearing or to mail comments to Ecology by September 15, 2000. You may also access information about the changes and comment through electronic form via our web-site at www.wa.gov/ecology/tcp/cleanup.html.

For a copy of the rules or other information call Carol Esget at 360-407-7224 or 1-800-826-7716. Special accommodations available on request at 360-407-6006.

ENCL. 1

SUBMITTED TO ECOLOGY 9-6-00 AT MTCA PUBLIC HEARING SEATTLE

Heart of America Northwest

"Advancing our region's quality of life."

Heart of America Northwest Comments on Reissued Proposed Amendments MOTCA Hazardous Waste Cleanup Regulation, and Public Participation Grants

2006 Heart of America Northwest urges Ecology to move to speedy adoption of the Proposed Amendments. Following a lengthy and positively heralded MOTCA Policy Advisory Committee (MOTCA-PAC) process, Ecology issued a draft rule reflecting the specific areas where tentative consensus had been reached, and the overall proposal to allow site specific risk assessment - which had agreement from all parties except several dissenting public interest and environmental groups who viewed the public participation requirements as too weak to enable effective protection of community concerns in highly complex risk and remedial action decisions. Heart of America Northwest supported the agreement and recommendations of the MOTCA-PAC, and urges Ecology to adopt rules reflecting the report of the MOTCA-PAC.

Heart of America Northwest supported the delicate agreement to provide for site specific risk assessment, clarification of criteria for industrial standard application, public notice and participation improvements, and ecological risk assessment. We do add a note of caution, however. The extensive time that has been allowed to elapse prior to these rules being adopted has shown that concerns about substitution of site specific risk assessment would occur without adequate public notice of how public concerns for future resource use would be impacted, and without consideration of those concerns (which the public is hard pressed to have voiced due to the highly technical shroud over the discussion of risk at sites). Because we have seen the concern voiced in the PAC meetings come to be reality, and because of additional developments that would undermine the delicate balance of the MOTCA-PAC's recommendations, we do offer some minor amendments to preserve the explicit recommendations of the MOTCA-PAC.

The delicate agreement of the MOTCA-PAC needs to be preserved by Ecology by specifically honoring the following commitments and taking the following recommended actions to reflect that agreement:

2007 1. There will be NO change in the degree of protectiveness of human health embodied in the current rules' standards for carcinogen risk at sites with either unrestricted public access or where an adult industrial worker is the reasonable maximum exposure scenario (or primary exposure).

Ecology can not agree to a relaxed carcinogen risk standard allowing public exposure to carcinogenic residual hazardous substances, including radionuclides, where the cumulative cancer risk would be greater than one in one hundred thousand [1E-5, or 1x10-5]; and, where the risk from individual carcinogens (including radionuclides) would be greater than one in one million [1E-6].

The agreement that there would be no change in the residual carcinogen risk standard was a fundamental underpinning of the MOTCA-PAC's success.

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recycled paper

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Washington Department of Health has now proposed to Ecology that the two agencies enter a Memorandum of Understanding to allow the use of a residual radionuclide exposure (expressed as a dose) that results in a significantly higher carcinogen risk than one in one hundred thousand for adults under a reasonable maximum exposure scenario. Furthermore, this proposal does not calculate risk for the most sensitive exposed population - children.

Health has recently adopted a rule for residual radionuclide dose, which is based on federal NRC standards for closure of licensed sites. MOTCA requires the use of a health based standard which is more protective than the federal standard for exposure to hazardous substances. There is no equivalency between the MOTCA standard and the Health standard. For adults, EPA and NRC calculations show the Washington Health standard would result in a carcinogen risk five times greater than permissible under MOTCA - without following MOTCA's requirements for risk assessment and reasonable maximum exposure scenario. Indeed, the Health rule would allow the adult cancer risk to grow to at least 20 times the MOTCA standard in the event of failure of institutional controls, whereas the proposed MOTCA rules make clear that the reasonable maximum exposure scenario must result in a cleanup and remediation level that protects the public from a cancer risk in excess on 1E-5 taking into consideration the likelihood of the failure of institutional controls. SEE proposed WAC 173-340-708 (3)(d)(i) regarding reasonable maximum exposure.

The definitions of reasonable maximum exposure scenario and alternate reasonable maximum exposure scenario have been easily understood by scores of citizen participants in workshops that we have helped to conduct regarding site specific risk assessment at Hanford in areas along the Columbia River. We urge the Department to adopt these sections without change.

However, if the Department believes that there is some other section of the current or proposed rules that allows it to approve of cleanups that use entirely different standards than the reasonable maximum exposure scenario, residual carcinogen risk and cleanup standards, then the Department must remove such a section or clarify in this record that it can not be used for approval of a cleanup that does not meet the fundamental standards of MOTCA and these rules.

(Let us also point out that such an action by Ecology would invite an immediate legal challenge by Heart of America Northwest. The EIS and SEPA determinations fail to disclose any provision for use of a less protective standard for any carcinogen. We expect that Ecology will conclusively put this issue to bed by issuing a statement in the response to comments on the proposed rule that restores our confidence that no such end run around the fundamental standards of MOTCA will be contemplated.)

Ecology must not enter into any Memorandum of Understanding with another agency to allow use of a different cleanup standard for radionuclides (i.e., resulting in a no further action letter from Ecology, or removing the site from the site ranking list) if it results in doses with health risks in excess of a cumulative carcinogen risk of 1E-5, or 1E-6 for specific carcinogenic radionuclides. Nor can Ecology agree to the use of risk assessments which violate the requirements of this proposed rule as to exposure assumptions or public notice and involvement.

2008

2. The agreement to allow use of site specific risk assessment was based upon specific agreements to improve public participation in highly technical decisions. The rule should specify that the approval of the use of site specific risk assessment at any site is a determination of the Department, which

must be based on compliance with the public notice and involvement requirements, and the access to technical assistance and grants provided for in the current law and proposed rule. If Ecology or the Legislature acts to restrict public involvement, including funding for, or access to, Public Participation Grants for hazardous substance release site affected citizen groups and the technical adviser, the rule should specify that Ecology will not be able to approve of the use of site specific risk assessments that vary important default assumptions or which could result in significant restriction on public access to land or resources.

WAC 173-340-708(10)(a) should be amended to add the following : ... Except as provided for in (b) and (c) of this subsection and in WAC 173-340-720 through 173-340-760, these default values shall not be changed for individual hazardous substances or sites; and, they shall not be modified if the requirements for notice and public participation plans pursuant to WAC 173-340-600 have not been complied with, nor shall they be modified if access to the citizen technical adviser established pursuant to WAC 173-340-600(18), or to public participation grants pursuant to RCW 70.105D.070(4) and WAC 173-321, by citizens affected by the site or release is restricted due to lack of funds, lack of notice, or other restriction.

We have seen that the public notice and participation requirements - put off in a different section of the proposed rule - are not being treated as substantive requirements for the opportunity to modify risk assessment default assumptions or to utilize an alternate reasonable maximum exposure scenario, which would restrict future public access. It must be clear in the proposed section of the rule that permits use of site specific risk assessment that notice and public participation are substantive requirements for use of a site specific risk assessment.

Ecology must be more specific in WAC 173-340-600 "Public Notice and Participation". During the PAC process, we were assured that Ecology would require and use appropriate notice and comment forums, including the sue of such efforts as workshops and effective mailings with surveys, if site specific risk assessments could lead to a restriction on future site use or resource use. See proposed 173-340-600 (4)(g). However, we have already seen for Hanford's 300 Area along the Columbia River (and for the 100 Areas, for which there was an exemplary set of workshops on risk assessment sponsored by EPA with Ecology and Health participation) Proposed Clean-Up Plans with such restrictive impacts. Proposed section 600 (9)(e) has been cited as providing discretion regarding notice and public participation in the risk assessment, and the liable parties' public participation plan has no provision for notice and participation in choice of risk assessment variables or appropriateness of long-term institutional controls. Therefore, (9)(e) should be amended to read:

If the variables proposed to be modified in a site specific risk assessment or alternative reasonable maximum exposure scenario may affect the significant public concerns regarding future land uses and exposure scenarios, then the Department shall assure appropriate public involvement and comment opportunities will occur as identified in the public participation plan, such as use of workshops, survey mailings, and other efforts in conjunction with the notice provided in subsection (4)(g), above.

2009

3. The rule should be amended to specify that additional exposure pathways may exist - particularly for carcinogenic radionuclides, and appropriate models must be utilized to determine the total carcinogen risk consistent with the existing sections of the rule. However, the rule must continue to explicitly require that use of such models must be subject to scientific approval requirements and

that they shall utilize the default assumptions for risk assessment. Except as provided for in (b) and (c) of this subsection and in WAC 173-340-720 through 173-340-760, these default values shall not be changed for individual hazardous substances or sites; and, they shall not be modified if the requirements for notice and public participation plans pursuant to WAC 173-340-600 have not been complied with... (see above).

The current rule does not explicitly state how external dose from exposure to residual radionuclides in soil or groundwater shall be modeled and factored into the determination of a soil action or remediation level. However, the rule is clear that the total carcinogen risk must be calculated, and that the assumptions in any external dose calculation model must not vary from the rule (except after the provisions allowing site specific risk assessment are adopted). The lack of any provision specific for the choice of an external dose model for determining cumulative carcinogenic risk from all pathways, has led some to claim that the dose does not have to be calculated, and others to claim that the model can modify default values for the risk assessment. *Therefore, Ecology should simply clarify that all exposures must be modeled and included in calculating the total carcinogen risk, and that the choice of dose or other exposure models must meet the current proposed rule's standards for science and use of assumptions.*

2010

4. We believe that, consistent with the MOTCA-PAC discussions, persons who engage in independent remedial actions should have notice, provided in the rule, that they can not vary from default assumptions for risk assessment or utilize alternative reasonable maximum exposure scenarios which continue or create new land use restrictions without fully complying with the notice and public participation requirements of WAC 173-340-600. In the MOTCA-PAC, it was discussed that the desire to utilize site specific risk assessment would be a motive for potentially liable parties to come under the Ecology program umbrella. This now seems unlikely to occur, unless the liable parties understand that they run substantial risk of not having their risk assessment modifications approved at a later date for failure to notify and properly involve the public.

SOLUBLE SOLUTIONS

September 7, 2000

Trish Akana
Rules Coordinator
P. O. Box 47600
Olympia, WA 98504-7600

Dear Persons:

I am writing to respond to the latest revision of The Model Toxics Control Act Clean up Regulations Chapter 173-340-WAC.

The most recent proposed amendments (publication No 00-09-056) are much clearer than the previous version, however there are still some areas that need clarified. While WAC 173-340-700 refers to section WAC 173-340-830 (3) (a) (vii) and method 7, there are no such items. Also it is unclear why a site on the hazardous sites list that has completed a clean up and does not require further action, would remain on that list if area background concentrations prevent the site from meeting cleanup levels at the point of compliance.

2011

2012

2013

Tables 747-1 and 747-2 report organic carbon-water portioning coefficients (Koc) and 747-3 reports the metals distribution coefficient (Kd). How can Kd's be defined when within the rule itself Kd is defined by equation 747-2, and is based on foc (organic content in the soil). The rule suggests other places to find necessary information such as Henry's Law constants and toxicity values. Why then does Ecology not also make these values available via guidance? Perhaps it is believed that Koc, a physical constant, does not vary within the scientific literature. However, that is not true. Just as new studies and new information can "change" a toxicity of a chemical species, so also can new studies and new information "change" the perceived conception and change a physical constant such as Koc. These values, be they toxicity or Henry's law constant or Koc, do not alter, they are just not easily measured or understood. Thus Koc can vary in the scientific literature just as toxicity values and Henry's law constants vary. Considering that the other values are not given due to their varying nature then Koc and especially Kd (which can vary with soil characteristics) should not be published as part of the rule.

2014

In closing, the Department of Ecology has accomplished writing revisions that make the state's Model Toxics Control Act cleanup regulation more scientifically applicable and more stringent. However, as a state agency, it is also important to have a rule that enhances the state's ability to work with industry to clean up hazardous waste and keep our state safe for human health and the environment. This rule, as it is currently written, makes some sites undergo unending monitoring and/or leaves them unable to achieve a no further action letter. This removes incentive from industry to undertake cleanups at such sites. This will result in a rule that causes more legal arguments rather than a cleaner state.

Sincerely,

Dr. Jennifer L. Holmes
Owner, Senior Consultant

720 N 103RD STREET • SEATTLE, WA • 98133
PHONE: (206)819-5995 •SOLUBLESOLUTIONS.NET:

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Akana, Trish Alicia

From: Jill Nordstrom [JNordstrom@thermoretec.com]
Sent: Tuesday, September 12, 2000 3:36 PM
To: taka461@ecy.wa.gov
Subject: Comment on Proposed MTCA

Microsoft Word 4

(See attached file: MTCA Comment.doc)

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September 12, 2000

Trish Akana
Department of Ecology
Via Email

Dear Ms. Akana:

I would like to submit the following comment on the proposed changes to MTCA:

2015 In the proposed MTCA, one is now required to make an effort to place deed restrictions where institutional controls will be used. I agree with the idea of providing maximum protection to landowners subject to institutional controls, but I believe there are some instances where one should not be required to seek deed restrictions. For instance, if an institutional control is already a local or state law or ordinance, it does not seem necessary to add additional deed restrictions. Example: In the City of Seattle, one is not allowed to install a private drinking water well, because of the availability of a high quality municipal drinking water source. If a remedy includes institutional controls which preclude groundwater extraction for use as drinking water, it is not necessary to get a separate deed restriction for this control. My comment would therefore be to change the wording to make an effort to seek deed restrictions in cases where current laws or ordinances do not cover

Sincerely,

Jill Nordstrom

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RAY F. SNYDER CO., INC.
PETROLEUM PRODUCTS DISTRIBUTOR
672 SEVENTH AVENUE (P.O. BOX 497)
KIRKLAND, WASHINGTON 98083
425-822-8281
FAX 425-827-0920

September 18, 2000

Department of Ecology, Toxics Cleanup Program
Attn: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA 98504-7600

Subj: Proposed MTCA cleanup rule changes; Chapters 173-340,322,321 WAC

Dear Ecology:

2016 I am responding to your request for public comments on the subject rules changes. I am opposed to any reduction to current cleanup standards. In other words, I am against any rule changes that will cause small business/land owners to pay additional monies to clean up petroleum related properties.

Ray F. Snyder Co. is an independent gasoline distributor that supplies around 60 independent gasoline retailers in the King, Pierce, and Snohomish counties. We have been in business since 1931 and employ around 25 people. We have been through the 1970's energy crisis', the 1988 to 1998 UST upgrade changes, the CARB rules changes, and now it looks like MTCA rules changes. After a while, we wonder if it's worth it!

By the end of 1998, all of our current independent gasoline retailers had upgraded their USTs by digging their properties up and replacing tanks, lines, whatever, to meet the Ecology rules. While they were doing that, they each dealt with the soil issues that faced them and acted accordingly. Every site had some contamination, and in spite of the clean up efforts, the sites still have some contamination. It is impossible to sell petroleum products without contaminating a site (even a new station). The current technology is good, but not perfect.

It is my understanding that the subject rule changes may require property owners and everyone else that either sold, touched, or looked at the petroleum, to now go back and retest and cleanup the first cleanup because it doesn't now meet the new standards. This is nuts! It's obvious that the people who are considering and making these rules have never operated a small business or made a payroll. Additionally, independent petroleum marketers are under siege from predatory pricing activities by their major oil company suppliers in metropolitan markets. So, it ain't fun, folks.

I could become politically incorrect in a heart beat, but pounding on the "polluters" is an easy target these days. What people seem to forget is that there is a pile of everyday working families that own or operate small businesses that "pollute" the environment by provided fuel so others can go to work or MTCA rule changing meetings.

Sincerely,

Lowell Rottrup

#67
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PD #1 of Clallam County

2431 East Highway 101
Post Office Box 1090
Port Angeles, WA 98362

(360) 452-9771
FAX 452-9338

Michael McInnes, General Manager

September 15, 2000

Commissioners
William McCrorie, District No. 1
Hugh Haffner, District No. 2
Ted Simpson, District No. 3

ATTN: TRISH AKANA, RULES COORDINATOR
STATE OF WASHINGTON - DEPARTMENT OF ECOLOGY
PO BOX 47600
OLYMPIA, WA 98504-7600

RE: Notice of Proposed Rule for Chapter 173-340 WAC

Ladies and Gentlemen:

This opportunity to comment on the proposed changes to Chapter 173-340 WAC (MTCA) is greatly appreciated.

2017 The District's concern with the proposed amendments to Chapter 173-340 WAC, is that they will lead to more complex, costly, and lengthy cleanups, without any measurable improvement to the environment.

The first area of concern is the models used by the Department for the revised Method A cleanup level for unrestricted land uses for benzene, chromium, ethyl benzene, lindane, MTBE, naphthalenes, tetrachloroethylene, toluene, 1,1,1-trichloroethane, and gasoline range organics with benzene. These revised values are based on the 3- and 4-phase models developed by the TPH working group. As these models have been implemented by the Department, the conservative assumptions used by the Department have resulted in model results that cannot always be justified. An example of the ultra-conservative results that can be generated with these models is the result from an actual cleanup using the 3-phase model. As the analytical results show, the only contaminate detected was 1 ppm of aromatic fractions C8-C10 which resulted in estimated well concentration of over three times the maximum allowable limit.

The Department of Ecology paper, "Proposed Changes to the Model Toxics Control Act Cleanup Regulation – Petroleum Cleanups," states under the section, "How are petroleum contaminated sites currently cleaned up?": "The use of (current) Method A cleanup levels at petroleum cleanup sites tends to result in conservative cleanup at many sites. The Method A levels are sometimes more stringent than would be required for preventing allowable risk to human or ecological receptors, causing remediation costs to increase and the completion rate of petroleum cleanup to slow down." The lowering of the Method A cleanup levels based on questionable modeling will only continue to increase costs and slow down cleanups until either the current Method A cleanup levels are shown in the field to not be protective of ground water or until the accuracy of the 3- and 4-phase models can be improved; therefore, the Method A cleanup levels should not be lowered.

2018 The reduction of Method A cleanup levels will also increase the usage of risk-based cleanup levels that will, in turn, increase the complexity, cost, and length of time associated with cleanups. More sites could be cleaned up in less time by continuing to apply Chapter 173-340 WAC in its form and using the 3- and 4- phase models in the form of guidance until such time this model can be refined.

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2019 As Method A cleanup levels continue to be lowered by the Department of Ecology, testing costs, uncertainty, and complexity continue to increase. As an example of this increase in testing costs, uncertainty, and complexity, the testing methods associated with benzene will be examined. Two of the methods that can be used for testing soils for benzene are Method 8021 and Method 8260. The PQL associated with these two analytical methods is 0.04 mg/kg. The PQL for testing methods is determined by matrix interference and testing accuracy. Since matrix interference cannot be controlled as the PQL of a method is lowered, the number of false positives associated with that analytical method would increase. To avoid this dilemma, more complex testing methods must be used to obtain the required PQL. This increase in testing complexity is accompanied by an increase in testing costs and does not completely address matrix interference. To address the matrix interference issue, a confirming method (e.g., GC/MS) may be required. In the final regulation, hopefully the Department will address the issue of testing methods and matrix interferences.

Table 740-1 lists 1 mg/kg as the cleanup level for PCBs in soil, and this cleanup level is based on 40 CFR 761.61. The exact ARAR for this cleanup level is 40 CFR 761.61 (c) (4) (i) (A), which states that "High occupancy areas where bulk PCB remediation remains of concentrations >1 ppm and ≤ 10 ppm shall be covered with a cap meeting the requirements of paragraphs (a) (7) and (a) (8) of this section." Since this cleanup level is based on this ARAR, this capping must be allowed for soils containing up to and including 10 ppm of PCB for all areas since this is the most stringent cleanup requirement under 40 CFR 761.61. The cleanup of PCBs, as with any group of compounds, is a complex task. Due to the complexity of this task, a single value in a table is not adequate. To properly address the cleanup of PCBs, 40 CFR 761 should be adopted as the cleanup standard for PCBs under Chapter 173-340 WAC.

2020 The requirements of WAC 173-340-7490 could involve very costly, timely and complex issues, unless one of the exclusions under WAC 173-340-7491 is met. The exclusions under WAC 173-340-7491 exclude urban areas while requiring rural areas to meet the full requirements of this section. These are the same rural areas that have felt the full economic impact of the ESA and are now being exposed to the full economic impact of the terrestrial ecological requirements that are based upon one method, and the associated ecological value and economic costs are both unknown at this time. Until such time as better terrestrial ecological models can be developed and the associated ecological value is determined, these requirements should not be implemented.

This opportunity to comment is greatly appreciated. Hopefully, these comments can be incorporated into improvements in the final revision of Chapter 173-340 WAC.

Sincerely,

Ken Morgan/LJA
Ken Morgan
Transmission and Substation Systems Manager

KM:lja
Enclosures

SOUND ANALYTICAL EPH / VPH SUMMARY REPORT

Client Sample ID:	DG-3					
Work Order	90681					
Laboratory ID:	90681-03					
Date Sampled:		Date Received:	6/27/00			
Date Prepared:	EPH	6/28/00	PAHs	6/28/00	VPH	6/28/00
Date Analyzed:	EPH	6/29/00	PAHs	7/5/00	VPH	6/29/00
Matrix: solid	% Solids:	80.99				

ANALYTICAL RESULTS:

Non-Carcinogen - Human Health Hazard Index Compounds

Compound	mg/kg
Total Aliphatics	ND
Total Aromatics *	1.3
Benzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND

* Total aromatics is aromatic fractions + benzene - ethylbenzene, toluene & xylenes

Carcinogen - Human Health Risk Compounds

Compound	mg/kg	PQL
Benzene *	0.13	0.25
Total cPAHs *	0.08	0.15

* For compounds not detected, 1/2 PQL values are Substituted

Soil to Groundwater - Fate and Transport Fractions

Aliphatic Fractions	mg/kg
C5 - C6	ND
>C6 - C8	ND
>C8 - C10	ND
>C10 - C12	ND
>C12 - C16	ND
>C16 - C21	ND
Total Aliphatic Fractions	ND

Aromatic Fractions	mg/kg
>C8 - C10*	1.3
>C10 - C12	ND
>C12 - C16	ND
>C16 - C21	ND
>C21 - C34	ND
Total Aromatic Fractions	1.3

* Does not include ethylbenzene and xylenes

HUMAN HEALTH SOILS CONTACT WORKSHEETS

CLIENT ID: DG-3

LAB ID: 90681-03

Non-Carcinogen--Hazard Index

			Residential			*Commercial*			*Industrial*		
Compound	Soil ppm	ORfD	Factor	Res. Mult.	HQ	Factor	Com. Mult.	HQ	Factor	Ind. Mult.	HQ
Total aliphatic	0	0.06	1.25E-05	2.08E-04	0.00	3.13E-06	5.21E-05	0.00	2.86E-07	4.77E-06	0.00
Total aromatic*	1	0.03	1.25E-05	4.17E-04	0.00	3.13E-06	1.04E-04	0.00	2.86E-07	9.53E-06	0.00
Benzene	0.0										
Ethylbenzene	0.0	0.10	1.25E-05	1.25E-04	0.00	3.13E-06	3.13E-05	0.00	2.86E-07	2.86E-06	0.00
Toluene	0.0	0.20	1.25E-05	6.25E-05	0.00	3.13E-06	1.56E-05	0.00	2.86E-07	1.43E-06	0.00
Xylenes	0.0	2.00	1.25E-05	6.25E-06	0.00	3.13E-06	1.56E-06	0.00	2.86E-07	1.43E-07	0.00
Hazard Index					0.00			0.00			0.00

* Total aromatic is total of aromatic fractions plus benzene minus ethylbenzene, toluene and xylenes

Carcinogen Risk

			Residential		*Commercial*		*Industrial*	
Compound	Soil ppm	OCPF	Res. Mult.	Risk	Com. Mult.	Risk	Ind. Mult.	Risk
Benzene *	0.13	0.029	1.00E-06	3.77E-09	2.50E-07	9.43E-10	7.62E-08	2.87E-10
Total cPAHs *	0.08	7.30	1.00E-06	5.62E-07	2.50E-07	1.41E-07	7.62E-08	4.28E-08

* For parameters not detected 1/2 PQL values are substituted

FATE AND TRANSPORT - SOIL TO GROUNDWATER

"Raoult's Law" Worksheet

CLIENT ID: DG-3

LAB ID: 90681-03

COMPOUND	Soil mg/kg	MW g/mol	Moles mmol/kg	Mol Frac.	Solubility mg/l	Effect. Sol. mg/l	DF	Well Conc. mg/l
Aliphatics								
EC 5 - 6	0	81	0.0	0.00	2.8E+01	0.0E+00	20	0.0E+00
EC >6 - 8	0	100	0.0	0.00	4.2E+00	0.0E+00	20	0.0E+00
EC >8 - 10	0	130	0.0	0.00	3.3E-01	0.0E+00	20	0.0E+00
EC >10 - 12	0	160	0.0	0.00	2.6E-02	0.0E+00	20	0.0E+00
EC >12 - 16	0	200	0.0	0.00	5.9E-04	0.0E+00	20	0.0E+00
EC >16 - 21	0	270	0.0	0.00	1.0E-06	0.0E+00	20	0.0E+00
Aromatics								
Benzene	0.0	78	0.0	0.00	1.8E+03	0.0E+00	20	0.0E+00
Toluene	0.0	92	0.0	0.00	5.2E+02	0.0E+00	20	0.0E+00
EC >8 - 10*	1	120	0.0	1.00	6.5E+01	6.5E+01	20	3.3E+00
EC >10 - 12	0	130	0.0	0.00	2.5E+01	0.0E+00	20	0.0E+00
EC >12 - 16	0	150	0.0	0.00	5.8E+00	0.0E+00	20	0.0E+00
EC >16 - 21	0	190	0.0	0.00	5.1E-01	0.0E+00	20	0.0E+00
EC >21 - 35	0	240	0.0	0.00	6.6E-03	0.0E+00	20	0.0E+00
			0.0	1.00				3.3

* Includes ethylbenzene & xylenes

Well Conc. must be 1 mg/l or less for soil concentrations to be protective of Method A drinking water standard.

Weyerhaeuser
The future is growing™

Corporate Headquarters
PO Box 2999
Tacoma WA 98477-2999
Tel (253) 924 2345

September 25, 2000

Department of Ecology (Toxics Cleanup Program)
Attn: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Akana:

Please consider these comments on proposed revisions to the Model Toxics Control Act, Chapter 173-340 WAC appearing in the Washington State Register 00-16-135, August 16, 2000.

2021 **Comment 1 – Consideration of Previously Submitted Comments**

A letter signed by Jim Pendowski dated August 16 served to transmit the rule package to interested persons. This letter committed the agency to respond to comments received on both the November 1999 and August 2000 proposed rule amendments. This commitment was not mentioned in the State Register entry.

A quick review of our comments on the November 1999 proposed rule amendments indicate that few were addressed in the August 2000 amendment package. As such, the request now is that you consider our November 1999 comments as re-submitted for the current proposed rule.

2022 **Comment 2 – The Proposed Amendments are a Significant Legislative Rule**

The State Register entry offers a contradictory statement regarding the Administrative Procedures Act obligation to address RCW 34.05.328.

> "RCW 34.05.328 does not apply to this rule adoption. These rules are significant under RCW 34.05.328 because they adopt new or make significant amendments to a policy or regulatory program. The agency has conducted the additional analysis under RCW 34.05.328."
>
> Middle of second column on page 353, WSR Issue 00-16

We concur with the view that these rule amendments classify as a Significant Legislative Rule and look forward to being provided an opportunity to review the analysis.

2023

Comment 3 – The Significant Legislative Rule Analysis Should be Complete

The Pendowski letter makes reference to a "Cost-Benefit Analysis." A subsequent agency communication indicates the estimate of costs and benefits will be available for review in early October, with a consequent extension of the comment period until October 27.

While RCW 34.05.328 does require an assessment of the probable benefits and probable costs of the rule, other sections of the statute should not be ignored. Of particular interest is the RCW 34.05.328(1)(d) requirement to consider an alternative version(s) of the rule to determine the version being adopted

> "...is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated under (a) of this subsection."

This is a challenging requirement and one which the business community has a particular interest in.

During the summer of 1998 an AWB task force made a significant effort to produce an amended MTCA regulation which narrowly incorporated the 1996 Policy Advisory Committee consensus recommendations. This draft was shared and discussed with Ecology and other stakeholders at the time. At an early February 2000 meeting with Ecology MTCA policy staff, an AWB group inquired about the agency's plan to satisfy the RCW 34.05.328(1)(d) requirement. The AWB group suggested the 1998 version could be a candidate (or to at least serve as a template) for evaluation as a less burdensome alternative for those regulated by the rule. A copy of the 1998 AWB work product is enclosed.

Most of the commenters on the November 1999 draft rule expressed the view that it was more complex, more prescriptive, and more costly than the promulgated regulation. The agency has an opportunity with the RCW 34.05.328 evaluation to demonstrate how this August 2000 draft will best accomplish the public policy objectives of the MTCA program.

Sincerely,

Ken Johnson
Washington Regulatory Affairs Manager

cc Jim Pendowski w/o attachment

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PART I — OVERALL CLEANUP PROCESS

WAC 173-340-100 Purpose. (1) This chapter is promulgated under the Model Toxics Control Act. It establishes ~~administrative~~ processes and standards to identify, investigate, and cleanup facilities where hazardous substances ~~have come to be~~ are located. It defines the role of the department and encourages public involvement in decision making at these facilities.

(2) The goal of this chapter is to implement ~~the policy declared by~~ chapter 70.105D RCW. This chapter provides a workable process to accomplish effective and expeditious cleanups in a manner that protects human health and the environment. This chapter is primarily intended to address releases of hazardous substances caused by past activities, although its provisions may be applied to potential and ongoing releases of hazardous substances from current activities.

WAC 173-340-110 Applicability. (1) This chapter ~~shall apply~~ applies to all facilities where there has been a release or threatened release ~~of a hazardous substance~~ that may pose a threat to human health or the environment. Under this chapter, the department may require or take those actions necessary to investigate and remedy these releases.

(2) Nothing herein shall be construed to diminish the department's authority to (a) address a release or threatened release or (b) use this chapter to protect human health or the environment after actions have been completed under other applicable laws or regulations. The cleanup process and procedures under this chapter and under other laws may be combined. The department may initiate a remedial action under this chapter and may upon further analysis determine that another law is more appropriate, or vice versa.

~~(3) If a hazardous substance remains at a facility after actions have been completed under other applicable laws or regulations, the department may apply this chapter to protect human health or the environment.~~

WAC 173-340-120 Overview. (1) Purpose. This section provides an overview of the cleanup process that typically will occur at a site where a release of a hazardous substance has been discovered. If there are any inconsistencies between this section and any specifically referenced sections, the referenced section shall govern.

(2) Site discovery. ~~Site discovery includes:~~

(a) Release ~~reporting. A reporting program is established to help identify potential hazardous waste sites. Owners and operators~~ reporting. An owner or operator who knows of or discovers a release ~~of a hazardous substance due to past activities must~~ shall, within ninety days of discovery, report the release to the department ~~within ninety days of discovery,~~ under WAC 173-340-300. ~~Most current releases of hazardous substances must be reported to the department under the state's hazardous waste, underground storage tank, or water quality laws. The term "hazardous substance" includes a broad range of substances as defined by chapter 70.105D RCW.~~

(b) Initial investigation. Within ninety days of learning of a ~~hazardous substance~~ release, the department ~~will~~ shall conduct an initial investigation of the site under WAC 173-340-310. For sites that may need further remedial action, the department shall send ~~an~~ early notice letters ~~will be sent~~ to the owner and operator, and other potentially liable persons known to the department, informing them of the department's decision.

(3) Site ~~priorities~~ prioritization. Priorities for further remedial action are set by the following process:

(a) Site hazard assessment. Based on the results of the initial investigation, a site hazard assessment ~~will~~ shall be performed, if necessary, under WAC 173-340-320. The purpose of the site hazard assessment is to gather information to confirm whether a release has occurred and to enable the department to evaluate the relative potential hazard posed by the release. If the department decides that no further action is required, it ~~will~~ shall notify the public of that decision through the site register.

(b) Hazardous sites list. The department ~~will~~ shall maintain a list of sites that require further remedial action under WAC 173-340-330. ~~Sites will be listed~~ The department shall list a site after the completion of a site hazard assessment. ~~Sites placed on the list will be ranked~~ and shall rank the site using the department's hazard ranking method. The department may remove a site from the hazardous sites list if the cleanup action at the site has achieved the cleanup standards and all remedial actions except confirmational monitoring have been completed. ~~See WAC 173-340-330.~~

(c) Biennial program report. Every even-numbered year, the department ~~will~~ shall prepare a biennial program report for the legislature under WAC 173-340-340. The hazard ranking, along with other

factors, ~~will~~ shall be used in this report to identify the projects and expenditures recommended for appropriation. ~~See WAC 173-340-340.~~

~~(4) Detailed site investigations and cleanup decisions. The following steps will be taken to ensure that the proper method of cleanup is chosen for the site.~~

~~(a)~~ (4) Remedial investigation and feasibility study. A ~~state~~ remedial investigation, and, if necessary, a feasibility study ~~will~~ shall be performed at ranked sites under WAC 173-340-350. The ~~state~~ remedial investigation/feasibility study defines the extent of the problems at the site and evaluates alternative cleanup actions.

~~(b)~~ (5) Selection of cleanup action. ~~The department will evaluate the remedial investigation/feasibility study, establish cleanup levels and the point or points at which they must be complied with in accordance with the procedures provided for in WAC 173-340-700 through 173-340-760 and select.~~ If required, a cleanup action shall be selected that ~~will~~ protects human health and the environment and meets the other requirements of WAC 173-340-360. At some sites, ~~restrictions on the use of the land and resources~~ (institutional controls) will be required to insure continued protection of human health and the environment. ~~See~~ under WAC 173-340-440. Where the cleanup action is conducted or supervised by the department, ~~T~~the cleanup action ~~will~~ shall be set forth in a draft cleanup action plan that addresses cleanup requirements for hazardous substances at the site. After public comment on the draft plan, a final cleanup action plan ~~will~~ shall be issued by the department. ~~(See WAC 173-340-700 for additional overview discussion of these requirements.)~~

~~(5)~~ (6) Site cleanup. Once the appropriate cleanup action has been selected for the site, the actual cleanup ~~will~~ shall be performed.

(a) Cleanup actions. WAC 173-340-400 describes the design and construction requirements for implementing the cleanup action plan.

(b) Compliance monitoring and review. The cleanup action ~~must~~ shall include compliance monitoring under WAC 173-340-410 and in some cases periodic review under WAC 173-340-420 to ensure the long-term effectiveness of the cleanup action.

~~(6)~~ (7) Interim actions. Under certain conditions, it may be appropriate to take early actions at a site prior to completing the process described in subsections (2) through ~~(5)~~ (6) of this section. WAC 173-340-430 describes when it is appropriate to take these early or interim actions and the requirements for such actions.

~~(7)~~ (8) Leaking underground storage tanks. Underground storage tank ~~(UST)~~ owners and ~~underground storage tank~~ operators regulated under chapter 90.76 RCW are required to perform specific, and frequently more prompt, actions in addition to what other site owners and operators would do under this chapter. ~~Such additional actions include reporting of a confirmed release within twenty-four hours, follow-up investigation, free product removal and immediate assessment of the threat to human health and the environment at the site. A written report describing the site and the actions taken must be submitted within ninety days of release confirmation. Depending on the results of these actions, additional remedial actions may be required.~~ WAC 173-340-450 describes these and other requirements for leaking underground storage tanks.

~~(8)~~ (9) Procedures for conducting remedial actions.

~~(a) Remedial action agreements. The department has authority to take remedial actions or to order persons to conduct remedial actions under WAC 173-340-510 and 173-340-540. However, the department encourages agreements for investigations and cleanups in appropriate cases. These agreements can be agreed orders or consent decrees reached under the procedures of WAC 173-340-520 and 173-340-530.~~

~~(b)~~ (a) Independent remedial actions. Persons may ~~decide to~~ perform investigations and cleanups without department approval under this chapter. The department ~~will~~ shall use the appropriate requirements contained herein in its evaluation of the adequacy of any independent remedial actions performed. Nothing in this chapter prohibits persons from performing such actions before the department is ready to act at the site; however, all ~~interim and cleanup~~ remedial actions must be reported to the department under WAC 173-340-300. ~~Furthermore,~~ iIndependent remedial actions are done at the potentially liable person's own risk and the department may take or require additional remedial actions at these sites at any time. ~~(See WAC 173-340-510.)~~

(b) Remedial action agreements. The department may take remedial actions or order persons to conduct remedial actions under WAC 173-340-540. However, the department encourages agreements for remedial action through consent decrees or agreed orders under WAC 173-340-520 and 173-340-530.

(c) Public participation. The department shall provide the public ~~will receive~~ with notice and an opportunity to comment ~~on~~ at most ~~of the~~ steps in the

cleanup process under WAC 173-340-600. At many sites, a public participation plan ~~will~~ shall be prepared to provide opportunities for more extensive public involvement in the cleanup process. ~~These requirements are described in WAC 173-340-600.~~

WAC 173-340-130 Administrative principles. (1) Introduction. The department shall conduct or require remedial actions consistent with the provisions of this section~~, as typically defined by the subsequent sections~~.

(2) Information sharing. It is the policy of the department to make available information about releases or threatened releases ~~with property~~ to owners, operators, ~~or~~ and other potentially liable persons ~~with potential liability for a site~~ in order to encourage them to conduct prompt remedial action. It is also the policy of the department to make information available to interested members of the public.

~~(3) Information exchange.~~

~~(a) Technical assistance. Persons are encouraged to contact the department and seek assistance on the general administrative and technical requirements of this chapter. The department may provide informal advice and assistance to potentially liable persons at any time during the development of a remedial action. Unless the department is providing formal guidance for the implementation of an order or decree any comments by the department or its agents are advisory and not commitments or approvals binding on the department. A person may not represent this advice as an approval of a remedial action. If the person requesting the advice is seeking binding commitments or approvals an order or consent decree shall be used. The department advises persons requiring site specific legal or technical assistance to hire an attorney or engineering consultant with the appropriate environmental expertise.~~

~~(b) Response to requests. If the department believes that responding to a request for technical assistance would involve substantial time or resources or would not be in the public interest, the department may decline to provide the requested assistance. The department shall inform the requester of its response. The department may require one or more of the following before devoting time to the request:~~

~~(i) A proposed schedule;~~

~~(ii) Payment, in advance, for its costs in responding to the request;~~

~~(iii) Other assurances that the requester is serious about carrying out the provisions of this chapter; or~~

~~(iv) Other information.~~

~~(4)~~ (3) Scope of public participation. The department seeks to encourage public participation in all steps of the cleanup process. The department shall encourage a level of participation appropriate to the conditions at a facility and the level of the public's interest.

~~(5)~~ (4) Scope of information. ~~It is the department's intention that a~~Adequate information ~~will~~ shall be gathered at a site to ~~enable~~ make decisions on appropriate actions. ~~It is also the department's intention that decisions be made once adequate information is obtained.~~ Studies ~~can~~ may be performed and submittals made at varying levels of detail appropriate to the conditions at the site. Steps in the cleanup process may be combined into fewer steps, when appropriate. ~~For example, the department might decide that a study of a small site with minimal ground water impacts need not include as detailed an analysis of the ground water flow system as for a study of a geologically more complex site.~~ Once ~~the department has~~ adequate information has been obtained, ~~it will make~~ cleanup decisions shall be made within the framework provided in this chapter and in site-specific orders or decrees. Flexibility in the scope of investigations and in combining steps may be particularly appropriate for routine cleanup actions.

~~(6) Combining steps. Several steps in the cleanup process may be combined into fewer steps, when appropriate. For example, the department and a potentially liable person may agree that conditions at a site are such that the remedial investigation/feasibility study and remedial design and implementation steps could be combined into a single step.~~

~~(7) Routine cleanup actions. Flexibility in the scope of investigations and in combining steps may be particularly appropriate for routine cleanup actions. For example, the department may decide to approve a routine cleanup action based upon a single investigation that includes a site hazard assessment and a simplified state remedial investigation/feasibility study and engineering design plan.~~

~~(a) A cleanup action may be considered routine if the following criteria are met:~~

~~(i) It involves an obvious and limited choice among cleanup methods;~~

~~(ii) It uses a cleanup method that is reliable and has proven capable of accomplishing cleanup standards;~~

~~(iii) Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow an adequate margin of safety for protection of human health and the environment;~~

~~(iv) The department has experience with similar actions; and~~

~~(v) The action does not require an environmental impact statement.~~

~~(b) Routine cleanup actions consist of or are comparable to one or more of the following remedial actions:~~

~~(i) Cleanup of above-ground structures;~~

~~(ii) Cleanup of below-ground structures;~~

~~(iii) Cleanup of contaminated soils where the action would restore the site to cleanup levels; or~~

~~(iv) Cleanup of solid wastes, including containers.~~

~~(c) Cleanup of ground water will not normally be considered a routine cleanup action.~~

~~(d) A routine cleanup action may be conducted under any of the procedures described in WAC 173-340-510. However, the department will attempt to ensure that all routine cleanup action decisions are consistent with this chapter.~~

(8) (5) Preparation of documents. Except for the initial investigation, any of the studies, reports, or plans used in the cleanup process ~~can~~ may be prepared by either the department or the potentially liable person. The department retains all authority to review and verify the documents submitted and to make decisions based on the documents.

(6) Except for reporting requirements under WAC 173-340-300, nothing in this chapter imposes any requirements on any person unless that person is subject to an order or decree under this chapter. This subsection shall not be construed to diminish the department's authority under WAC 173-340-110.

~~(9)~~ (7) Inter-agency coordination.

(a) The department shall ensure appropriate local, state, and federal agencies and tribal organizations are kept informed and, as appropriate, involved in the development and implementation of remedial actions. The department may require a potentially liable person to undertake this responsibility. If the potentially liable person demonstrates that they are unable to obtain adequate involvement to allow the remedial action to proceed by a particular government agency or tribe, the department shall request the involvement of the agency or tribe.

(b) The nature and degree of coordination and consultation shall be commensurate with the other agencies' and tribes' interest and needs at the site. Interested agencies and tribes shall also be included in the mailing list for public notices under WAC 173-340-600. To facilitate coordination, it is important for the agencies and tribes to provide specific comments, including the identification of additional information needed or mitigating measures that are necessary or desirable to satisfy their concerns.

(c) In order to provide for expeditious cleanup actions, all federal, state, and local agencies, and tribes are encouraged to coordinate when providing notices, holding meetings and hearings, and preparing documents. Whenever reasonable, the department shall coordinate and combine its activities with other agencies and tribes to minimize the duplication of notices, hearings and preparation of documents, unless otherwise prohibited.

~~(10)~~ (8) Appeals. Unless otherwise indicated all department decisions made under this chapter are remedial decisions and may be appealed only as provided for in RCW 70.105D.060.

WAC 173-340-140 Deadlines. (1) Purpose. It is the department's intent to move sites through the cleanup process as expeditiously as possible. However, the department is limited by the amount of personnel and funds it can expend in any given fiscal year. This section is intended to establish reasonable deadlines for remedying releases ~~within these constraints~~. The procedure for setting priorities is described in WAC 173-340-330 and 173-340-340.

(2) Within ninety days of learning of a release or threatened release of a hazardous substance, the department shall complete an initial investigation under WAC 173-340-310.

(3) At least twice a year, the department ~~will~~ shall determine which sites with completed initial investigations are a high priority for further investigation. At that time, the department ~~will~~ shall schedule high priority sites for further investigations to commence within six months. This determination ~~will~~ shall be based on best professional judgment of department staff. Sites may be scheduled for further investigation at any time if the department determines that the site warrants expedited action.

(4) The department shall complete the site hazard assessment and hazard ranking on high priority sites within one hundred eighty days of the scheduled start date. These sites ~~will~~ shall be identified in the ~~department's~~ site register. Sites not designated as a

high priority ~~will~~ shall be scheduled for future investigations and listed in the biennial report to the legislature under ~~(~~WAC 173-340-340~~)~~. The department ~~will~~ shall conduct at least thirty-five site hazard assessments each fiscal year until the number of sites needing site hazard assessments are reduced below this number.

(5) Within thirty days ~~of~~ after ranking, the department shall designate which sites are a high priority for a ~~state~~ remedial investigation/feasibility study and which sites are a lower priority where further action can be delayed. The department shall review these lower priority sites and provide an opportunity for public comment as part of the biennial report to the legislature under ~~(~~WAC 173-340-340~~)~~.

(6) For all sites designated as a high priority the ~~state~~ remedial investigation/feasibility study shall be completed under WAC 173-340-350 within eighteen months ~~of~~ after signing the order or decree. The department may extend the deadline up to twelve months if the circumstances at the site merit a longer timeframe. The department shall provide the public an opportunity to comment on any extension. The department shall initiate a ~~state~~ remedial investigation/feasibility study on at least ten sites per fiscal year.

(7) The department shall select the cleanup action under WAC 173-340-360 and file a consent decree or issue an order for cleanup action for all designated high priority sites within six months of the completion of the ~~state~~ remedial investigation/feasibility study. The department may extend the deadline for up to four months for consent decree and order discussions. The department shall provide the public with an opportunity to comment on any deadline extension.

(8) The department ~~will~~ shall publish site schedules for designated high priority sites in the site register under WAC 173-340-600(6).

PART II — DEFINITIONS AND USAGE

WAC 173-340-200 Definitions. For the purpose of this chapter, the following definitions shall apply:

~~"Act" means the same as the "Model Toxics Control Act" and "chapter 70.105D RCW."~~

"Acute toxicity" means the ability of a hazardous substance to cause injury or death to an organism as a result of a short-term exposure to a hazardous substance.

"Agreed order" means an order issued by the department under WAC 173-340-530 ~~with which the potentially liable person receiving the order agrees to comply. An agreed order may be used to require or approve any cleanup or other remedial actions but it is not a settlement under RCW 70.105D.040(4) and shall not contain a covenant not to sue, or provide protection from claims for contribution, or provide eligibility for public funding of remedial actions under RCW 70.105D.070 (2)(d)(xi).~~

~~"All practicable methods of treatment" means all technologies and/or methods currently available and demonstrated to work under similar site circumstances or through pilot studies, and applicable to the site at reasonable cost. These include "all known available and reasonable methods of treatment" (AKART) for discharges or potential discharges to waters of the state, and "best available control technologies" for releases of hazardous substances into the air resulting from cleanup actions.~~

"Applicable state and federal laws" means all legally applicable requirements and those requirements that the department determines, based on the criteria in WAC 173-340-710(3), are relevant and appropriate requirements.

"Area background" means the concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site which are the result of human activities unrelated to releases from that site.

"Bioconcentration factor" means the ratio of the concentration of a hazardous substance in the tissue of an aquatic organism divided by the hazardous substance concentration in the ambient water in which the organism resides.

"Carcinogen" means any substance or agent that produces or tends to produce cancer in humans. For ~~implementation~~ purposes of this chapter, the term carcinogen ~~will apply~~ applies to substances on the United States Environmental Protection Agency lists of A (known human) and B (probable human) carcinogens, and any substance which causes a significant increased incidence of benign or malignant tumors in a single, well conducted animal bioassay, consistent with the weight of evidence approach specified in the United States Environmental Protection Agency's ~~Guidelines for Carcinogen Risk Assessment~~

~~as set forth in 51 FR 33992 et seq. as presently published or as subsequently amended or republished~~ most recent risk assessment or toxicological guidance. [NOTE: The U.S. Environmental Protection Agency is currently modifying its Guidelines for Carcinogen Risk Assessment. When these changes are finalized, the definition of "carcinogen" will be updated to reflect the current state of the science.]

"Carcinogenic potency factor" or "CPF" means the upper 95th percentile confidence limit of the slope of the dose-response curve and is expressed in units of (mg/kg-day)-1. When derived from human epidemiological data, the carcinogenic potency factor may be a maximum likelihood estimate.

"Chronic reference dose" means an estimate (with an uncertainty spanning an order of magnitude or more) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of adverse effects during a lifetime.

"Chronic toxicity" means the ability of a hazardous substance to cause injury or death to an organism resulting from repeated or constant exposure to the hazardous substance over an extended period of time.

"Cleanup" means the implementation of a cleanup action or interim action.

"Cleanup action" means any remedial action, ~~except~~ other than an interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with WAC 173-340-360.

"Cleanup action alternative" means one or more treatment technologies, engineered controls, institutional controls, or other measures ("cleanup action components") which together address the risks at a site.

"Cleanup action plan" means the document prepared ~~by the department~~ under ~~WAC 173-340-360~~ WAC 173-340-380 which selects the cleanup action and specifies cleanup standards and other requirements for the cleanup action.

"Cleanup level" means the concentration of a hazardous substance in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

~~"Cleanup process" means the process for identifying, investigating, and cleaning up hazardous waste sites under chapter 70.105D RCW.~~

"Cleanup standards" means the standards promulgated under RCW 70.105D.030 (2)(d). Establishing cleanup standards requires specification of the following:

- Hazardous substance concentrations that protect human health and the environment ("cleanup levels");
- The locations on the site where those cleanup levels must be attained ("points of compliance"); and
- Additional regulatory requirements, if any, that apply to a cleanup action because of the type of action and/or the location of the site. These requirements are specified in applicable state and federal laws and are generally established ~~following~~ in conjunction with the selection of a specific cleanup action.

~~"Closure site assessment" means a site assessment required for closure of an underground storage tank pursuant to rules adopted under chapter 90.76 RCW.~~

"Compliance monitoring" means a remedial action that consists of monitoring as described in WAC 173-340-410.

"Commercial property" means properties that are or have been characterized by or are committed to, or are zoned for traditional commercial uses such as retail sales and services, entertainment, warehouses, outdoor storage, and other similar uses.

"CERCLA" means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 41 U.S.C. et seq. (commonly known as Superfund), as presently enacted or as subsequently amended.

"Conceptual site model" means a description of the complete, and potentially complete, exposure pathways at a site.

"Consent decree" or "decree" means a consent decree entered into under WAC 173-340-520.

"Containment" means a container, vessel, barrier, or structure, whether natural or constructed, which confines a hazardous substance within a defined boundary and prevents or minimizes its release into the environment.

"Contaminant" means any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

~~"Curie" means the measure of radioactivity defined as that quantity of radioactive material which decays at the rate of 3.70×10^{10} transformations per second. This decay rate is nearly equivalent to that exhibited by 1 gram of radium in equilibrium with its disintegration products.~~

"Day" means calendar day; however, any document due on the weekend or a holiday may be submitted on the first working day after the weekend or holiday.

~~"Decree" means consent decree under WAC 173-340-520. "Consent decree" is synonymous with decree.~~

"Department" means the department of ecology.

"Developmental reference dose" means an estimate (with an uncertainty of an order of magnitude or more) of an exposure level for the human population, including sensitive subgroups, that is likely to be without an appreciable risk of developmental effects.

"Direct contact" means exposure to hazardous substances through ingestion or dermal contact.

"Director" means the director of ecology or the director's designee.

"Drinking water fraction" means the fraction of drinking water obtained from the site.

"Engineered controls" means the physical measures designed and constructed to prevent or limit exposure to, or the migration of, residual hazardous substances.

"Environment" means any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the state of Washington or under the jurisdiction of the state of Washington.

"Exposure" means subjection of an organism to the action, influence, or effect of a hazardous substance (chemical agent) or physical agent. Exposure is quantified as the amount of the agent available at the exchange boundaries (e.g., skin, lungs, gut) and available for absorption.

"Exposure parameters" means those parameters used to derive an estimate of the exposure to a hazardous substance.

"Exposure pathway" means the path a hazardous substance takes or could take from a source to an exposed organism. An exposure pathway describes the mechanism by which an individual or population is exposed or has the potential to be exposed to hazardous substances at or originating from a site. Each exposure pathway includes an actual or potential source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source of the hazardous substance, the exposure pathway also includes a transport/exposure medium.

"Facility" means any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.

~~"Federal cleanup law" means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. 9601 et seq., as presently promulgated or as subsequently amended or repromulgated.~~

"Fish diet fraction" means the percentage of the total fish or shellfish in an individual's diet that is obtained or has the potential to be obtained from the site.

"Food crop" means any domestic plant which is produced for the purpose of, or may be used in whole or in part for, consumption by people or livestock. This shall include nursery, root, or seedstock to be used for the production of food crops.

"Free product" means a hazardous substance that is present as a nonaqueous phase liquid (that is, liquid not dissolved in water).

"Ground water" means water in a saturated zone or stratum beneath the surface of land or below a surface water.

"Hazard index" means the sum of two or more hazard quotients for multiple hazardous substances and/or multiple exposure pathways.

"Hazardous sites list" means the list of hazardous waste sites maintained under WAC 173-340-330.

"Hazardous substance" means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous substance as defined in RCW 70.105.010(14) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of ~~the federal cleanup law, 42 U.S.C., Sec. 9601(14)~~ CERCLA, 42 U.S.C. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment.

The term hazardous substance does not include ~~any of the following~~ crude oil or any fraction thereof of petroleum when contained in an underground storage tank from which there is not a release~~: Crude oil or any fraction thereof or petroleum,~~ if the tank is in compliance with all applicable federal, state, and local laws.

~~"Hazardous waste site" means any facility where there has been confirmation of a release or threatened release of a hazardous substance that requires remedial action.~~

"Hazard quotient" or **"HQ"** means the ratio of the dose of a single hazardous substance over a specified time period to a reference dose for that hazardous substance derived for a similar exposure period.

"Health effects assessment summary tables" or "HEAST" means the data base of the same name developed by the United States Environmental Protection Agency which provides a summary of information on the toxicity of hazardous substances.

"Highest beneficial use" means the beneficial use of a resource generally requiring the highest quality in the resource. ~~For example, for many hazardous substances, providing protection for the beneficial use of drinking water will generally also provide protection for a great variety of other existing and future beneficial uses of ground water.~~

"Independent remedial actions" means remedial actions conducted without department oversight or approval and not under an order or decree. (See WAC 173-340-515.)

"Indicator hazardous substances" means the subset of hazardous substances present at a site selected under WAC 173-340-708 for monitoring and analysis during any phase of remedial action for the purpose of characterizing the site or establishing cleanup requirements for that site.

"Industrial properties" means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials, that are either:

- Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW (Growth Management Act); or
- For counties not planning under chapter 36.70A RCW (Growth Management Act) and the cities within them, zoned for industrial use and adjacent to properties currently used or designated for industrial purposes.

See WAC 173-340-745 for additional criteria to determine if a land use not specifically listed in this definition would meet the requirement of "traditional industrial use" and for evaluating if a land use zoning category meets the requirement of being "zoned for industrial use."

~~"Inhalation correction factor" means a multiplier that is used to adjust exposure estimates~~

~~based on ingestion of drinking water to take into account exposure to hazardous substances which are volatilized and inhaled during use of the water.~~

"Initial investigation" means a remedial action that consists of an investigation under WAC 173-340-310 ~~to determine that a release or threatened release may have occurred that warrants further action under this chapter~~.

"Institutional controls" means ~~a~~ administrative measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or a cleanup action or result in exposure to hazardous substances at the site.

"Integrated risk information system" or **"IRIS"** means ~~a~~ the data base of the same name developed by the United States Environmental Protection Agency which provides a summary of information on hazard identification and dose-response assessment for specific hazardous substances.

"Interim action" means a remedial action conducted under WAC 173-340-430 ~~that partially addresses the cleanup of a site~~.

"Interspecies scaling factor" means the conversion factor used to take into account differences between animals and humans.

"Legally applicable requirements" means those cleanup standards, standards of control, and other human health and environmental protection requirements, criteria, or limitations promulgated under state or federal law that specifically address a hazardous substance, cleanup action, location, or other circumstances at the site.

"Lowest observed adverse effect level" or **"LOAEL"** means the lowest concentration of a hazardous substance at which there is a statistically or biologically significant increase in the frequency or severity of an adverse effect between a population and a control group.

"Mail" means delivery through the United States Postal Service or an equivalent method of delivery or transmittal, including private mail carriers, or personal delivery.

"Maximum contaminant level" or **"MCL"** means the maximum concentration of a contaminant established by either the Washington state board of health or the United States Environmental Protection Agency under the Federal Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in chapter 248-54 WAC or 40 C.F.R. 141 ~~as presently promulgated or subsequently amended or repromulgated~~.

"Maximum contaminant level goal" or **"MCLG"** means the maximum concentration of a contaminant established by either the Washington state board of health or the United States Environmental Protection Agency under the Federal Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in chapter 248-54 WAC or 40 C.F.R. 141 ~~as presently promulgated or subsequently amended or repromulgated,~~ for which no known or anticipated adverse effects on human health occur, including an adequate margin of safety.

"Method detection limit" or **"MDL"** means the minimum concentration of a compound that can be measured and reported with 99% confidence that the value is greater than zero.

~~"Millirem" or "mrem" means the measure of the dose of any radiation to body tissue in terms of its estimated biological effect relative to a dose received from an exposure to one roentgen (R) of x-rays. One millirem equals 0.001 rem.~~

"Mixed funding" means any funding provided to potentially liable persons from the state toxics control account under WAC 173-340-560.

"Model Toxics Control Act" or **"aAct"** means ~~the act approved by the voters at the November 1988 general election, also known as Initiative 97 (chapter 70.105D RCW)~~ chapter 70.105D RCW, first passed by the voters in the November 1988 general election as Initiative 97.

"Native vegetation" means any plant community native to Washington, which may be determined by reviewing scientific botanical publications such as *Natural Vegetation of Oregon and Washington*, J. F. Franklin and C.T. Dyrness, Oregon State University Press.

"Natural background" means the concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities. For example, several metals naturally occur in the bedrock and soils of Washington state due solely to the geologic processes that formed

these materials and the concentration of these metals would be considered natural background. Also, low concentrations of some particularly persistent organic compounds such as polychlorinated biphenyls (PCBs) can be found in surficial soils and sediment throughout much of the state due to global use of these hazardous substances. These low concentrations would be considered natural background. Similarly, concentrations of various radionuclides which are present at low concentrations throughout the state due to global distribution of fallout from bomb testing and nuclear accidents would be considered natural background.

"Natural person" means any unincorporated individual or group of individuals. The term "individual" is synonymous with "natural person."

"No observed adverse effect level" or **"NOAEL"** means the exposure level at which there are no statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control; some effects may be produced at this level, but they are not considered to be adverse, nor precursors to specific adverse effects.

"Null hypothesis" means an assumption about hazardous substance concentrations at a site when evaluating compliance with cleanup levels established under this chapter. The null hypothesis is that the site is contaminated at concentrations which exceed cleanup levels. This shall not apply to cleanup levels based on background concentrations.

"Order" means an enforcement order issued under WAC 173-340-540 or an agreed order issued under WAC 173-340-530.

"Owner or operator" means any person covered by the definition of "owner or operator" under RCW 70.105D.020(12). ~~with any ownership interest in the facility or who exercises any control over the facility; or in the case of an abandoned facility, any person who had owned, or operated, or exercised control over the facility any time before its abandonment. The term does not include:~~

~~An agency of the state or unit of local government which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or circumstances in which the government involuntarily acquires title. This exclusion does not apply to an agency of the state or unit of local government which has caused or contributed to the release or threatened release of a hazardous substance from the facility; or~~

~~A person who, without participating in the management of a facility, holds indicia of ownership primarily to protect the person's security interest in the facility.~~

"PAHs (carcinogenic)" means those PAHs substances identified as A (known human) or B (probable human) carcinogens by the United States Environmental Protection Agency. These include benzo{[a]}anthracene, benzo{[b]}fluoranthene, benzo{[k]}fluoranthene, benzo{[a]}pyrene, chrysene, dibenzo{[a,h]}anthracene, and indeno{[1,2,3-cd]}pyrene.

"Permanent solution" means a cleanup action in which cleanup standards of WAC 173-340-700 through 173-340-760 can be met without further action being required at the site being cleaned up or any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances.

"Person" means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, state government agency, unit of local government, federal government agency, or Indian tribe.

"Petroleum hydrocarbons" means any fraction of crude oil that is contained in plant condensate, crankcase motor oil, gasoline, aviation fuels, kerosene, diesel motor fuel, benzol, fuel oil, and other products derived from the refining of crude oil, including but not limited to benzene, toluene, ethylbenzene, xylenes, and naphthalenes. For the purposes of this chapter, petroleum hydrocarbons will generally mean those fractions of the above products that are quantified by EPA Methods 8015 or 418.1, analytical methods such as NWTPH-Gx, NWTPH-Dx, volatile petroleum hydrocarbons (VPH) for volatile petroleum fractions, and extractable petroleum hydrocarbons (EPH) for non-volatile petroleum hydrocarbons, as appropriate for the release and the cleanup levels being determined, or other test methods approved by the department. "Petroleum hydrocarbons" does not include materials from plant sources (i.e., biogenics).

"Petroleum hydrocarbon fractions" means groups of petroleum hydrocarbon compounds that share similar physical or chemical properties. A compounds is allocated to a given fraction based on its equivalent carbons (i.e., its boiling point, normalized to the boiling point of the n-alkanes, or its retention time in a boiling point gas chromatographic column). Petroleum hydrocarbon fractions include aliphatic hydrocarbons (which are characterized by straight, branched or cyclic chain arrangement of carbon atoms), and aromatic hydrocarbons (which are characterized by one or more unsaturated cyclic rings typified by benzene).

~~"Picocurie" or "pCi" means 10^{-12} curie.~~

"Point of compliance" means the point or points where cleanup levels established in accordance with WAC 173-340-720 through 173-340-760 shall be attained.

"Polychlorinated biphenyls" or "PCB mixtures" means those aromatic compounds containing two benzene nuclei with two or more substituted chlorine atoms. For the purposes of this chapter, PCBs includes those congeners which are identified using the appropriate analytical methods as specified in WAC 173-340-830.

"Polycyclic aromatic hydrocarbons" or "PAH" means those hydrocarbon molecules composed of two or more fused benzene rings. For the purpose of this chapter, PAHs includes those compounds which are identified and quantified using the appropriate analytical methods as specified in WAC 173-340-830. The specific compounds generally included are acenaphthene, acenaphthylene, fluorene, naphthalene, anthracene, fluoranthene, phenanthrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, pyrene, chrysene, benzo[a]pyrene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, and benzo[ghi]perylene.

"Potentially liable person" means any person whom the department finds, based on credible evidence, to be liable under RCW 70.105D.040.

"Practicable" means ~~(except when used in the phrase "permanent to the maximum extent practicable" which is defined in WAC 173-340-360(5))~~ capable of being designed, constructed and implemented in a reliable and effective manner including consideration of cost. ~~When considering cost under this analysis, an~~ A cleanup action component or alternative shall not be considered practicable if ~~the~~ its incremental costs ~~of the alternative is substantial and~~ are disproportionate to its incremental benefits. Incremental costs are disproportionate to incremental benefits if the incremental cost of the component or alternative over that of another component or alternative exceeds ~~to~~ the incremental degree of ~~protection provided~~ benefits achieved by the component or alternative over ~~other~~ the lower cost component or alternatives.

"Practical quantitation limit" or "PQL" means the lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability during routine laboratory operating conditions, using department approved methods.

"Public notice" means, at a minimum, adequate notice mailed to all persons who have made a timely request of the department and to persons residing in the potentially affected vicinity of the proposed action; mailed to appropriate news media; published in the newspaper of largest circulation in the city or county of the proposed action; and opportunity for interested persons to comment.

"Public participation plan" means a plan prepared under WAC 173-340-600(9) ~~to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.~~

~~"Rad" means that quantity of ionizing radiation that results in the absorption of 100 ergs of energy per gram of irradiated material, regardless of the source of radiation.~~

~~"Radionuclide" means a type of atom which spontaneously undergoes radioactive decay. Radionuclides are hazardous substances under the act.~~

~~"Recovery by products" means any hazardous substance, water, sludge or other materials collected in the free product removal process in response to a release from an underground storage tank.~~

"Reasonable maximum exposure" means the highest exposure that can be reasonably expected to occur for a human or other living organisms at a site under current and potential future site use.

"Reference dose" or "RFD" means a benchmark dose, derived from the NOAEL or LOAEL for a hazardous substance by consistent application of uncertainty factors used to estimate acceptable daily intake doses and an additional modifying factor, which is based on professional judgment when considering all available data about a substance, expressed in units of milligrams per kilogram body weight per day. This includes chronic reference doses, subchronic reference doses, and developmental reference doses.

~~"Regional office" means one of the regional offices of the department of ecology.~~

"Release" means any intentional or unintentional entry of any hazardous substance into the environment, including but not limited to the abandonment or disposal of containers of hazardous substances.

~~"Relevant and appropriate requirements" means those cleanup standards, standards of control, and other human health and environmental requirements, criteria, or limitations established under state and federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, the department determines address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site. The criteria specified in WAC 173-340-710(3) shall be used to determine if a requirement is relevant and appropriate.~~

~~"Rem" means the unit of radiation dose equivalent that is the dosage in rads multiplied by a factor representing the different biological effects of various types of radiation.~~

"Remedial investigation/feasibility study" means a remedial action that consists of activities performed under WAC 173-340-350.

"Remediation level" means the concentration of a hazardous substance in soil, water, air, or sediment above which a particular cleanup action component is required as part of a cleanup action alternative. A remediation level may be established in a variety of ways, including, but not limited to, the consideration of a site-specific risk assessment, evaluation of the effect of institutional and/or engineered controls on fate-and-transport, and/or disproportionate cost analysis. A cleanup action that includes remediation levels and is selected under WAC 173-340-360 constitutes a remedy which is protective of human health and the environment, notwithstanding that hazardous substances may remain on-site at concentrations that exceed cleanup levels.

"Remedy" or "remedial action" means any action or expenditure consistent with the purposes of chapter 70.105D RCW to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment including any investigative and monitoring activities with respect to any release or threatened release of a hazardous substance and any health assessments or health effects studies conducted in order to determine the risk or potential risk to human health.

"Restoration time frame" means the period of time needed to achieve the required cleanup levels at the points of compliance established for the site.

"Risk" means the probability that a hazardous substance, when released into the environment, will cause an adverse effect in exposed humans or other living organisms.

"Routine cleanup action" means a remedial action that consists of a cleanup action meeting the ~~requirements in WAC 173-340-130(7),~~ following criteria:

- Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow an adequate margin of safety for protection of human health and the environment.
- It involves an obvious and limited choice among cleanup action alternatives, and uses an alternative that is reliable, has proven capable of accomplishing cleanup standards, and with which the department has experience.
- The cleanup action does not require preparation of an environmental impact statement.

~~"Safety and health plan" means a plan prepared under WAC 173-340-810.~~

"Sample mean" means the arithmetic mean or the average of a set of measurements. The arithmetic mean is defined as the sum of all measurements divided by the number of measurements.

~~"Sampling and analysis plan" means a plan prepared under WAC 173-340-820.~~

"Saturated zone" means the area below the water table in which all interstices are filled with water.

"Schools" means preschools, elementary schools, middle schools, high schools, and similar facilities, both public and private, used primarily for the instruction of minors.

"Science advisory board" means the advisory board established by the department under RCW 70.105D.030(4).

~~"Secondary maximum contaminant level" means the maximum concentration of a secondary contaminant in water established by the United States Environmental Protection Agency under the Federal Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in 40 C.F.R. 143 as presently promulgated or as subsequently amended or repromulgated.~~

"Semi-native vegetation" means a plant community in which the ecologically dominant species are native to Washington. Vegetated areas not considered native or semi-native vegetation include areas planted for ornamental or landscaping purposes, cultivated crops and areas predominantly covered by noxious, nonnative, exotic plant species or weeds.

"Sensitive environment" means an area of particular environmental value, where a release could pose a greater threat than in other areas including: Wetlands; critical habitat for endangered or threatened species; national or state wildlife refuge; critical habitat, breeding or feeding area for fish or shellfish; wild or scenic river; rookery; riparian area; big game winter range as those areas are designated under applicable state and federal law.

"Site" means the same as facility.

~~"Site characterization report" means a written report describing the site and nature of a release from an underground storage tank, as described in WAC 173-340-450 (4)(b).~~

~~"Site check" means the investigation conducted pursuant to rules adopted under chapter 90.76 RCW in order to confirm a release from an underground storage tank.~~

~~"Site hazard assessment" means a remedial action that consists of an investigation performed under WAC 173-340-320.~~

~~"Site register" means the public information document described in WAC 173-340-600.~~

"Soil" means a mixture of organic and inorganic solids, air, water, and biota which exists on the earth's surface above bedrock, including materials of anthropogenic sources such as slag, sludge, etc.

~~"State remedial investigation/feasibility study" means a remedial action that consists of activities performed under WAC 173-340-350 to collect, develop and evaluate sufficient information regarding a site to enable the selection of a cleanup plan under WAC 173-340-360.~~

~~"Status report" means a written or verbal report on the status of the interim actions taken in response to a release from an underground storage tank, as described in WAC 173-340-450 (4)(b).~~

"Subchronic reference dose" means an estimate (with an uncertainty of an order of magnitude or more) of a daily exposure level for the human population, including sensitive subgroups, that is likely to be without appreciable risk of adverse effects during a portion of a lifetime.

"Surface water" means lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the state of Washington or under the jurisdiction of the state of Washington.

"Surrogate petroleum hydrocarbon" means a petroleum hydrocarbon for which the noncarcinogenic human health effects are representative of the noncarcinogenic human health effects of a defined petroleum hydrocarbon fraction. The reference dose and/or reference concentration of a surrogate petroleum hydrocarbon is attributed to all petroleum hydrocarbons within that fraction for purposes of establishing cleanup standards.

"Technically possible" means capable of being designed, constructed and implemented in a reliable and effective manner, regardless of cost.

"Threatened or endangered species" means species listed as threatened or endangered under the federal

Endangered Species Act, 40 CFR 17.11, or WAC 232-12-297.

"Total excess cancer risk" means the upper bound on the estimated excess cancer risk associated with exposure to multiple hazardous substances and multiple exposure pathways.

"Total petroleum hydrocarbons" or **"TPH"** means the additive total of all petroleum hydrocarbon fractions found in an analytical sample. ~~any fraction of crude oil that is contained in plant condensate, crankcase motor oil, gasoline, aviation fuels, kerosene, diesel motor fuel, benzol, fuel oil, and other products derived from the refining of crude oil. For the purposes of this chapter, TPH will generally mean those fractions of the above products that are quantified by EPA Methods 8015 or 418.1 as appropriate or other test methods approved by the department.~~

"Type I error" means the error made when it is concluded that an area of a site is below cleanup levels when it actually exceeds cleanup levels. This is the rejection of a true null hypothesis.

"Underground storage tank" or **"UST"** means an underground storage tank and connected underground piping as defined in the rules adopted under chapter 90.76 RCW.

~~"Underground storage tank operator" means any underground storage tank operator as defined in the rules adopted under chapter 90.76 RCW.~~

~~"Underground storage tank owner" means any underground storage tank owner as defined in the rules adopted under chapter 90.76 RCW.~~

~~"Underground storage tank release" means a confirmed release from an underground storage tank pursuant to the rules adopted under chapter 90.76 RCW.~~

~~"Unrestricted site use conditions" means restrictions on the use of the site or natural resources affected by releases of hazardous substances from the site are not required to ensure continued protection of human health and the environment.~~

"Upper bound on the estimated excess cancer risk of one in one hundred thousand" means the upper 95th percent confidence limit on the estimated risk of one additional cancer above the background cancer rate per one hundred thousand individuals.

"Upper bound on the estimated excess cancer risk of one in one million" means the upper 95th percent confidence limit on the estimated risk of one additional cancer above the background cancer rate per one million individuals.

"Volatile organic compound" means those carbon-based compounds listed in EPA methods 601, 602, 603, 624, 8010, ~~8015,~~ 8020, 8030, 8240, 502.1, 502.2, 503.1, 524.1, 524.2, and those with similar vapor pressures or boiling points.

~~"Wastewater facility" means all structures and equipment required to collect, transport, treat, reclaim, or dispose of domestic, industrial, or combined domestic/industrial wastewaters.~~

"Wetlands" means lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification, wetlands must have one or more of the following attributes at least periodically, the land supports predominantly hydrophytes; the substrate is predominately undrained hydric soil; and the substrate is nonsoil and saturated with water or covered by shallow water at some time during the growing season each year.

"Wildlife" means any non-human vertebrate animal other than fish.

"Zoned for (a specified) use" means the use is allowed as a permitted or conditional use under the local jurisdiction's land use zoning ordinances. A land use that is inconsistent with the current zoning but allowed to continue as a nonconforming use or through a comparable designation is not considered to be zoned for that use.

~~WAC 173-340-210 Usage. For the purposes of this chapter, the following shall apply:~~

~~(1) Unless the context clearly requires otherwise the use of the singular shall include the plural and conversely.~~

~~(2) The terms "applicable," "appropriate," "relevant," "unless otherwise directed by the department" and similar terms implying discretion mean as determined by the department, with the burden of proof on other persons to demonstrate the requirements are or are not necessary.~~

~~(3) "Approved" means for department conducted or ordered remedial actions, or for potentially liable person conducted cleanups agreed to by the department in an agreed order or decree governing remedial actions at the site.~~

~~(4) "Conduct" means to perform or undertake whether directly or through an agent or contractor, unless this chapter expressly provides otherwise.~~

~~(5) "Include" means included but not limited to.~~

~~(6) "May" means the provision is optional and permissive, and does not impose a requirement.~~

~~(7) "Shall" means the provision is mandatory.~~

~~(8) "Threat" means threat or potential threat.~~

~~(9) "Under" means pursuant to, subject to, required by, established by, in accordance with, and similar expressions of legislative or administrative authorization or direction.~~

PART III — SITE REPORTS AND CLEANUP DECISIONS

WAC 173-340-300 Site discovery and reporting. (1) Purpose. ~~As part of a program to identify hazardous waste sites,~~ tThis section sets forth the requirements for reporting a release of a hazardous substance ~~due to past activities~~ that presents a threat to human health or the environment, whether discovered before or after the effective date of this regulation. It also sets forth the requirements for reporting independent ~~cleanup~~ remedial actions. The department may take any other actions it deems appropriate, ~~to identify potential hazardous waste sites~~ consistent with chapter 70.105D RCW, to identify a release of a hazardous substance that presents a threat to human health or the environment.

(2) Release report. Any owner or operator who has information that a hazardous substance has been released to the environment at the owner or operator's facility and may be a threat to human health or the environment shall report such information to the department ~~by June 1, 1990, or for discovery of releases after this date,~~ within ninety days of discovery. ~~Releases from underground storage tanks as described in the rules adopted under chapter 90.76 RCW must be reported~~ The owner or operator of a UST shall report a release from the UST within twenty-four hours of release confirmation, in accordance with WAC 173-340-450. Persons should use best professional judgment, including consideration of the potential for exposure to the release and the toxicity and amount of hazardous substance released, in deciding whether a discovered release may pose a threat to human health or the environment. To the extent known, the report shall include:— ~~T~~the identification and location of the hazardous substance, circumstances of the release and the discovery, and any remedial actions planned, completed, or underway. ~~All o~~Other persons are encouraged to report such information to the department.

(3) Exemptions. (a) The following releases are exempt from ~~these notification~~ the requirements of this section:

~~(a)~~ (i) Application of pesticides and fertilizers for their intended purposes and according to label instructions;.

~~(b)~~ (ii) Lawful and nonnegligent use of hazardous substances by a natural person for personal or domestic purposes;.

~~(c)~~ (iii) A release in accordance with a permit that authorizes the release;.

~~(d)~~ (iv) A release previously reported to the department ~~in fulfillment of a reporting requirement in~~ under this chapter or in another law or regulation;.

(e) A release previously reported to the United States Environmental Protection Agency under section 103(c) of CERCLA, ~~Section 103(c) (~~42 U.S.C. 9603(c)~~)~~;

~~(f)~~ (vi) A release to the air;.

~~(g)~~ (vii) ~~Releases~~ A release discovered in a public water systems regulated by the department of health.; ~~or~~

~~(h)~~ (viii) A release to a permitted wastewater facility.

(b) An exemption from ~~these notification~~ the requirements of this section does not imply a release from liability ~~in future actions by the department.~~

(4) Report of independent actions.

(a) Report. Any person who conducts an independent ~~interim action or cleanup~~ remedial action shall submit a written report to the department within ninety days ~~of the~~ after completion of the action. For the purposes of this section, ~~the department will consider an interim action or cleanup~~ a remedial action is complete if no remedial action other than compliance monitoring has occurred at the site for ninety days. This ~~is~~ does not ~~intended to~~ preclude earlier reporting of such actions. See WAC 173-340-450 for additional requirements for reporting independent ~~interim~~ remedial actions for releases from underground storage tanks.

(b) Contents. The report shall include the ~~information in subsection (2) of this section if not already reported, and~~ results of all site investigations, cleanup actions and compliance monitoring planned or underway. The department may require additional reports on the work performed.

(c) Combined reports. If the independent ~~interim action or cleanup~~ remedial action is completed within ninety days ~~of~~ after discovery, a single written report may be submitted on both the release and the action taken. The reports shall contain the information specified ~~in~~ under subsections (2) and (4) of this section and shall be submitted within ninety days of completion of the ~~interim action or cleanup~~ remedial action.

(d) Notification. The department shall publish in the site register a notice of all reports on independent ~~interim actions and cleanup~~ remedial actions received under this section ~~in the site register~~.

(e) Review. The department shall, as expeditiously as possible, review each report submitted under this section for sites at which a site hazard assessment has been conducted, with priority given to higher ranked sites. The review shall include an evaluation of whether the site qualifies for removal from the hazardous sites list, or whether further action is required.

(5) Department response. Within ninety days of receipt of information under this section, the department shall respond ~~in accordance with~~ under WAC 173-340-310. Receipt of information regarding an independent ~~interim action or cleanup~~ remedial action under subsection ~~(3) or~~ (4) of this section shall not obligate the department to take any action beyond that prescribed in WAC 173-340-310 and subsection (4)(d) of this section. Neither submission of information on independent ~~interim action and cleanup~~ remedial actions nor any response by the department shall release the person submitting the report or any other person from liability. The department reserves all rights to pursue any subsequent action it deems appropriate.

(6) Other obligations. Nothing in this section shall eliminate any obligations to comply with reporting requirements that may exist in a permit or under other laws.

WAC 173-340-310 Initial investigation. (1) Purpose. The purpose of the initial investigation is to determine whether or not a release or threatened release ~~of a hazardous substance~~ may have occurred that warrants further action under this chapter.

(a) Applicability and timing. Whenever the department receives information and has a reasonable basis to believe that there may be a release or a threatened release ~~of a hazardous substance~~ that may pose a threat to human health or the environment, the department shall conduct an initial investigation within ninety days.

(b) Exemptions. The department shall not be required to conduct an initial investigation when:

(i) ~~T~~the circumstances associated with the release or threatened release are known to the department and have previously been or currently are being evaluated by the department or other government agency; ~~or~~

(ii) ~~T~~the release is permitted~~.~~; or

(iii) the release is exempt from reporting under WAC 173-340-300.

(2) Contents. The initial investigation shall include, at a minimum~~:~~, ~~A~~ a site visit and documentation of conditions observed.

(3) Department deferral to others. The department may rely on another government agency or a contractor to the department to conduct an initial investigation on its behalf, provided the department determines such agency or contractor is not suspected to have contributed to the release or threatened release ~~of a hazardous substance~~ and that no conflict of interest exists.

(4) Department decision. (a) Based on the information obtained about the site, the department shall within thirty days of completion of the initial investigation make one or more of the following decisions:

~~(a)~~ (i) A site hazard assessment is required~~;~~.

~~(b)~~ (ii) Emergency remedial action is required~~;~~.

~~(c)~~ (iii) Interim action is required~~;~~ ~~or~~

~~(d)~~ (iv) The site requires no further action under this chapter at this time because either:

~~(i)~~ (A) ~~T~~there has been no release or threatened release of a hazardous substance; or

~~(ii)~~ (B) ~~A~~ a release or threatened release of a hazardous substance has occurred, but in the department's judgment, does not pose a threat to human health or the environment; or

~~(iii)~~ (C) ~~A~~action under another authority is appropriate.

(b) A decision for a particular follow-up action does not preclude the department from requiring some

other action in the future based on reevaluation of the site or additional information.

(c) If the department determines that an emergency remedial action or interim action is required, notification of the threat to the potentially affected vicinity may be required by the department. The method and nature of the notification and the individuals to be notified shall be determined on a case-by-case basis. Such notification shall be the responsibility of the site owner or operator if required in writing by the department.

(5) Early notice letter.

(a) ~~For sites requiring further remedial action under chapter 70.105D RCW, t~~The department ~~will~~ shall notify the owner, and operator, of its decision under subsection (4) of this section as soon as practicable. ~~and~~ In addition, where further remedial action is required, the department shall notify any potentially liable person known to the department of its decision under subsection (4) of this section as soon as practicable. This letter may be combined with the notice in WAC 173-340-500.

(b) Where further remedial action is required, ~~T~~the notification required under this subsection shall be a letter mailed to the person which includes:

(i) The basis for the department's decision;

(ii) Information on the cleanup process provided for in this chapter;

(iii) A statement that it is the department's policy to work cooperatively with persons to accomplish prompt and effective cleanups;

(iv) A person or office of the department to contact regarding the contents of the letter; ~~and~~

(v) A statement that the letter is not a determination of liability and that cooperating with the department in planning or conducting a remedial action is not an admission of guilt or liability.

(6) Nothing in this section shall preclude the department from taking or requiring appropriate remedial action at any time.

WAC 173-340-320 Site hazard assessment. (1) Purpose. The purpose of the site hazard assessment is to provide sufficient sampling data and other information to:

(a) ~~C~~confirm or rule out that a release or threatened release ~~of a hazardous substance~~ has occurred;

(b) ~~T~~o identify the hazardous substance and provide some information regarding the extent and concentration of the substance;

(c) ~~I~~identify site characteristics that could result in the hazardous substance entering and moving through the environment;

(d) ~~E~~evaluate the potential for the threat to human health and the environment; and

(e) ~~D~~determine the hazard ranking of the site under WAC 173-340-330, if appropriate.

(2) Timing. ~~Unless otherwise directed by the department,~~ Generally, a site hazard assessment shall be completed before proceeding to any subsequent phase of remedial action, other than an emergency or interim action.

(3) Administrative options. The site hazard assessment may be conducted under any of the procedures described in WAC 173-340-510.

(4) Scope and content. A site hazard assessment is an early study to provide preliminary data regarding the relative potential hazard of the site. A site hazard assessment is not intended to be a detailed site characterization; however, it shall include sufficient sampling, site observations, maps, and other information needed to meet the purposes specified in subsection (1) of this section. To fulfill this requirement, a site hazard assessment shall include, as appropriate, the following information:

(a) Identification of hazardous substances, including what was released and is threatened to be released and/or, if known, what products of decomposition, recombination, or chemical reaction are currently present on site, and an estimate of their quantities and concentrations;

(b) Evidence confirming a release or threatened release ~~of hazardous substances to the environment~~;

(c) Description of facilities containing releases, if any, and their condition;

(d) Identification of the location of all areas where a hazardous substance is known or suspected to be, indicated on a site map;

(e) Consideration of surface water run-on and run-off and the hazardous substances' leaching potential;

(f) Preliminary characterization of the subsurface and ground water actually or potentially affected by the release, including vertical depth to ground water and distance to nearby wells, bodies of surface water, and drinking water intakes;

(g) Preliminary evaluation of receptors, including: ~~H~~human population, food crops, recreation areas,

parks, sensitive environments, irrigated areas, and aquatic resources currently or potentially affected by ground water, air, or surface water containing the ~~release of~~ hazardous substances at the site, including distances to these receptors.~~; and~~

(h) Any other physical factors which may be significant in estimating the potential or current exposure to sensitive biota.

(5) Guidance. The department shall make available guidance for how to conduct a site hazard assessment to meet the requirements of this section.

(6) Results. Based on the results of the site hazard assessment and other available information about the site, the department shall either determine that the site warrants no further action using the criteria in WAC 173-340-310(4)(d) or proceed with ranking and placing the site on the hazardous sites list under WAC 173-340-330.

~~(6)~~ (7) Notification. The department shall make available the results of the site hazard assessment to the site's owner and operator and any person who has received a potentially liable person status letter under WAC 173-340-500 regarding the site. If the department finds after a site hazard assessment that the site requires no further action, it shall publish this decision in the site register.

WAC 173-340-330 Hazard ranking and ~~H~~hazardous sites list. (1) Purpose. The department shall maintain a list of sites where it has determined that remedial action ~~has been determined by the department to be~~ is necessary. ~~This hazardous sites list shall fulfill the department's responsibilities under RCW 70.105D.030 (2)(b) and (3).~~ From this list, the department shall select those sites where action is anticipated and include those in the biennial program report. ~~(See WAC 173-340-340.)~~

(2) Hazard ranking. The department shall give a hazard ranking to ~~S~~sites placed on the list ~~shall be given a hazard ranking~~. The purpose of hazard ranking is to estimate, based on the information compiled during the site hazard assessment, the relative potential risk posed by the site to human health and the environment. This assessment considers air, ground water, and surface water migration pathways, human and nonhuman exposure targets, properties of the substances present, and the interaction of these variables.

(a) The department shall evaluate each site on a consistent basis using the procedure described in the *"Washington Ranking Method Scoring Manual,"* publication number 90-14, dated April 1992. The ranking procedure and major amendments to the manual shall be reviewed by the science advisory board established under chapter 70.105D RCW. Information obtained in the site hazard assessment, plus any additional data specified in the manual, shall be included in the hazard ranking evaluation.

(b) The department shall periodically provide notification of the results of hazard ranking in the site register ~~established under WAC 173-340-600~~. The department shall make available hazard ranking results for each site to the site owner and operator and any potentially liable person known to the department prior to ~~publishing~~ publication in the site register.

(c) The department may at its discretion re-rank a site if, prior to the initiation of state action at the site, the department receives additional information within the scope of the evaluation criteria which indicates that a significant change in rank may result.

(3) Listing.

(a) Sites shall be placed on the hazardous sites list if, after the completion of a site hazard assessment, the department ~~has determined~~ determines that further action is required at the site. The list shall be updated at least once per year. Placement of a site on the hazardous sites list does not, by itself, imply that persons associated with the site are liable under chapter 70.105D RCW.

(b) The hazardous sites list shall also reflect the current status of remedial action at each site. The department may change a site's status to reflect current conditions. The status for each site shall be identified as one of the following:

(i) Sites awaiting further remedial action~~;~~.

(ii) Sites with remedial action in progress~~;~~.

(iii) Sites where a cleanup action has been conducted but confirmational monitoring is underway~~;~~.

(iv) Sites with independent remedial actions~~; or~~

(v) Other categories established by the department.

(4) Removing sites from the list.

(a) The department may remove a site from the list only after it has determined that:

(i) All remedial actions except confirmational monitoring and/or institutional controls have been completed and compliance with the cleanup standards has been achieved at the site; or

(ii) The listing was erroneous.

(b) A site owner, operator, or potentially liable person may request that a site be removed from the list by submitting a petition to the department. The petition

shall include thorough documentation of all investigations performed, all cleanup actions taken (including institutional controls), and of adequate compliance monitoring to demonstrate to the department's satisfaction that one of the conditions in (a) of this subsection has been met. The department may require payment of costs incurred, including an advance deposit, for review and verification of the work performed. The department shall review such petitions; however, the timing of the review shall be at its discretion and as resources may allow.

(c) The department ~~will~~ shall maintain a record of sites that have been removed from the list under (a)(i) of this subsection. The record shall identify which sites have institutional controls under WAC 173-340-440 and which are subject to periodic review under WAC 173-340-420. This record will be made available to the public upon request.

(5) Relisting of sites. The department may relist a site which has previously been removed if it determines that the site requires further remedial action.

(6) Notice. The department shall provide public notice and an opportunity to comment when the department proposes to remove a site from the list. Additions to the list, changes in site status, and removal from the list shall be published in the site register.

WAC 173-340-340 Biennial program report. (1) Before November 1 of each even-numbered year, the department shall prepare a biennial program report for the legislature containing its plan for conducting remedial actions for the following two fiscal years. This report shall identify the projects and expenditures recommended for appropriation from both the state and local toxics control accounts. In determining which sites the department shall consider for planned action, emphasis shall be given to sites posing the highest risk to human health and the environment, as indicated by a site's hazard ranking. The department may also consider other factors in setting site priorities. After legislative action and any revisions, this report shall become the department's biennial program plan.

(2) The department shall provide public notice and a hearing on the proposed plan. For purposes of this subsection only, public notice shall consist of mailings to all persons who have made a timely request and to appropriate news media, and publication in the state register. Notice shall also be provided in the site register. The public comment period on the proposed plan shall run for at least thirty days from the date of the publication in the site register.

WAC 173-340-350 ~~State r~~Remedial investigation and feasibility study. (1) Purpose. The purpose of a ~~state~~ remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to ~~enable the selection of~~ select a cleanup action under WAC 173-340-360.

(2) Timing. Unless otherwise directed by the department, a ~~state~~ remedial investigation/feasibility study shall be completed before selecting a cleanup action under WAC 173-340-360, except for an emergency or interim action.

(3) Administrative options. A ~~state~~ remedial investigation/feasibility study may be conducted under any of the procedures described in WAC 173-340-510.

(4) Reporting requirements. For remedial actions conducted by the department or under an order or decree, a report shall be prepared at the completion of the remedial investigation/feasibility study. Additionally, the department may require reports to be submitted following discrete elements of the remedial investigation/feasibility study. Reports prepared under this subsection and under an order or decree shall be submitted to the department for review and approval. For independent remedial actions, any reports that are prepared under this section shall be submitted as required under WAC 173-340-300(4).

~~(4)~~ (5) Public participation. Public participation will be accomplished in a manner consistent with WAC 173-340-600.

~~(5)~~ (6) Scope. The scope of a ~~state~~ remedial investigation/feasibility study varies from site to site. ~~will~~ depending on the informational needs of the specific facility. This requires that the process remain flexible and be streamlined when possible, ~~with the scope of the state remedial investigation/feasibility study varying from site to site~~ to avoid the collection and evaluation of unnecessary information so that the cleanup can proceed in a timely manner. In appropriate cases, the remedial investigation/feasibility study may depart from the requirements of subsections (7) and (8) of this section, and information may be incorporated by reference to avoid unnecessary duplication. However, in all cases sufficient information must be collected, developed, and evaluated to enable the selection of a cleanup action under WAC 173-340-360. In addition, for facilities on the federal national

priorities list, ~~the state~~ a remedial investigation/feasibility study shall comply with federal requirements.

(7) Remedial investigation.

(a) Purpose. The purpose of the remedial investigation is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup action alternatives. Site characterization may be conducted in one or more phases to focus sampling efforts and increase the efficiency of the remedial investigation. Site characterization activities may be integrated with the development and evaluation of alternatives in the feasibility study, as appropriate.

(b) Scoping activities. The following scoping activities may be taken prior to conducting a remedial investigation, to focus the collection of data and assist the department in making the preliminary evaluation required under the State Environmental Policy Act (see WAC 197-11-256):

(i) Assemble and evaluate existing data on the site, including the results of any interim or emergency actions, initial investigations, site hazard assessments, and other site inspections;

(ii) Develop a conceptual understanding of the potential exposure pathways and migration routes at the site, and a conceptual understanding of the objectives for the cleanup action;

(iii) Begin to identify likely cleanup levels for the site.

(iv) Begin to identify likely cleanup action components that may address the releases at the site;

(v) Consider the type, quality and quantity of data necessary to support selection of a cleanup action;

(vi) Begin to identify likely applicable state and federal laws under WAC 173-340-710.

~~(6)~~ (c) Contents of the remedial investigation. A ~~state~~ remedial investigation~~feasibility study~~ shall include the following information as appropriate:

~~(a)~~ (i) General facility information. General information, including: Project title; name, address, and phone number of project coordinator; legal description of the facility location; dimensions of the facility; present owner and operator; chronological listing of past owners and operators and operational history; and other pertinent information.

~~(b)~~ (ii) Site conditions map. An existing site conditions map which illustrates relevant current site features such as:~~—~~ ~~P~~property boundaries~~;~~, proposed facility boundaries~~;~~, surface topography~~;~~, surface and subsurface structures~~;~~, utility lines~~;~~, well locations~~;~~, and other pertinent information.

~~(c)~~ (iii) Field investigations. Sufficient investigations to characterize the distribution of hazardous substances present at the site, and threat to human health and the environment. Where applicable to the site, these investigations will need to address the following:

~~(i)~~ (A) Surface water and sediments. Investigations of surface water and sediments to characterize significant hydrologic features such as:~~—~~ ~~S~~surface drainage patterns and quantities, areas of erosion and sediment deposition, surface waters, floodplains, and actual or potential hazardous substance migration routes towards and within these features. Sufficient surface water and sediment sampling shall be performed to adequately characterize the areal and vertical distribution and concentrations of hazardous substances. Properties of surface and subsurface sediments which are likely to influence the type and rate of hazardous substance migration, or are likely to affect the ability to implement alternative cleanup actions shall be characterized.

~~(ii)~~ (B) Soils. Investigations to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the soil due to the ~~facility~~ release. Properties of surface and subsurface soils which are likely to influence the type and rate of hazardous substance migration, or which are likely to affect the ability to implement alternative cleanup actions shall be characterized.

~~(iii)~~ (C) Geology and ground water system characteristics. Investigations of site geology and hydrogeology to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the ground water and those features which affect the fate and transport of these hazardous substances. This shall include, as appropriate, the description, physical properties and distribution of bedrock and unconsolidated materials; ground water flow rate and gradient for affected and potentially affected ground waters; ground water divides; areas of ground water recharge and discharge; location of public and private production wells; and ground water quality data.

~~(iv)~~ (D) Air. An evaluation of air quality impacts, including sampling, where appropriate, and information regarding local and regional climatological characteristics which are likely to affect the hazardous substance migration such as:~~—~~ ~~S~~seasonal patterns of

rainfall;, the magnitude and frequency of significant storm events;, temperature extremes;, prevailing wind direction;, and wind velocity.

~~(v)~~ (E) Land use. Information regarding ~~characterizing human populations exposed or potentially exposed to the hazardous substance released from the facility; and~~ present and proposed land and resource uses and zoning for the site and potentially affected areas, and characterizing human and/or ecological populations that are reasonably likely to be exposed or potentially exposed to the release based on such use.

~~(vi)~~ (F) Natural resources and ecology. (I) Information to determine the impact or potential impact of the hazardous substance from the facility on the natural resources and ecology of the area, ~~such as: Sensitive environment, plant and animal species, and other environmental receptors~~ including any information needed to conduct a terrestrial ecological evaluation under WAC 173-340-709.

(II) If it is determined that such an evaluation is not required at the site, the basis for this determination shall be included in the remedial investigation report.

~~(vii)~~ (G) Hazardous substance sources. A description of and sufficient sampling to define the location, quantity, areal and vertical extent, concentration within and sources of waste disposal areas. Where relevant, information on the physical and chemical characteristics, and the biological effects of hazardous substances shall be provided.

~~(viii)~~ (H) Regulatory classifications. Regulatory designations classifying affected air, surface water and ground water, if any.

(iv) Work plans. A sampling and analysis plan, and a safety and health plan shall be prepared as part of remedial investigation/feasibility study activities. These plans shall conform to the requirements specified in this chapter.

(v) Any information required by the department to fulfill the applicable requirements of the State Environmental Policy Act and other applicable laws.

(vi) Other information as required by the department.

(8) Feasibility study.

(a) Purpose. The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site. If site concentrations do not exceed cleanup levels at points of compliance, no further action shall be necessary.

(b) Screening of alternatives that are not reasonable for the site. An initial screening of alternatives to reduce the number of alternatives for the final detailed evaluation may be appropriate. The person conducting the feasibility study may initially identify cleanup action alternatives or components to be screened from detailed evaluation. The department shall make the final determination of which alternatives must be evaluated in the feasibility study. The following cleanup action alternatives or components may be eliminated from the feasibility study:

(i) Alternatives that, based on a preliminary analysis, clearly are unreasonable considering the criteria in WAC 173-340-350(8)(e) and requirements in WAC 173-340-360; and

(ii) Alternatives or components that are not technically possible at the site.

(iii) In screening alternatives, consideration may be given to the applicability of presumptive remedies identified by the U.S. Environmental Protection Agency.

(c) Focusing the feasibility study. The feasibility study may be focused on one or more issues consistent with the conceptual understanding of the site developed as part of the remedial investigation under WAC 173-340-350(7)(b)(ii).

(d) Contents of the feasibility study. A feasibility study shall include the following information as appropriate:

(i) The feasibility study shall include cleanup action alternatives that protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route.

(ii) A reasonable number and type of alternatives shall be included in the feasibility study, taking into account the characteristics and complexity of the facility, including current site conditions and physical constraints.

(iii)(A) Each alternative may consist of one or more cleanup action components, including, but not limited to, components that reuse or recycle the hazardous substances, destroy or detoxify the hazardous substances, immobilize or solidify the hazardous substances, provide for on-site or off-site disposal of the hazardous substances in an engineered, lined and monitored facility, on-site isolation or containment of the hazardous substances with attendant engineering controls, and institutional controls and monitoring.

(B) Alternatives may, as appropriate, include different cleanup action components and different remediation levels for the same component.

(iv) The feasibility study shall include alternatives with the point of compliance throughout the site and may include, as appropriate, alternatives with conditional points of compliance.

(v) The feasibility study shall include the results of a terrestrial ecological evaluation if one has been conducted under WAC 173-340-709.

(vi) Alternatives in the feasibility study shall include:

(A)(I) At least one permanent cleanup action alternative, as defined in WAC 173-340-200, to serve as a baseline against which other alternatives shall be evaluated for the purpose of determining whether the remedy is permanent to the maximum extent practicable.

(II) A permanent cleanup action alternative need not be included for landfills, for sites where a model remedy established under WAC 173-340-390 exists, for sites where a permanent alternative is not technically possible, and for sites where the cost of a permanent alternative is so clearly disproportionate that a more detailed analysis is not necessary, as determined in subsection (b) of this section.

(B) A reasonable number of other reasonable alternatives for the site.

(vii) An evaluation of cleanup action alternatives. Each alternative shall be evaluated on the basis of the criteria in subsection WAC 173-340-350 (8)(e), using the procedures in WAC 173-340-360.

(viii) A preferred cleanup action may be identified in the feasibility study, where appropriate.

(e) Evaluation criteria. The following criteria are used to evaluate and compare cleanup action alternatives. Where it is obvious and undisputed that the significant differences between one or more alternatives are primarily with respect to only some of these criteria, the comparison between such alternatives, including a disproportionate cost analysis under WAC 173-340-360(5), may be focused on those criteria.

(i) Protectiveness. Overall protectiveness of human health and the environment including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.

(ii) Permanence. The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.

(iii) Cost. The cost to implement the alternative, including the cost of construction and the net present value of any long-term costs. Long-term costs include, but are not limited to, costs of operation and maintenance, monitoring, and equipment replacement, and agency costs which are cost-recoverable. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.

(iv) Effectiveness over the long-term. Long-term effectiveness includes the degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual risk, and effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degrees of long-term effectiveness: reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.

(v) Management of short-term risks. The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.

(vi) Technical and administrative implementability. Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility

operations and other current or potential remedial actions; and

(vii) Consideration of public concerns. Whether the community has concerns regarding the alternative, and, if so, the extent to which the alternative addresses those concerns.

(9) Other remedial investigation/feasibility study activities.

~~(d)~~ (a) Risk assessment. A site-specific risk assessment may be conducted characterizing the current and potential threats to human health and the environment that may be posed by the release ~~hazardous substances~~at the site for the purpose of establishing cleanup levels, remediation levels, and/or helping to evaluate the residual risk that would exist at a site after implementation of a cleanup action alternative. Where this chapter requires the use of a specified approach, including a formula and default values, for a particular exposure pathway, a risk assessment shall use that approach, except as provided for under WAC 173-340-702 and 173-340-708. ~~This assessment may not be required when the department determines that proposed cleanup standards are obvious and undisputed and allow an adequate margin of safety for protection of human health and the environment.~~

~~(e) Cleanup action alternatives. An evaluation of alternative cleanup actions that protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route, shall be required. The number and types of alternatives to be evaluated shall take into account the characteristics and complexity of the facility. A phased approach for evaluation of alternatives may be required for certain facilities, including an initial screening of alternatives to reduce the number of potential remedies for the final detailed evaluation. The final evaluation of cleanup action alternatives that pass the initial screening shall be evaluated for compliance with the requirements in WAC 173-340-360.~~

~~(f) Work plans. A sampling and analysis plan, and a safety and health plan shall be prepared as part of state remedial investigation/feasibility study activities. These plans shall conform to the requirements specified in this chapter.~~

~~(g)~~ (b) Treatability studies. The department may require treatability studies as necessary to provide sufficient information to develop and evaluate cleanup action alternatives for a site.

~~(h) Any information needed to fulfill the applicable requirements of the State Environmental Policy Act.~~

(c) Compliance with other laws. The department may require that a remedial investigation/feasibility study include additional information or analyses to comply with the State Environmental Policy Act or other applicable laws. This may include information necessary to make a threshold determination (WAC 197-11-335(1)), or information necessary to integrate the remedial investigation/feasibility study with an environmental impact statement (WAC 197-11-262).

(d) Cleanup and remediation levels. Include the appropriate cleanup levels and/or remediation levels for each medium and pathway of concern.

~~(i)~~ (e) Other information. Other information as required by the department.

(10) Flexibility. The remedial investigation/feasibility study activities described in this section include steps that may be conducted sequentially or they may overlap, as appropriate at the site. They may be modified, abbreviated, conducted in a different order, or eliminated, as appropriate at the site.

~~(7) In appropriate cases the department may allow departure from the requirements of subsection (6) of this section and will allow information to be incorporated by reference to avoid unnecessary duplication.~~

~~(8) Report. A report shall be prepared at the completion of the remedial investigation/feasibility study. Additionally, the department may require reports to be submitted following discrete elements of the remedial investigation/feasibility study. Reports prepared under this section and under an order or decree shall be submitted to the department for review and approval.~~

WAC 173-340-360 Selection of cleanup actions. (1) Purpose. This section describes the process for selecting cleanup actions, using the criteria in WAC 173-340-350(8)(e).

~~(a) This section describes the requirements for selecting cleanup actions. It specifies the criteria for approving cleanup actions, the order of preference for cleanup technologies, policies for permanent solutions, the application of these criteria to particular situations, and the process for making these decisions. This section is intended to be used in conjunction with the cleanup standards defined in WAC 173-340-700~~

~~through 173-340-760 and the administrative principles for the overall cleanup process (WAC 173-340-130).~~

~~(b) Because cleanup actions will often involve the use of several cleanup technologies or methods at a single site, the overall cleanup action shall meet the requirements of this section.~~

(2) Threshold requirements.

All cleanup actions conducted under this chapter shall protect human health and the environment; ~~shall~~ comply with cleanup standards ~~(see WAC 173-340-700 through 173-340-760); shall comply with~~ (including applicable state and federal laws), ~~(see WAC 173-340-710);~~ and ~~shall~~ provide for compliance monitoring ~~(see WAC 173-340-410)~~.

(3) Other requirements. In addition, the cleanup action conducted shall:

~~(a)~~ Uuse permanent solutions to the maximum extent practicable, ~~(see WAC 173-340-360 (4), (5), (7), and (8));~~

~~(b)~~ Pprovide for a reasonable restoration time frame, ~~(see WAC 173-340-360(6));~~ and

~~(c)~~ Cconsider public concerns raised during public comment on the draft cleanup action plan. ~~(see WAC 173-340-360 (10) through (13)).~~

~~(4) Cleanup technologies.~~

~~(a) Cleanup of hazardous waste sites shall be conducted using technologies which minimize the amount of untreated hazardous substances remaining at a site. Toward that end, the following technologies for addressing specific hazardous substances or pathways shall be considered in order of descending preference:~~

~~(i) Reuse or recycling;~~

~~(ii) Destruction or detoxification;~~

~~(iii) Separation or volume reduction followed by reuse, recycling, destruction, or detoxification of the residual hazardous substance;~~

~~(iv) Immobilization of hazardous substances;~~

~~(v) On-site or off-site disposal at an engineered facility designed to minimize the future release of hazardous substances and in accordance with applicable state and federal laws;~~

~~(vi) Isolation or containment with attendant engineering controls; and~~

~~(vii) Institutional controls and monitoring.~~

~~(b) A combination of technologies from more than one of the categories under (a) of this subsection may be used at a specific site. For example, the source of the hazardous substance may be recovered and recycled or destroyed, while containment is used to stop the migration of hazardous substances that have reached the ground water.~~

~~(c) Since cleanup actions will often involve a combination of technologies, cleanup action alternatives shall maximize the use of higher preference technologies.~~

~~(d) Ecology does not expect that one type of technology will be used for all sites. The adoption of the technology preferences in this subsection is designed to make it more difficult to select a cleanup action with a low preference without careful explanation of why technologies above it have not been used. As noted in subsection (9) of this section, ecology expects that lower options will be appropriate for some sites.~~

(4) Applicability. Where a release of a hazardous substance at a facility that may be a threat to human health or the environment results in concentrations of such hazardous substance exceeding cleanup level(s) at the point(s) of compliance, a cleanup action shall be evaluated and selected to address the release.

(5) Selection of Ppermanent solutions to the maximum extent practicable.

(a) Applicability. (i) When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. This shall be done by comparing the costs and benefits of the cleanup action alternatives that meet the requirements of WAC 173-340-360 (2) and (3). The costs and benefits to be compared in the disproportionate cost test are the evaluation criteria identified under WAC 173-340-350 (8)(e).

(ii) It shall not be necessary to conduct a disproportionate cost analysis under this subsection, or to conduct a feasibility study under WAC 173-340-350(8), if the department and the potentially liable persons agree that:

(A) the incremental costs of a permanent alternative over that of the lower cost alternatives are not substantial, and

(B) the permanent alternative is identified as the proposed cleanup action in the draft cleanup action plan.

(b) Permanent cleanup action. A permanent cleanup action or solution is defined at WAC 173-340-200.

(c) Disproportionate cost analysis. An alternative is not practicable if its incremental costs are disproportionate to its incremental benefits. Incremental costs are disproportionate to incremental

benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative. Application of the disproportionate cost analysis shall be consistent with the following procedures, although a they may be simplified on a site-specific basis if appropriate:

(i) The alternatives evaluated in the feasibility study shall be ranked from most to least permanent, based on the evaluation of the alternatives under WAC 173-340-350(8)(e)(ii).

(ii) The most practicable permanent solution evaluated in the feasibility study shall be the baseline cleanup action alternative against which cleanup action alternatives are compared. If no permanent solution has been evaluated in the feasibility study, the cleanup action alternative evaluated in the feasibility study that provides the greatest degree of permanence shall be the baseline cleanup action alternative.

(iii) The baseline alternative shall be discarded from further consideration, and the next most permanent alternative shall be the new baseline alternative, if the incremental cost of the baseline alternative over that of the next most permanent alternative exceeds the incremental benefits achieved by the baseline alternative over that next most permanent alternative, or if the baseline alternative provides no incremental benefits over that of a lower cost alternative.

(iv) The comparison of benefits and costs may be quantitative, but will often be qualitative and will often require the use of best professional judgment. In particular, the department has the discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action.

(6) The cleanup action that is determined to be permanent to the maximum extent practicable under this section, must also meet the requirements in WAC 173-340-360 (2) and (3).

~~(b) A permanent solution is one in which cleanup standards can be met without further action being required at the original site or any other site involved with the cleanup action, other than the approved disposal of any residue from preferred treatment technologies under subsection (4)(a)(i) through (iii) of this section.~~

~~(c) In general, technologies which reuse, recycle, destroy, or detoxify hazardous substances will result in permanent solutions if residual hazardous substance concentrations are below cleanup levels established under WAC 173-340-700 through 173-340-760. Containment of hazardous substances and/or institutional controls alone are not permanent solutions. Other technologies, such as immobilization of hazardous substances, may provide permanent solutions under some conditions.~~

~~(d) Ecology recognizes that permanent solutions may not be practicable for all sites. A determination that a cleanup action satisfies the requirement to use permanent solutions to the maximum extent practicable is based upon consideration of a number of factors. The following criteria shall be used to determine whether a cleanup action is "permanent to the maximum extent practicable":~~

~~(i) Overall protectiveness of human health and the environment including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, the degree the cleanup action may perform to a higher level than specific standards in WAC 173-340-700 through 173-340-760, and improvement of the overall environmental quality;~~

~~(ii) Long-term effectiveness including degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual risk, and effectiveness of controls required to manage treatment residues or remaining wastes;~~

~~(iii) Short-term effectiveness including protection of human health and the environment during construction and implementation of the alternative, and the degree of risk to human health and the environment prior to attainment of cleanup standards;~~

~~(iv) Permanent reduction of toxicity, mobility and volume of the hazardous substance including adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated;~~

~~(v) Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction, operations and monitoring, and integration with existing facility operations and other current or potential remedial actions;~~

~~(vi) Cleanup costs. A cleanup action shall not be considered practicable if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action. When selecting from among two or more cleanup action alternatives which have an equivalent level of preference under subsection (4) of this section, preference may be given to the least cost alternative. In performing this evaluation, the top three preferences in subsection (4) of this section shall be considered equivalent unless there are overriding public concerns or technical uncertainties:~~

~~(vii) The degree to which community concerns are addressed.~~

~~(c) To ensure a bias toward permanent solutions, cleanup actions conducted under this chapter including consideration of prior actions at the site shall comply with the following requirements:~~

~~(i) The cleanup action shall prevent or minimize present and future releases and migration of hazardous substances in the environment;~~

~~(ii) The cleanup action shall provide for a net reduction in the amount of a hazardous substance being released from the source area;~~

~~(iii) The cleanup action shall not rely primarily on dilution and dispersion of the hazardous substance if active remedial measures are technically possible;~~

~~(iv) A cleanup action relying primarily on institutional controls and monitoring shall not be used where it is technically possible to implement a cleanup action alternative that utilizes a higher preference cleanup technology for all or a portion of the site; and~~

~~(v) A cleanup action involving off site transport and disposal of hazardous substances without treatment shall not be used if a treatment technology or method exists which will attain cleanup standards and is practicable.~~

~~(6)~~ (7) Restoration time frame.

(a) The cleanup action selected shall provide for a reasonable restoration time frame. The factors to be considered when establishing a reasonable restoration time frame shall include:

(i) Potential risks posed by the site to human health and the environment;

(ii) Practicability of achieving a shorter restoration time frame;

(iii) Current use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;

(iv) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;

(v) Availability of alternative water supplies;

(vi) Likely effectiveness and reliability of institutional controls;

(vii) Ability to control and monitor migration of hazardous substances from the site;

(viii) Toxicity of the hazardous substances at the site; and

(ix) Natural processes which reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.

(b) A longer period of time may be used for the restoration time frame for a site to achieve cleanup levels at the point of compliance if ~~higher preference cleanup technologies in accordance with subsections (4) and (5) of this section~~ more permanent remedies, as determined under WAC 173-340-350(8)(e)(ii), are selected instead of on-site or off-site disposal, isolation, or containment options.

(c) When area background concentrations would result in recontamination of the site to levels which exceed cleanup levels, that portion of the cleanup action which addresses cleanup below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled. In these cases the remedial action shall be considered an interim action until cleanup levels are attained.

(d) Where cleanup levels determined under method C in WAC 173-340-707 are below technically possible concentrations, concentrations that are technically possible to achieve shall be met within a reasonable time frame considering the factors in (a) of this subsection. In these cases the remedial action shall be considered an interim action until cleanup levels are attained.

(e) Extending the restoration time frame shall not be used as a substitute for active cleanup actions, when such actions are practicable.

~~(7)~~ (8) Ground water ~~restoration~~ cleanup actions.

(a) Ground water ~~treatment to~~ cleanup actions shall permanently achieve the cleanup levels ~~in~~ established under WAC 173-340-720 throughout the ground water at and beyond the point of compliance ~~shall be required~~ where such ~~treatment~~ a permanent solution is practicable or where ~~such treatment~~ it is not practicable, but deemed by the department to be in the public interest.

(b) When ~~ground water treatment~~ a permanent ground water solution to achieve the cleanup levels established under WAC 173-340-720 at or beyond the point of compliance ~~within an existing ground water plume~~ is not practicable the following measures shall be taken:

~~(i) Treatment shall be used to reduce the levels to the maximum extent practicable;~~

~~(ii)~~ (i) Ground water containment, including barriers or hydraulic control through ground water pumping or both, shall be implemented to the maximum extent practicable to avoid lateral and vertical expansion of the ground water volume affected by the hazardous substance;.

~~(iii)~~ (ii) Source control measures shall be implemented to prevent or minimize additional releases to the ground water.; including, but not limited to, the removal of petroleum and other light non-aqueous phase liquid free product from the ground water to the maximum extent practicable using normally accepted engineering practices.

~~(iv)~~ (iii) Adequate ground water monitoring to demonstrate control and containment of the hazardous substance shall be conducted.;

~~(v)~~ (iv) The potentially liable person shall provide an alternative water supply or treatment for persons with water supplies rendered unusable by the release.; ~~and~~

~~(vi) The practicability of achieving ground water cleanup levels by treating the ground water affected by the release shall be reevaluated during the periodic review under WAC 173-340-420.~~

~~(c)~~ (v) Appropriate restrictions on the use of ground water shall be placed under WAC 173-340-440 until cleanup levels established under WAC 173-340-720 are achieved.

~~(d) The integrity and continued operation of any treatment or containment system shall be assured in accordance with WAC 173-340-440.~~

~~(8) Containment actions.~~

~~(a) A cleanup action which relies primarily on on-site disposal, isolation, or containment of hazardous substances shall not be conducted if it is practicable to reuse, destroy, or detoxify those substances in a manner that remaining concentrations are below cleanup levels established under WAC 173-340-700 through 173-340-760.~~

~~(b) Long-term monitoring (WAC 173-340-410) and institutional controls (WAC 173-340-440) shall be required if on-site disposal, isolation, or containment is the selected cleanup action for a site or a portion of a site. Such measures shall be required until residual hazardous substance concentrations no longer exceed site cleanup levels established under WAC 173-340-700 through 173-340-760.~~

~~(c) If the proposed cleanup action involves on-site containment, the draft cleanup action plan shall specify the types, levels, and amounts of hazardous substances remaining on-site and the measures that will be utilized to prevent migration and contact with those substances.~~

~~(9)~~ WAC 173-340-370 **Expectations.** ~~Ecology~~ The department has the following expectations for the development of cleanup action alternatives under WAC 173-340-350 and the selection of cleanup actions under WAC 173-340-360~~conducted under this chapter~~. The department recognizes that there may be sites where these expectations are not appropriate:

~~(a)~~ (1) ~~Ecology expects that treatment technologies will be used wherever practicable.~~ Use of treatment technologies should be emphasized at sites containing liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances which lend themselves to treatment;.

~~(b)~~ (2) To minimize the need for long-term management of contaminated materials, ~~ecology~~ the department expects that all hazardous substances will be ~~totally~~ destroyed, detoxified, and/or removed to concentrations below cleanup levels throughout sites containing small volumes of hazardous substances;.

~~(c)~~ (3) ~~Ecology~~ The department recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable;.

~~(d) Ecology expects institutional controls, such as water use restrictions and deed restrictions, will be used to supplement engineering controls in order to prevent or limit exposure to hazardous substances and protect the integrity of the cleanup action.~~

~~(e) Ecology expects that cleanup actions will return useable ground waters to their beneficial uses wherever practicable, within a reasonable time frame. When restoration of ground water to beneficial uses is not practicable, ecology expects to require measures to minimize/prevent further migration, minimize ongoing releases, prevent exposure to contaminated water, and other appropriate measures (see WAC 173-340-360(7)).~~

~~(f)~~ (4) In order to minimize the potential for migration of hazardous substances, ~~ecology~~ the department expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials. When such measures are impracticable, such as during active cleanup, ~~ecology~~ the department expects that site runoff will be contained and treated prior to release from the site;.

~~(g)~~ (5) ~~Ecology~~ The department expects that when hazardous substances remain on-site at concentrations which exceed cleanup levels, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances;.

~~(h)~~ (6) ~~Ecology~~ The department expects that, for facilities adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and ground water discharges in excess of cleanup standards. ~~Ecology expects that dilution will not be the sole method for demonstrating compliance with cleanup standards; and~~

(7) The department expects that degradation of hazardous substances may be appropriate at sites where (a) the migration and cross-media transport of contamination from the source has been controlled to the maximum extent practicable, (b) leaving contaminants onsite during the cleanup action timeframe does not pose an unacceptable threat to human health or the environment, and (c) appropriate monitoring requirements are adopted to ensure that the degradation process is taking place and that human health and the environment are protected.

~~(i)~~ (8) ~~Ecology~~ The department expects that cleanup actions conducted under this chapter will not result in a significantly greater overall threat to human health and the environment than other alternatives.

WAC 173-340-380 Cleanup action plan.

~~(10)~~ (1) Draft cleanup action plan. The department shall issue a draft cleanup action plan for a cleanup actions to be conducted by the department or ~~conducted~~ by a potentially liable person under an order or decree. The level of detail in the draft cleanup action plan shall be commensurate with the complexity of the site and proposed cleanup action.

(a) The draft cleanup action plan shall include each of the following:

(i) A general description of the proposed cleanup action ~~including compliance monitoring;~~ developed in accordance with WAC 173-340-360.

(ii) A summary of the rationale for selecting the proposed alternative.

~~(ii)~~ (iii) A brief summary of other alternative cleanup actions evaluated in the ~~state~~ remedial investigation/feasibility study or comparable documents;.

~~(iii)~~ (iv) ~~Site cleanup levels and points of compliance~~ Cleanup standards for each hazardous substance and for each ~~media~~ medium of concern; at the site.

~~(iv)~~ (v) The schedule for implementation of the cleanup action plan including, if known, restoration time frame;.

~~(v)~~ (vi) ~~Required i~~Institutional controls ~~and site use restrictions~~, if any, ~~for~~ required as part of the proposed cleanup action;.

~~(vi) Justification for selecting a cleanup action that uses cleanup technologies that have a lower preference than higher representative cleanup technologies listed in subsection (4)(a) of this section;~~

(vii) Applicable state and federal laws, if any, for the proposed cleanup action, when these are known at this step in the cleanup process (this does not preclude subsequent identification of applicable state and federal laws);.

(viii) A preliminary determination by the department that the proposed cleanup action will comply with ~~subsections (2) and (3) of this section; and~~ WAC 173-340-360 (2) and (3).

(ix) Where the cleanup action involves on-site containment, specification of the types, levels, and amounts of hazardous substances remaining on site and the measures that will be utilized to prevent migration and contact with those substances.

(b) For routine actions the department may use an order or decree to fulfill the requirements of a cleanup action plan, provided that the information in (a) of this subsection is included therein. The scope of detail for the required information shall be commensurate with the complexity of the site and proposed cleanup action.

~~(11)~~ (2) Public participation. The department will provide public notice and opportunity for comment on the draft cleanup plan as described in WAC 173-340-600.

~~(12)~~ (3) Final plan.

(a) ~~Upon completion of~~ After review and consideration of the comments received during the public comment period, the department, ~~after review~~

~~and consideration of the comments received,~~ shall issue a final cleanup action plan and publish its availability in the site register and by other appropriate methods. If the department determines, following the implementation of the preferred alternative, that the cleanup ~~levels~~ standards established in the cleanup action plan cannot be achieved, the department shall issue public notice of this determination.

~~(12)~~ (b) Federal cleanup sites. A record of decision or order or consent decree prepared under ~~the Federal Cleanup Law~~ CERCLA that provides for a cleanup action may be used by the department to meet the requirements of this section provided:

~~(a)~~ (i) ~~T~~the cleanup action meets the requirements ~~in subsections (2) and (3) of this section~~ under WAC 173-340-360 (2) and (3);

~~(b)~~ (ii) ~~T~~the state has concurred with the cleanup action; and

~~(c)~~ (iii) ~~A~~an opportunity was provided for the public to comment on the cleanup action.

WAC 173-340-390 Model remedies

(1) Purpose. The purpose of model remedies is to streamline and accelerate the selection of cleanup actions that protect human health and the environment, with a preference for permanent solutions to the maximum extent practicable.

(2) Identification of model remedies. The department may, from time to time, identify model remedies for common categories of facilities, types of contamination, types of media, and geographic areas. In identifying a model remedy, the department shall identify the circumstances for which application of the model remedy meets the requirements in WAC 173-340-360 (2) and (3) and is a permanent solution to the maximum extent practicable.

(3) Effect of model remedies. Where a site meets the circumstances identified by the department under subsection (2) of this section, the components of the model remedy may be selected as the cleanup action, or portion of the cleanup action. At such sites, it shall not be necessary to conduct a feasibility study under WAC 173-340-350(8) or a disproportionate cost analysis under WAC 173-340-360(5)(c) for those components or portions of the site to which a model remedy applies.

PART IV — SITE CLEANUP AND MONITORING

WAC 173-340-400 Cleanup actions. ~~Unless otherwise directed by the department, cleanup actions shall comply with this section except for emergencies or interim actions.~~

(1) Purpose. The purpose of this section is to ensure that the cleanup action is designed, constructed, and operated in a manner which is consistent with:

(a) ~~T~~the cleanup action plan;

(b) ~~A~~accepted engineering practices; and

(c) ~~T~~the ~~requirements of~~ appropriate standards applicable to selection of a cleanup action at the site under WAC 173-340-360 ~~(1) and (2)~~.

(2) Applicability. Unless otherwise directed by the department, a person conducting a cleanup action under this chapter pursuant to a decree or order shall comply with this section. This section does not apply to an interim action or emergency action conducted under this chapter.

~~(2)~~ (3) Administrative options. A cleanup action may be conducted under any of the procedures described in WAC 173-340-510.

~~(3)~~ (4) Public participation. During cleanup action implementation, public participation shall be accomplished in a manner consistent with the requirements of WAC 173-340-600.

~~(4)~~ (5) Plans describing the cleanup action. (a) Design, construction, and operation of the cleanup action shall be consistent with the purposes of this section and shall consider relevant information provided by the ~~state~~ remedial investigation/feasibility study. For most cleanups, to ensure this is done it will be necessary to prepare the ~~following~~ engineering documents described in this subsection. The scope and level of detail in these documents may vary from site to site depending on the site specific conditions and nature and complexity of the proposed cleanup action. In ~~some~~ many cases, such as routine cleanups and cleanups at leaking underground storage tanks, it ~~may be~~ is appropriate to combine the information in these various documents into one report to avoid unnecessary duplication. Any document prepared in order to implement a cleanup may be used to satisfy these requirements provided ~~they~~ it contains the required information. In addition, for facilities on the national priorities list, the plans prepared for the cleanup action shall also comply with federal requirements.

~~(a)~~ (b) Engineering design report. The engineering design report shall include sufficient information for the development and review of construction plans and specifications. It shall document engineering concepts and design criteria used for design of the cleanup action. The following information shall be included in the engineering design report, as appropriate:

(i) Goals of the cleanup action including specific cleanup or performance requirements;

(ii) General information on the facility including a summary of information in the ~~state~~ remedial investigation/feasibility study updated as necessary to reflect the current conditions;

(iii) Identification of who will own, operate, and maintain the cleanup action during and following construction;

(iv) Facility maps showing existing site conditions and proposed location of the cleanup action;

(v) Characteristics, quantity, and location of materials to be treated or otherwise managed, including ground water containing hazardous substances;

(vi) A schedule for final design and construction;

(vii) A description and conceptual plan of the actions, treatment units, facilities, and processes required to implement the cleanup action including flow diagrams;

(viii) Engineering justification for design and operation parameters, including: Design criteria, assumptions and calculations for all components of the cleanup action; expected treatment, destruction, immobilization, or containment efficiencies and documentation on how that degree of effectiveness is determined; demonstration that the cleanup action will achieve compliance with cleanup requirements by citing pilot or treatability test data, results from similar operations, or scientific evidence from the literature;

(ix) Design features for control of hazardous materials spills and accidental discharge (for example, containment structures, leak detection devices, run-on and run-off controls);

(x) Design features to assure long-term safety of workers and local residences (for example, hazardous substances monitoring devices, pressure valves, bypass systems, safety cutoffs);

(xi) A discussion of methods for management or disposal of any treatment residual and other waste materials containing hazardous substances generated as a result of the cleanup action;

(xii) Facility specific characteristics which may affect design, construction, or operation of the selected cleanup action, including: Relationship of the proposed cleanup action to existing facility operations; probability of flooding, probability of seismic activity, temperature extremes, local planning and development issues; soil characteristics and ground water system characteristics;

(xiii) A general description of construction testing which will be used to demonstrate adequate quality control;

(xiv) A general description of compliance monitoring which will be performed during and after construction to meet the requirements of WAC 173-340-410;

(xv) A general description of construction procedures proposed to assure that the safety and health requirements of WAC 173-340-810 are met;

(xvi) Any information not provided in the ~~state~~ remedial investigation/feasibility study needed to fulfill the applicable requirements of the State Environmental Policy Act (chapter 43.21C RCW);

(xvii) Any additional information needed to address the applicable state, federal and local requirements, including the substantive requirements identified by the department for any exempted permits; and property access issues which need to be resolved to implement the cleanup action; ~~and~~

(xviii) For sites requiring financial assurance and where not already incorporated into the order or decree, cost calculations and other financial information describing the basis for the amount of financial assurance.

~~(xviii)~~ (xix) Other information ~~as~~ required by the department.

~~(b)~~ (c) Construction plans and specifications. Construction plans and specifications shall detail the cleanup actions to be performed. The plans and specifications shall be prepared in conformance with currently accepted engineering practices and techniques and shall include the following information as applicable:

(i) A general description of the work to be performed and a summary of the engineering design criteria from the engineering design report;

(ii) General location map and existing facility conditions map;

(iii) A copy of any permits and approvals;

(iv) Detailed plans, ~~and procedural~~ procedures and material specifications necessary for construction of the cleanup action;

(v) Specific quality control tests to be performed to document the construction, including specifications for the testing or reference to specific testing methods, frequency of testing, acceptable results, and other documentation methods;.

(vi) Startup procedures and criteria to demonstrate the cleanup action is prepared for routine operation;.

(vii) Additional information to address applicable state, federal, and local requirements, including the substantive requirements identified by the department for any exempted permits.;

(viii) A compliance monitoring plan prepared under WAC 173-340-410 describing monitoring to be performed during construction, and a sampling and analysis plan meeting the requirements of WAC 173-340-820;.

(ix) Provisions to assure safety and health requirements of WAC 173-340-810 are met.; ~~and~~

(x) Other information ~~as~~ required by the department.

~~(c)~~ (d) Operation and maintenance plan. An operation and maintenance plan which presents technical guidance and regulatory requirements to assure effective operations under both normal and emergency conditions. The operation and maintenance plan shall include the following elements, as appropriate:

(i) Name and phone number of the responsible individuals;.

(ii) Process description and operating principles;.

(iii) Design criteria and operating parameters and limits.;

(iv) General operating procedures, including startup, normal operations, operation at less than design loading, shutdown, and emergency or contingency procedures.;

(v) A discussion of the detailed operation of individual treatment units, including a description of various controls, recommended operating parameters, safety features, and any other relevant information;.

(vi) Procedures and sample forms for collection and management of operating and maintenance records.;

(vii) Spare part inventory, addresses of suppliers of spare parts, equipment warranties, and appropriate equipment catalogues;.

(viii) Equipment maintenance schedules incorporating manufacturers recommendations;.

(ix) Contingency procedures for spills, releases, and personnel accidents;.

(x) A compliance monitoring plan prepared under WAC 173-340-410 describing monitoring to be performed during operation and maintenance, and a sampling and analysis plan meeting the requirements of WAC 173-340-820;.

(xi) Description of procedures which assure that the safety and health requirements of WAC 173-340-810 are met, including specification of contaminant action levels and contingency plans, as appropriate;.

(xii) Procedures for the maintenance of the facility after completion of the cleanup action, including provisions for removal of unneeded appurtenances, and the maintenance of covers, caps, containment structures, and monitoring devices.; ~~and~~

(xiii) For sites requiring financial assurance, a copy of the financial assurance document and any procedures for periodic adjustment to the value of the financial assurance mechanism.

~~(xiii)~~ (xx) Other information ~~as~~ required by the department.

(5) In appropriate cases the department may authorize departure from the requirements of subsection (4) of this section, and may allow information to be incorporated by reference to avoid unnecessary duplication.

(6) Permits and approvals and any permit exemption issues, if required for construction or to otherwise implement the cleanup action shall be identified and where possible, resolved prior to, or during, the design phase to avoid delays during construction and implementation of the cleanup action.

(7) Construction. Construction shall be conducted in accordance with the construction plans and specifications, and other plans prepared under this section.

(a) Department inspections.

(i) The department may perform site inspections and construction oversight. The department may require that construction activities be halted at a site if construction or any supporting activities: Are not consistent with approved plans; are not in compliance with environmental regulations or accepted construction procedures; or endanger human health or the environment.

(ii) The department may conduct a formal inspection of the site following construction and an initial operational shake down period to ensure satisfactory completion of the construction. If such an inspection is performed, the construction documentation report and engineer's opinion specified

in (b)(ii) of this subsection shall be available prior to the inspection.

(b) Construction documentation.

(i) ~~All~~ Except as provided for in WAC 173-340-400(8)(b)(iii), all aspects of construction shall be performed under the ~~supervision~~ oversight of a professional engineer registered in the state of Washington or a qualified technician under the direct supervision of a professional engineer registered in the state of Washington, or other individuals whom the department determines are qualified, or as otherwise provided for in RCW 18.43.130. During construction detailed records shall be kept of all aspects of the work performed including construction techniques and materials used, items installed, and tests and measurements performed.

(ii) ~~As-built reports.~~ At the completion of construction the engineer responsible for the ~~supervision~~ oversight of construction shall prepare as built drawings and a report documenting all aspects of facility construction. The report shall also contain an opinion from the engineer, based on testing results and inspections, as to whether the cleanup action has been constructed in substantial compliance with the plans and specifications and related documents.

(iii) For leaking underground storage tanks, the above construction oversight and documentation report may be conducted by an underground storage tank provider certified under WAC 173-36-600 through 173-360-670. Removal of above ground abandoned drums, tanks and similar above ground containers and associated minor soil contamination may be overseen and documented by an experienced environmental professional. In other comparable appropriate cases the department may authorize departure from the requirements of this subsection and may allow information to be incorporated by reference to avoid unnecessary duplication.

(c) Plan modifications. Changes in the design or construction of the cleanup action performed under an order or decree shall be approved by the department.

(8) If the department determines that any plans prepared under this section represent a substantial change from the cleanup action plan, the department shall provide public notice and opportunity for comment under WAC 173-340-600.

(9) Plans or reports prepared under this section and under an order or decree shall be submitted to the department for review and approval.

(10) Waste management. Any waste contaminated by a hazardous substance generated during cleanup activities and requiring off-site treatment, storage or disposal, shall be transported to a facility permitted or approved to handle these wastes.

WAC 173-340-410 Compliance monitoring requirements. (1) Purpose. The purposes of compliance monitoring and evaluation of the data are to:

(a) Protection monitoring. Confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of ~~an interim action or cleanup~~ a remedial action as described in the safety and health plan;

(b) Performance monitoring. Confirm that the interim action or cleanup action has attained cleanup standards and, if appropriate, other performance standards identified by the department pursuant to a decree or order;

(c) Confirmational monitoring. Confirm the long-term effectiveness of the ~~interim action or cleanup~~ remedial action once cleanup standards and, if appropriate, other performance standards have been attained.

(2) General requirements. Compliance monitoring shall be required for all cleanup actions, and may be required for interim and emergency actions, performed under this chapter pursuant to a decree or order.

(3) Compliance monitoring plans. (a) A compliance monitoring plan shall be prepared for all cleanup actions and may be required for interim and emergency actions performed under this chapter pursuant to a decree or order unless otherwise directed by the department. Plans prepared under this section and under an order or decree shall be submitted to the department for review and approval. Protection monitoring may be addressed in the safety and health plan. Performance and confirmational monitoring may be addressed in separate plans ~~and~~ or may be combined with other plans or submittals, such as those in WAC 173-340-400 and 173-340-820.

(b) Compliance monitoring plans may include monitoring for both chemical constituents and physical parameters as appropriate for the site. Where the cleanup action includes engineered controls or institutional controls, the monitoring may include documentation of observations on the performance of these controls. Compliance monitoring plans shall be

specific for the media being tested and shall contain the following elements:

~~(a)~~ (i) A sampling and analysis plan meeting the requirements of WAC 173-340-820 which shall explain in the statement of objectives how the purposes of ~~WAC 173-340-410(2)~~ subsection (1) of this section are met;

~~(b)~~ (ii) Data analysis and evaluation procedures used, to demonstrate and confirm compliance and justification for these procedures, including:

~~(i)~~ (A) A description of any statistical method to be employed; or

~~(ii)~~ (B) If sufficient data is not available prior to writing the plan to propose a reliable statistical method to demonstrate and confirm compliance, a contingency plan proposing one or more reliable statistical methods to demonstrate and confirm compliance, and the conditions under which the methods would be used at the facility; and

~~(c)~~ (iii) Other information ~~as~~ required by the department.

WAC 173-340-420 Periodic review. (1) Review requirement. ~~If the department selects or approves a cleanup action that results in hazardous substances remaining at a site at concentrations which exceed method A or method B cleanup levels established under WAC 173-340-700 through 173-340-760 or if conditional points of compliance have been established, t~~The department shall review ~~the~~ a cleanup action subject to this section no less frequently than every five years after the initiation of such cleanup action to assure that human health and the environment are being protected. Such review shall occur earlier than the five-year period upon the initiative of either the department or a potentially liable person.

(2) Applicability. This section applies to a cleanup action conducted by the department or by a potentially liable person under an order or decree where the cleanup action includes an institutional control required under WAC 173-340-440 or the cleanup level is based on a practical quantitation limit under WAC 173-340-707.

~~(2)~~ (3) ~~When evaluating whether human health and the environment are being protected~~ conducting a review under this section, the factors the department shall consider shall include:

(a) The effectiveness of ongoing or completed cleanup actions;

(b) New scientific information for individual hazardous substances or mixtures present at the site;

(c) ~~New~~ Substantial changes in standards or procedures under this chapter and under applicable state and federal laws for hazardous substances present at the site;

(d) Current and projected site and resource uses; and

~~(e) The availability and practicability of higher preference technologies as defined in WAC 173-340-360(4); and~~

~~(f)~~ (e) The availability of substantially improved analytical techniques to evaluate compliance with cleanup levels.

~~(3)~~ (4) Public notice. The department shall publish a notice of all periodic reviews in the site register and provide an opportunity for public comment. The department shall also notify all potentially liable persons known to the department of the results of the periodic review.

(5) Modifications to cleanup action. (a) Upon completion of a review under this section, the department shall modify, or require modifications to, the cleanup action if the department determines thatX

(i) implementation of the cleanup action does not meet the standards and requirements under WAC 173-340-360(2); or

(ii) modifications to the cleanup action will enable the cleanup action to meet the standards and requirements under WAC 173-340-360(2) at a lower cost

~~(4)~~ (b) ~~When the department determines that substantial changes in the cleanup action are necessary to protect human health and the environment at the site,~~ If modifications to the cleanup action adopted under this subsection represent substantial changes in the cleanup action, a revised cleanup action plan shall be prepared. The department shall provide opportunities for public review and comment on the draft cleanup action plan ~~consistent with the requirements in WAC 173-340-360 and 173-340-600~~ as required under WAC 173-340-400(8). The revised cleanup action plan may be prepared under any of the mechanisms described under WAC 173-340-510.

(6) Duration of periodic review. In conducting a review under this section, the department shall determine whether additional reviews are necessary, taking into consideration the factors described under subsection (3) of this section; except that a site that is subject to the review requirements under this section

due to the inclusion in the cleanup action of an institutional control shall remain subject to such requirements until the institutional control is removed under WAC 173-340-440(10).

WAC 173-340-430 Interim actions.

(1) Purpose. The purpose of this section is to describe how certain ~~interim~~ remedial actions can occur prior to the selection and completion of a cleanup action. An interim action is:

(a) ~~An~~ a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more exposure pathways ~~for exposure to a hazardous substance at a facility~~; or

(b) ~~An~~ a remedial action that corrects a problem that may become substantially worse or cost substantially more to address if the action is delayed; or

(c) ~~An~~ a remedial action needed to provide for completion of a site hazard assessment, ~~state~~ remedial investigation/feasibility study or design of a cleanup action.

~~Example. A site is identified where oil based wood preservative has leaked from a tank and is puddled on the ground and is floating on the water table. Run off from adjacent properties passes through the site. Neighborhood children have been seen on the site. In this case, several interim actions would be appropriate prior to fully defining the extent of the distribution of hazardous substances at the site and selecting a cleanup action. These interim actions might consist of removing the tank, fencing the site, rerouting run off, and removing the product puddled on the ground and floating on the water table. Further studies would then determine what additional soil and ground water cleanup would be needed.~~

(2) General requirements.

(a) Interim actions may:

(i) ~~A~~achieve cleanup standards for a portion of the site; or

(ii) ~~P~~provide a partial cleanup, that is, clean up hazardous substances from all or part of the site, but not achieve cleanup standards; or

(iii) ~~P~~provide a partial cleanup of hazardous substances and not achieve cleanup standards, but provide information on how to achieve cleanup standards for a cleanup. ~~For example, demonstration of an unproven cleanup method.~~

(b) Relationship to the cleanup action:

(i) If the cleanup action is known, the interim action shall be consistent with the cleanup action.

(ii) If the cleanup action is not known, the interim action shall not foreclose reasonable alternatives for the cleanup action. This is not meant to preclude the destruction or removal of hazardous substances.

(3) Timing.

(a) Interim actions may occur anytime during the cleanup process. Interim actions shall not be used to delay or supplant the cleanup process. An interim action may be done prior to or in conjunction with a site hazard assessment and hazard ranking. However, sufficient technical information must be available regarding the facility to ensure the interim action is appropriate and warranted.

(b) Interim actions shall be followed by additional remedial actions unless compliance with cleanup standards has been confirmed at the site.

(c) The department shall set appropriate deadlines commensurate with the actions taken for completion of the interim action that is conducted under an order or decree.

(4) Administrative options. ~~Except as provided in WAC 173-340-530, i~~Interim cleanup actions may be conducted under any of the procedures described in WAC 173-340-510.

(5) Public participation will be accomplished in a manner consistent with WAC 173-340-600.

(6) Submittal requirements. Unless otherwise directed by the department and except for underground storage tank releases being addressed under WAC 173-340-450 and emergencies, a report shall be prepared prior to conducting an interim action. Reports prepared under an order or decree shall be submitted to the department for review and approval. Reports shall be of a scope and detail commensurate with the work performed and site-specific characteristics, and shall include, as appropriate:

(a) A description of the interim action and how it will meet the criteria identified in subsections (1) and (2) of this section;.

(b) Information from the applicable subsections of the remedial investigation/feasibility study of WAC 173-340-350, including at a minimum;:

(i) ~~A~~ a description of existing site conditions and a summary of all available data related to the interim action; and

(ii) ~~A~~alternative interim actions considered and an explanation why the proposed alternative was selected;.

(c) Information from the applicable subsections of the design and construction requirements of WAC 173-340-400;,

(d) A compliance monitoring plan meeting the applicable requirements of WAC 173-340-410;,

(e) A safety and health plan meeting the requirements of WAC 173-340-810,; and

(f) A sampling and analysis plan meeting the requirements of WAC 173-340-820.

(7) Construction. Construction of the interim action shall be in conformance with WAC 173-340-400(7) that is conducted under an order or decree.

WAC 173-340-440 Institutional controls. (1) Purpose. Institutional controls are administrative measures undertaken as part of a remedial action to limit or prohibit activities that may interfere with the integrity of ~~an interim action or cleanup~~ the remedial action or result in exposure to hazardous substances at a site.

(2) Applicability. ~~Such measures~~ Institutional controls shall be required ~~to assure both the continued protection of human health and the environment and the integrity of an interim action or cleanup~~ as part of a remedial action ~~in~~ under the following circumstances:

(a) ~~W~~where a ~~cleanup~~ remedial action results in ~~residual concentrations of~~ hazardous substances remaining on-site at concentrations which exceed ~~method A or m~~Method B cleanup levels (or Method A cleanup levels where the cleanup standard is established under Method A), ~~as applicable,~~ established under WAC 173-340-700 through 173-340-760; or

(b) ~~If~~ where a conditional points of compliance ~~have~~ has been established at the site; or

(c) ~~When~~ where the department determines such controls are required to assure the continued protection of human health and the environment or the integrity of the ~~cleanup~~ remedial action.

~~(2) Institutional controls shall not be used as a substitute for cleanup actions that would otherwise be technically possible.~~

(3) Institutional controls include but are not limited to:

(a) Physical measures, such as fences and signs, to limit activities that may interfere with the cleanup action or result in exposure to hazardous substances at the site; ~~and~~

(b) ~~Legal and administrative mechanisms to limit site use or activities and/or to ensure that any physical measures are maintained over time. Examples of limits on site use activities include~~ Use restrictions, such as restricting the use of a property for industrial or commercial purposes or other specified land uses, or placing restrictions on activities such as disturbing a cap or using the ground water.

(c) ~~Examples of maintenance activities include,~~ Maintenance activities such as inspection and repair of monitoring wells, treatment systems, caps or ground water barrier systems.

(d) Educational programs, such as signs, postings, public notices, health advisories, mailings, and similar measures that educate the public and/or employees about site contamination and ways to limit exposure.

(4) Effectiveness. In order for an institutional control to be considered in determining compliance with cleanup standards, the potentially liable person(s) shall demonstrate that an institutional control being applied at a site is effective, both in the long-term and the short-term (as appropriate for the remedial action at the site). This demonstration should be based on quantitative, scientific analysis where appropriate. Nothing in this chapter is intended to limit the ability of property owners to voluntarily employ additional institutional controls, which may or may not be considered in determining compliance with cleanup standards at the discretion of the department.

~~(4)~~ (5) Format.

(a) For properties owned by a person who has been named as a potentially liable person or who has not been named a potentially liable person by the department but meets the criteria in RCW 70.105D.040 for being named a potentially liable person, appropriate institutional controls shall be described in a restrictive covenant on the property. The covenant shall be executed by the property owner and recorded with the register of deeds for the county in which the site is located. This restrictive covenant shall run with the land, and be binding on the owner's successors and assigns.

(b) For properties containing hazardous substances where the owner does not meet the criteria in RCW 70.105D.040 for being a potentially liable person, the department may approve cleanup actions which include restrictive covenants or other legal and/or administrative mechanisms. The use of legal or administrative mechanisms which do not include restrictive covenants is intended to apply to situations where the release has affected properties near the source of the release not owned by a person potentially liable under the act. Examples of such mechanisms

include zoning overlays, placing notices in local zoning or building department records or state lands records, public notices and educational mailings.

~~(5)~~ (6) Where required, the restrictive covenant shall:

(a) Prohibit activities on the site that may interfere with a cleanup action, operation and maintenance, monitoring, or other measures necessary to assure the integrity of the cleanup action and continued protection of human health and the environment;

(b) Prohibit activities that may result in the release of a hazardous substance which was contained as a part of the cleanup action;

(c) Require notice to the department of the owner's intent to convey any interest in the site. No conveyance of title, easement, lease, or other interest in the property shall be consummated by the property owner without adequate and complete provision for the continued operation, maintenance and monitoring of the cleanup action, and for continued compliance with this subsection;

(d) Require the land owner to restrict leases to uses and activities consistent with the restrictive covenant and notify all lessees of the restrictions on the use of the property. This requirement applies only to restrictive covenants imposed after February 1, 1996;

(e) Require notice and approval by the department of any proposal to use the site in a manner which is inconsistent with the restrictive covenant. If the department, after public notice and comment approves the proposed change, the restrictive covenant shall be amended to reflect the change;

(f) Grant the department and its designated representatives the right to enter the property at reasonable times for the purpose of evaluating compliance with the cleanup action plan and other required plans, including the right to take samples, inspect any remedial actions taken at the site, and to inspect records.

~~(6)~~ (7) Local government notification. Prior to a restrictive covenant being established under this chapter, the department shall notify ~~and seek comment from~~ a city or county department with land use planning authority for real property subject to the restrictive covenant. Once a restrictive covenant has been executed, this same department shall be notified and sent a copy of the restrictive covenant. For independent cleanups using restrictive covenants, the person conducting the cleanup shall be responsible for these notifications if required by the department as a condition for issuance under WAC 173-340-515(2) of a written opinion that no further action is required.

~~(7)~~ (8) Financial assurances. The department may require the potentially liable person to provide financial assurances, through a trust fund or equivalent financial mechanism approved by the department, sufficient to cover all costs of operation and maintenance including compliance monitoring and undertaking appropriate corrective measures. ~~It is the department's expectation that~~ Generally, such assurances will be required wherever the cleanup action includes ~~containment and in other appropriate circumstances~~ engineering controls and/or institutional controls, unless the potentially liable person can demonstrate that sufficient financial resources are available and in place to assure the long-term effectiveness of the engineering controls and/or institutional controls.

~~(8) Removal of restrictions. If the residual hazardous substances remaining at the site are subsequently reduced in concentration such that the method A or method B cleanup levels, as applicable, established under WAC 173-340-700 through 173-340-760 are met without a conditional point of compliance, then the owner may request that the restrictive covenant or other restrictions be eliminated. The restrictive covenant or other restrictions shall be removed, if the department, after public notice and opportunity for comment, concurs.~~

(9) Removal of institutional controls. The department shall evaluate the need to maintain an institutional control as part of a periodic review conducted under WAC 173-340-420, or upon the request of any person responsible for maintaining the institutional control. If the department determines that the circumstances giving rise to the need for institutional controls under subsection (2) of this section no longer exist, the person maintaining the institutional control may remove or terminate the control as appropriate.

WAC 173-340-450 Releases from underground storage tanks. (1) Purpose. The purpose of this section is to set forth the requirements for addressing releases which may pose a threat to human health or the environment from USTs ~~defined under chapter 90.76 RCW and rules adopted therein, including heating oil USTs of greater than 1,100 gallons capacity~~.

(a) Releases from USTs exempted under chapter 90.76 RCW and rules adopted therein are still subject to all other requirements of this chapter.

(b) Unless the department requires otherwise, UST owners and UST operators, as defined under chapter 90.76 RCW and rules adopted thereunder, shall comply with the requirements in this section after confirmation of an UST release, as defined under chapter 90.76 RCW and rules adopted thereunder, which may pose a threat to human health or the environment.

(2) Initial response. Within twenty-four hours of the UST release, the UST owner or the UST operator shall perform the following actions:

(a) Report the UST release to the department and other authorities with jurisdiction, in accordance with rules adopted under chapter 90.76 RCW and any other applicable law;

(b) Remove as much of the hazardous substance from the UST as is possible and necessary to prevent further release to the environment;

(c) Eliminate or reduce any fire, explosion or vapor hazards in such a way as to minimize any release of hazardous substances to surface water and ground water; and

(d) Visually inspect any aboveground releases or exposed belowground releases and prevent the hazardous substance from spreading into surrounding soils, ground water and surface water.

(3) Interim actions.

(a) As soon as possible but no later than twenty days following confirmation of an UST release, the UST owner or the UST operator shall perform the following interim actions:

(i) Continue to monitor and mitigate any additional fire and safety hazards posed by vapors or free product which may have migrated from the UST into structures in the vicinity of the site, such as sewers or basements;

(ii) Reduce the threat to human health and the environment posed by contaminated soils that are excavated or discovered as a result of investigation or cleanup activities. Treatment, storage and disposal of soils must be carried out in compliance with all applicable federal, state and local requirements;

(iii) Test for hazardous substances in the environment where they are most likely to be present. Such testing shall be done in accordance with a sampling and analysis plan prepared under WAC 173-340-820. The sample types, sample locations, and measurement methods shall be based on the nature of the stored substance, type of subsurface soils, depth to ground water and other factors as appropriate for identifying the presence and source of the release. If contaminated soil is found in contact with the ground water or soil contamination appears to extend below the lowest soil sampling depth, then testing shall include the installation of ground water monitoring wells to test for the presence of possible ground water contamination. Information gathered for the site check or closure site assessment conducted pursuant to rules adopted under chapter 90.76 RCW, which sufficiently characterizes the releases at the site, may be substituted for the testing required under this paragraph;

(iv) The testing performed under (a)(iii) of this subsection shall include, at a minimum, the following:

~~(A) Benzene, toluene, ethylbenzene, xylene, lead, and total petroleum hydrocarbons where leaded gasoline may be present;~~

~~(B) Benzene, toluene, ethylbenzene, xylene and total petroleum hydrocarbons where unleaded gasoline may be present;~~

~~(C) Total petroleum hydrocarbons and other appropriate indicator hazardous substances where any petroleum product other than gasoline may be present;~~

(A) The concentration(s) of total petroleum hydrocarbons or petroleum hydrocarbon fractions found at the site;

(B) The concentration(s) of the appropriate indicator hazardous substances found at the site, as described under WAC 173-340-708(2)(d)(iii), depending on the type of petroleum product(s) that may be present;

~~(D)~~ (C) The hazardous substance stored and any likely decomposition by-products where a hazardous substance other than petroleum may be present; and

~~(E)~~ (D) Any other tests required by the department; and

(v) Investigate for the presence of free product.

(b) Free product removal. At sites where investigations indicate free product is present, the UST owner or the UST operator shall conduct, as soon as possible after discovery, an interim action to remove the free product while continuing, as necessary, any other actions required under this section. To accomplish this the UST owner or UST operator shall:

(i) Conduct free product removal to the maximum extent practicable and in a manner which minimizes the spread of hazardous substances, by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site. The objective of free product

removal system must be, at a minimum, to stop the free product migration;

(ii) Properly treat, discharge, or dispose of ~~recovery by products~~ any hazardous substance, water, sludge or any other materials collected in the free product removal process in compliance with all applicable local, state, and federal regulations and permits; and

(iii) Handle all flammable products safely to prevent fires and explosions.

(4) Reporting requirements. The following reports are required to be submitted to the department:

(a) Status report. Within twenty days after an UST release, the UST owner or UST operator shall submit a status report to the department. The status report shall identify if known, the types, amounts, and locations of hazardous substances released, how the release occurred, evidence confirming the release, actions taken under subsections (2) and (3) of this section, any planned remedial actions, and any results of work done up to the time of the report. This report may be provided verbally to the department.

(b) Site characterization reports. Within ninety days after release confirmation, unless directed to do otherwise by the department, the UST owner or UST operator shall submit a report to the department about the site and nature of the release. This report shall be submitted to the department in writing and may be combined with the twenty-day status report, if the information required is available at that time. The site characterization report shall include, at a minimum, the following information:

(i) The information required for the status report under (a) of this subsection;

(ii) A site conditions map indicating approximate boundaries of the property, all areas where hazardous substances are known or suspected to be located, and sampling locations. This map may consist of a sketch of the site at a scale sufficient to illustrate this information;

(iii) Available data regarding surrounding populations, surface and ground water quality, use and approximate location of wells potentially affected by the release, subsurface soil conditions, depth to ground water, direction of ground water flow, proximity to and potential for affecting surface water, locations of sewers and other potential conduits for vapor or free product migration, surrounding land use, and proximity to sensitive environments;

(iv) Results of tests for hazardous substances performed under subsection (3)(a)(iii) and (iv) of this section;

(v) Results of the free product investigation required under subsection (3)(a)(v) of this section;

(vi) Results of all completed site investigations, interim actions and cleanup actions and a description of any remaining investigations, cleanup actions and compliance monitoring which are planned or underway; and

(vii) Information on the free product removal efforts at sites where investigations indicate free product is present. This shall include, at a minimum, the following information:

(A) Name of the person responsible for implementing the free product removal measures;

(B) The estimated quantity, type, and thickness of free product observed or measured in wells, boreholes and excavations;

(C) The type of free product recovery system used;

(D) The location of any on-site or off-site discharge during the recovery operation;

(E) The type of treatment applied to, and the effluent quality expected from, any discharge;

(F) The steps taken and planned to obtain necessary permits for any discharge;

(G) Disposition of recovered free product; and

(viii) Any other information required by the department.

(5) ~~State r~~Remedial investigation and feasibility study.

(a) ~~The scope of a state remedial investigation and feasibility study under this chapter will depend on the informational needs at a specific site and will vary from site to site to avoid the collection of unnecessary information. For sites with UST releases, a state remedial investigation and feasibility study must at a minimum address the elements in WAC 173-340-350 (6)(a), (b), (c)(ii), (e)(iii), (e)(v) through (e)(vii) and (e).~~ The provisions of WAC 173-340-350 shall apply to a remedial investigation and feasibility study conducted at sites with UST releases. The department may require additional information when needed to select a cleanup action. Where a remedial action is conducted by a UST owners ~~and~~ or operators under an order or decree, the owner or operator shall conduct a ~~state~~ remedial investigation and, where necessary, a feasibility study for sites where any one of the following conditions exist:

(i) There is evidence that the release has caused hazardous substances to be present in the ground water in excess of the ground water standards promulgated under chapter 90.48 RCW or cleanup ~~levels in~~ standards developed under WAC 173-340-720 ~~(Table 1)~~;

(ii) Free product is found; ~~or~~

(iii) ~~Where~~ A remedial investigation and feasibility study is otherwise required by the department under an order or decree.

~~(b) UST owners and UST operators shall submit the information collected for the state remedial investigation/feasibility study to the department as soon as practicable. The information may be included with other reports submitted under this section.~~

~~(6) If the department determines, based on the results of the remedial investigation/feasibility study or other information, that additional remedial action is required, the department may require the UST owner or the UST operator to submit engineering documents as described in WAC 173-340-400.~~

~~(7) Unless directed to do otherwise by the department, cleanup actions performed by UST owners or UST operators shall comply with cleanup standards, WAC 173-340-700 through 173-340-750 and the requirements for the selection of cleanup actions, WAC 173-340-360.~~

(6) The applicable provisions of WAC 173-340-360 shall be used to select a cleanup action under this chapter at a UST site.

~~(8)~~ (7) Independent cleanup actions. In addition to ~~work performed under subsections (2) through (5), and~~ (7) meeting applicable requirements under subsections (2) through (6) of this section, UST owners or UST operators performing independent cleanup actions shall:

(a) Notify the department of their intention to begin cleanup. This can be included with other reports under this section;

(b) Comply with any conditions imposed by the department under an order or decree to assure adequate protection of human health and the environment; and

(c) Within ninety days of completion of the cleanup action, submit the results of all investigations, interim and cleanup actions and compliance monitoring not previously submitted to the department.

PART V — ADMINISTRATIVE PROCEDURES FOR REMEDIAL ACTIONS

WAC 173-340-500 Determination of status as a potentially liable person. (1) Status letter. The department shall issue a potentially liable person status letter to any person it believes to be potentially liable as provided for in RCW 70.105D.020(8), unless an emergency requires otherwise. Persons will be notified when the department has credible evidence of their potential liability under RCW 70.105D.040 and when the department is ready to proceed with remedial action except for emergencies and initial investigations. The status letter shall be sent by certified mail, return receipt requested, or by personal service.

(2) Contents of letter. The status letter shall provide:

(a) The name of the person the department believes to be potentially liable;

(b) A general description of the location of the facility;

(c) The basis for the department's belief that the person has a relationship to the facility;

(d) The basis for the department's belief that a release or threatened release of a hazardous substance has occurred at the facility and that the release or threatened release poses a threat to human health or the environment;

(e) An indication of the department's intentions regarding enforcement or other actions at the facility; and

(f) The names of other persons to whom the department has sent a status letter.

(3) Opportunity to comment. Any comments shall be submitted in writing to the department within thirty days from the date of receipt by the potentially liable person of the status letter unless the department provides an extension.

(4) Determination of status. If after reviewing any comments submitted, the department concludes that credible evidence supports a finding of potential liability, then the department shall issue a determination of potentially liable person status.

(5) Voluntary waiver. Persons may accept status as a potentially liable person at any time through a voluntary waiver of their right to notice and comment.

(6) Additional potentially liable persons. The department reserves the right to notify additional potentially liable persons at any time, and as resources permit, will facilitate potentially liable persons' efforts to identify additional potentially liable persons. The department shall notify in writing, all persons who

previously received a status letter for the facility whenever additional status letters have been sent.

WAC 173-340-510 Administrative options for remedial actions. (1) Policy. It is the responsibility of each and every liable person to conduct remedial action so that sites are cleaned up well and expeditiously where a release or threatened release of a hazardous substance requires remedial action. ~~Potentially liable persons are encouraged to initiate discussions and negotiations with the department and the office of the attorney general which may lead to an agreement on the remedial action to be conducted with the state of Washington. The department may provide informal advice and assistance on the development of proposals for remedial action, as provided by WAC 173-340-130. Any approval by the department or the state of remedial action shall occur by one of the means described in subsections (2) and (3) of this section.~~

(2) Types of options. Generally, remedial actions under this chapter are conducted either~~X~~

(a) as an independent remedial action under WAC 173-340-515, or

(b) under department oversight pursuant to a consent decree under WAC 173-340-520, an agreed order under WAC 173-340-530, or an enforcement order under WAC 173-340-540.

~~(2) Actions initiated by the potentially liable person. Potentially liable persons may initiate a remedial action, as follows:~~

~~(a) A person may initiate negotiations for a consent decree by submitting a letter under WAC 173-340-520(1).~~

~~(b) A person may request an agreed order by submitting a letter under WAC 173-340-530.~~

~~(3) Action initiated by the department. The department may initiate remedial action by:~~

~~(a) Issuing a letter inviting negotiations on a consent decree under WAC 173-340-520(2); or~~

~~(b) Issuing an enforcement order under WAC 173-340-540.~~

~~(4)~~ (3) Department remedial action. Nothing in this chapter shall preclude the department from taking appropriate remedial action on its own at any time. Except for emergency actions and initial investigations, reasonable effort will be made to notify potentially liable persons prior to the department taking remedial actions for which the recovery of public funds can be sought under RCW 70.105D.050(3).

WAC 173-340-512 Technical Assistance. When requested, the department may provide informal advice and assistance regarding the administrative and technical requirements of this chapter. Such advice or assistance may be provided on a site-specific basis to persons who are conducting or may conduct an independent remedial action, including a written opinion as to whether the action meets the substantive requirements of this chapter and/or whether further remedial action is or will be required. Such advice or assistance is advisory and shall not be binding on the department or the person requesting the advice or assistance. The department may recover certain costs associated with this assistance.

~~(5)~~ WAC 173-340-515 **Independent remedial actions.** (1) Purpose. This section describes the procedures and requirements applicable to independent remedial actions conducted under this chapter. An independent remedial action is a remedial action conducted without department oversight or approval and not under an order or decree.

(2) Policy. Nothing in this chapter shall preclude potentially liable persons from ~~taking~~ conducting an independent remedial action without oversight or approval from the department at sites not in discussions or negotiations for, or under, an order or decree. A potentially liable person may not ~~take~~ conduct an independent remedial action after commencing discussions or negotiations for an agreed order or consent decree unless:

(a) Such action does not foreclose or preempt the remedial actions under discussion or negotiations and such action does not foreclose the selection of cleanup action; or

(b) If the potentially liable person has provided reasonable notice to the department and the department does not object to such action.

(3) Review by the department. (a) The department ~~will~~ shall use the appropriate requirements ~~herein~~ in this chapter to evaluate the adequacy of any independent remedial action ~~performed~~ conducted under this chapter. Persons ~~performing~~ conducting independent remedial actions do so at their own risk and may be required to take additional remedial actions if the department ~~deems~~ determines that such actions are necessary. In such circumstances, the department reserves all of its rights to take actions authorized by law.

(b) Upon completing the review of an independent remedial action report or proposal that is submitted for the department's review and opinion under this section, the department shall take one of the following actions:

(i) Provide a written opinion regarding the adequacy of the remedial actions performed at a site.

(ii) Provide a written opinion regarding the adequacy of the remedial actions performed at the site, and remove the site or a portion of the site from the hazardous sites list if the department has sufficient information to show that the independent remedial actions are appropriate to characterize and address contamination at the site, as provided for in WAC 173-340-330 (4)(b).

(iii) Provide a written opinion describing the deficiencies with the remedial action report or proposal for a remedial action conducted at the site.

(c) In conducting reviews under this subsection, the department shall promote independent remedial actions by delisting sites or portions of sites whenever petitions and supporting documents show that the actions taken are appropriate to characterize and address the contamination at the site.

WAC 173-340-520 Consent decrees. (1)(a) Initiated by potentially liable persons. ~~To~~ A potentially liable person may request a consent decree ~~a person shall~~ by submitting a letter to the department and office of the attorney general via certified mail, return receipt requested, or by personal delivery.

~~(a)~~ (b) Request. The letter shall describe, based on available information:

(i) The proposed remedial action, including the schedule for the work;

(ii) Information which demonstrates that the settlement will lead to a more expeditious cleanup, be consistent with cleanup standards if the remedial action is a cleanup action, and be consistent with any previous orders;

(iii) The facility, including location and boundaries;

(iv) The environmental problems to be addressed including a description of the releases at the facility and the potential impact of those releases to human health and the environment;

(v) A summary of the relevant historical use or conditions at the facility;

(vi) The date on which the potentially liable person will be ready to submit a detailed proposal;

(vii) Any special scheduling considerations for implementing the remedial actions;

(viii) Names of other persons who the person has reason to believe may be potentially liable persons at the facility; and

(ix) A proposed public participation plan. This proposed plan shall be commensurate with the nature of the proposal and site and shall ~~include the elements listed in WAC 173-340-600(8)~~ provide appropriate public participation opportunities under WAC 173-340-600.

~~(b)~~ (c) The letter may include:

(i) A waiver of the procedural requirements of WAC 173-340-500 and acceptance, for purposes of settlement, of potentially liable person status.

(ii) The contents of detailed proposal under (f) of this subsection.

~~(c)~~ (d) Recognizing that the steps of the cleanup process may be combined and may vary by site, the information in the request shall be at the level of detail appropriate to the steps in the process for which the consent decree is requested. ~~For example, a request for a consent decree for a state remedial investigation/feasibility study should generally include the level of information needed for a site hazard assessment, if not already done by the department, so that the department and the public can evaluate the proposed scope of work and relative priority of the site.~~

~~(d)~~ (e) The department may waive part of the letter requirements of (a) of this subsection if the requirements have already been met.

~~(e)~~ (f) Response. The department shall respond to the request within sixty days, unless the department needs additional time to determine potentially liable person status under WAC 173-340-500. This determination will be based in part on a preliminary finding by the department that any resulting consent decree would be in accordance with RCW 70.105D.040 (4)(a). The department may:

(i) Request additional information;

(ii) Accept the request and require the person to submit a detailed written proposal by a specified date; or

(iii) Provide written reasons for denying the request.

(f) Contents of detailed proposal. The proposal shall contain:

(i) A proposed technical scope of work describing the remedial action to be conducted;

(ii) The data, studies, or any other information upon which the settlement proposal is based;

(iii) A statement describing the potentially liable person's ability to conduct or finance the remedial action as described in the proposed scope of work; and

(iv) A schedule for proposed negotiations and implementation of the proposed remedial actions.

~~(g)~~ (h) The department and the office of the attorney general shall determine whether the proposal provides a sufficient basis for negotiations, and shall deliver to the potentially liable person within sixty days following receipt of their proposal a written notice indicating whether or not the proposal is sufficient to proceed with negotiations.

~~(h)~~ (i) Time limits for negotiations. The department shall set the time period and starting date for negotiations. The department and the office of the attorney general shall then negotiate with those potentially liable persons who have received a notice under (e) of this subsection that their proposal was sufficient to proceed with negotiations. Negotiations may address one or more phases of remedial action. The length of the negotiation period specified by the department shall be no less than that proposed by the potentially liable person provided it does not conflict with the deadlines established under WAC 173-340-140.

~~(i)~~ (j) Enforcement stay. (i) Unless an emergency exists, the department will stay any enforcement action under chapter 70.105D RCW, but the duration of such stay shall not exceed one hundred twenty days from the date negotiations begin. The department can withdraw from negotiations if it determines that:

~~(i)~~ (A) Reasonable progress is not being made toward a consent decree acceptable to the department; or

~~(ii)~~ (B) The proposal is inappropriate based on new information or changed circumstances.

(ii) The department may commence ~~with~~ an enforcement action after notifying the potentially liable person, in writing, of its intent to withdraw from negotiations.

(2) State-initiated procedures. When the department believes that a consent decree will be a more expeditious method to achieve remedial action at a facility, it may initiate the procedures set forth in this subsection by sending a letter to the potentially liable person. The letter shall be sent via certified mail, return receipt requested, or by personal service.

(a) The letters may be delivered with potentially liable person status letters issued under WAC 173-340-500. The period for negotiation shall not commence until the thirty-day comment period required by WAC 173-340-500 has expired or the person expressly waives the procedural requirements of WAC 173-340-500.

(b) Contents of letter. The letter shall:

(i) Inform potentially liable person(s) that the department and the attorney general want to begin negotiations which may lead to a consent decree providing for remedial action;

(ii) Propose a draft consent decree and scope of work;

(iii) Define the negotiation process and schedule which shall not exceed ninety days;

(iv) Reference the department's finding under WAC 173-340-500;

(v) Request a written statement of the potentially liable person's willingness to proceed with the negotiation process defined in the letter; and

(vi) Request the names of other persons whom the person has reason to believe may be potentially liable persons at the facility.

(c) The letter may request the potentially liable person to respond, in writing, to the proposed draft consent decree and scope of work prior to initiating the negotiation phase.

(d) Negotiations. The department and the office of the attorney general shall negotiate with potentially liable persons who have indicated to the department a willingness to proceed with the negotiations. The negotiation time frame shall begin from the date the potentially liable person receives the letter under (a).of this subsection unless modified by the department. Negotiations may address one or more phases of remedial action.

(e) Enforcement stay. Unless an emergency exists, the department will stay any enforcement action under chapter 70.105D RCW, but the duration of the stay shall not exceed ninety days from the date negotiations begin. The department can withdraw from negotiations if it determines that:

(i) Reasonable progress is not being made toward a consent decree acceptable to the department; or

(ii) The proposal is inappropriate based on new information or changed circumstances. The department may commence with enforcement action after notifying the potentially liable person, in writing, of its intent to withdraw from negotiations.

(f) Deadline extensions. The department may at its discretion extend the deadline for negotiations established in (b) of this subsection, provided the extension does not exceed thirty days.

(3) Filing a decree. After satisfying the public comment and hearing requirements, the department shall determine whether the proposed settlement negotiated under subsection (1) or (2) of this section, is more expeditious and consistent with cleanup standards established and in compliance with any order issued by the department relevant to the remedial action. After making the requisite findings, the department shall forward the proposed consent decree with the findings required by RCW 70.105D.040(4), to the office of the attorney general. If agreed to by the office of the attorney general, the consent decree will be filed by that office with the appropriate superior court or the federal court having jurisdiction over the matter.

WAC 173-340-530 Agreed orders. (1) Agreed orders may be used for all remedial actions. Since an agreed order is not a settlement, an agreed order shall not provide for mixed funding, a covenant not to sue, or protection from claims for contribution. An agreed order means that the potentially liable person agrees to perform remedial actions at the site in accordance with the provisions of the agreed order and that the department will not take additional enforcement action against the potentially liable person to require those remedial actions specified in the agreed order so long as the potentially liable person complies with the provisions of the order. The department may require additional remedial actions should it deem such actions necessary.

(2) Request.

(a) A potentially liable person may ~~To~~ request an agreed order~~, a person shall~~ by submitting a letter to the department based on available information, describing:

(i) The proposed remedial action including a schedule for the work;

(ii) The facility, including location and boundaries;

(iii) The environmental problems to be addressed, including the releases at the facility and the potential impact of those releases to human health and the environment;

(iv) A summary of the relevant historical use or conditions at the facility;

(v) Names of other persons whom the person has reason to believe may be potentially liable persons at the facility; and

(vi) A proposed public participation plan. This proposed plan shall be commensurate with the nature of the proposal and site and shall ~~include at a minimum the elements listed in WAC 173-340-600(8)~~ provide appropriate public participation opportunities under WAC 173-340-600.

(b) The letter may include a waiver of the procedural requirements of WAC 173-340-500, and acceptance, for purposes of the agreed order, of potentially liable person status.

(c) Recognizing that the basic steps of the cleanup process may be combined and may vary by site, the information in the request shall be at the level of detail appropriate to the step in the process for which the order is requested. ~~For example, a request for an agreed order for a state remedial investigation/feasibility study should generally include the level of information needed for a site hazard assessment, so that the department and the public can evaluate the proposed scope of work and relative priority of the site.~~

(d) The department may waive part of the letter requirements of (a) of this subsection if the requirements have already been met.

(3) Response. The department shall respond to the request within sixty days, unless the department needs additional time to determine potentially liable person status under WAC 173-340-500. The department may:

(a) Request additional information;

(b) Proceed with discussions, if the department believes it is in the public interest to do so; or

(c) Provide written reasons for denying the request.

(4) (a) Discussions on the agreed order shall not exceed sixty days unless the department decides continued discussions are in the public interest.

(b) Unless an emergency exists, the department will stay any enforcement action under chapter 70.105D RCW; however, the duration of such stay shall not exceed sixty days from the date discussions begin. Furthermore, the department can withdraw from discussions if it determines that:

~~(a)~~ (i) Reasonable progress is not being made toward an agreed order acceptable to the department; or

~~(b)~~ (ii) The agreed order is inappropriate based on new information or changed circumstances.

(c) The department may commence ~~with~~ an enforcement action after notifying the potentially liable person in writing of its intent to withdraw from discussions.

(5) Focus of discussions. The focus of discussions for the agreed order shall ordinarily be the technical scope of work and work schedule. This subsection is not intended to preclude discussion on any item. It is intended to convey the expectation that the scope of work and work schedule will be the primary topics of discussion in formulating agreed orders.

(6) When issuing an agreed order, the department shall provide appropriate public participation opportunities under WAC 173-340-600. ~~If the agreed order is for a routine cleanup action and any person requests judicial review, then the applicable consent decree procedures under WAC 173-340-520 will be initiated.~~

(7) Revisions. If the department and the potentially liable person signing the order agree to substantial changes in the order, the department shall provide appropriate additional public notice and opportunity to comment.

WAC 173-340-540 Enforcement orders. The department may issue an enforcement order requiring remedial action after issuing a notice of potentially liable person status letter under WAC 173-340-500. In emergencies, the notice of potentially liable person status may occur concurrently with the issuance of the order. Unless an emergency requires otherwise, the issuance of a potentially liable person status letter shall precede or take place concurrently with the issuance of an enforcement order. Furthermore, except in an emergency, the department shall issue its determination under WAC 173-340-500(4) before an enforcement order can become effective. Failure to comply with an enforcement order may result in substantial liability for costs and penalties as specified in RCW 70.105D.050.

WAC 173-340-545 Private rights of action.

(1) Purpose. The purpose of this section is to facilitate private rights of action and minimize department staff involvement in these actions by providing guidance to potentially liable persons and the court on what remedial actions the department would consider the substantial equivalent of a department-conducted or department-supervised remedial action. In determining substantial equivalence, the department anticipates the requirements in this section will be evaluated as a whole and that a claim would not be disallowed due to omissions that do not diminish the overall effectiveness of the remedial action.

(2) Substantially equivalent remedial actions. For the purposes of this section, the department would consider the following remedial actions to be the substantial equivalent of a department-conducted or department-supervised remedial action.

(a) A remedial action conducted by the department;

(b) A remedial action that has been or is being conducted under an order or decree and the remedial requirements of the order or decree have been satisfied for those portions of the remedial action for which the private right of action is being sought; or

(c) A remedial action that has been conducted as an independent remedial action that includes the following elements:

(i) Information on the site and remedial actions conducted has been reported to the department in accordance with WAC 173-340-300 and 173-340-450, as applicable;

(ii) The department has not objected to the remedial action being conducted or any such objection has been cured as determined by the court;

(iii) Except for emergency remedial actions, prior to conducting a remedial action, reasonable steps have been taken to provide advance public notice under subsection (3) of this section;

(iv) The remedial actions have been conducted substantially equivalent with the technical standards and evaluation criteria described in subsection (4) of this section; and,

(v) For facilities where hazardous substances have been disposed of as part of the remedial action, documentation is available indicating where these substances were disposed of and that this disposal was in compliance with applicable state and federal laws. It is not the intent of this provision to require extensive documentation. If the remedial action results in solid wastes being transported off-site for disposal, it is sufficient to have records indicating the wastes have been disposed of at a permitted solid waste or hazardous waste landfill.

(3) Public notice. (a) This subsection shall be used to determine if reasonable steps have been taken to provide advance public notice under subsection (2)(c)(iii) of this section.

(b) These public notice procedures apply only to remedial actions conducted as independent remedial actions after the effective date of this section. For remedial actions conducted as independent remedial actions prior to the effective date of this section, the department recognizes little or no public notification typically occurred because there were no department-

specified requirements other than the reporting requirements in this chapter. For these actions, this chapter contains no other specific public notice requirements or guidance, and the court will need to determine such requirements, if any, on a case-by-case basis.

(c) For independent remedial actions consisting of site investigations and studies, it is anticipated that public notice would not normally be done since often these early phases of work are to determine if a release even requires an interim action or cleanup action.

(d) For the purposes of this subsection only, unless the court determines other notice procedures are adequate for the site-specific circumstances, the following constitutes adequate public notice for independent remedial actions and supersedes the requirements in WAC 173-340-600:

(i)(A) Except for emergency remedial actions, written notification has been mailed at least fifteen days prior to beginning construction of the interim action or cleanup action to the last known address of the following persons: The department (which shall publish a summary of the notice in the *Site Register*); the local jurisdictional health department/district; the town, city or county with land use jurisdiction; the land owners identified by the tax assessor at the time the action is commenced for that portion of the facility where the remedial action is being conducted; and persons potentially liable under RCW 70.105D.040 known to the person conducting the interim action or cleanup action.

(B) In identifying persons potentially liable under RCW 70.105D.040 who are to be noticed under this provision, the person doing the remedial action need only make a reasonable effort to review information currently readily available. Where the remedial action is complex, written notification prior to beginning detailed design is recommended but not required. For emergency remedial actions, written notice should be provided as soon as practicable;

(ii) The written notice includes: A brief statement describing the releases being remedied and the remedial actions expected to be conducted; the schedule for these remedial actions; and, for persons potentially liable under RCW 70.105D.040 known to the person conducting the remedial actions, a statement that they could be held liable for the costs of remedial actions being conducted; and

(iii) Posting a sign at the site at a location visible to the general public indicating what remedial actions are being conducted and identifying a person to contact for more information. Except for emergency remedial actions this sign should be posted not later than the beginning of construction of any remedial action and should remain posted for the duration of the construction. For emergency remedial actions posting of a sign should be done as soon as practicable.

(e) A notice under this subsection may be combined with any other notice provided under this chapter or other law.

(4) Technical standards and evaluation criteria. (a) This subsection shall be used to determine if the remedial actions have been conducted substantially equivalent with the technical standards and evaluation criteria contained in this chapter.

(b) Where documents are required by the sections referred to under paragraph (d) of this subsection, the documents prepared need not be the same in title or format. Other documents can be used in place of the documents specified in these sections as long as sufficient information is included in the record to serve the same purpose.

(c) When using the sections referred to under paragraph (d) of this subsection to determine substantial equivalence it should be recognized that there are often many alternative methods for cleanup of a facility that would comply with these provisions. When this chapter requires an approval or determination by the department, such approvals or determinations are not necessary for remedial actions to meet the substantial equivalence requirement under this section; however, the remedial action must still be conducted substantially equivalent with the substantive requirements of those provisions.

(d) A remedial action shall be deemed to comply with subsection (2)(c)(iv) of this section if it has been conducted substantially equivalent to the technical standards and evaluation criteria contained in the following sections of this chapter, where such sections apply. In applying these sections, reference should be made to other applicable sections of this chapter as appropriate, with particular attention to WAC 173-340-130 (Administrative principles) and WAC 173-340-200 (Definitions):

(i) WAC 173-340-350 (Remedial investigation and feasibility study);

(ii) WAC 173-340-360 (Selection of cleanup actions);

(iii) WAC 173-340-390 (Model remedies);

(iv) WAC 173-340-400 (Cleanup actions);

(v) WAC 173-340-410 (Compliance monitoring requirements);

(vi) WAC 173-340-430 (Interim actions);

(vii) WAC 173-340-440 (Institutional controls);

(viii) WAC 173-340-450 (Releases from underground storage tanks);

(ix) WAC 173-340-700 through WAC 173-340-760 (Cleanup standards); and

(x) WAC 173-340-810 through WAC 173-340-850 (General provisions).

WAC 173-340-550 Payment of remedial action costs.

(1) Policy. RCW 70.105D.050(3) requires that the state seek to recover the amounts spent by the department for ~~investigative and~~ remedial actions ~~and orders~~. It is the department's intention to recover those costs which are reasonably attributable to the site. Timing of cost recovery for individual sites will be considered on a case-by-case basis, however, the department may demand, and generally requires, payment of costs as they are incurred.

(2) Costs. Each person who is liable under chapter 70.105D RCW is liable for remedial action costs incurred by the department. Remedial action costs are costs reasonably attributable to the site and may include costs of direct activities, support costs of direct activities, and interest charges for delayed payments. The department may send its request for payment to all potentially liable persons who are under an order or decree for the remedial action costs at the site. The department shall charge an hourly rate based on direct staff costs plus support costs. It is the department's intention that the resulting hourly rate charged be less than the hourly rate typically charged by a comparably sized consulting firm providing similar services. The department shall use the following formula for computing hourly rates:

Hourly Rate = DSC + DSC(ASCM) + DSC(PSCM) + DSC(CTA), where

DSC = Direct Staff Costs defined in (a) of this subsection,

ASCM = Agency Support Cost Multiplier defined in (b) of this subsection, and

PSCM = Program Support Cost Multiplier defined in (c) of this subsection

CTA = Citizen Technical Advisor cost multiplier defined in (d) of this subsection

(a) Costs of direct activities are direct staff costs and other direct costs. Direct staff costs (DSC) are the costs of hours worked directly on a contaminated site, including salaries, retirement plan benefits, Social Security benefits, health care benefits, leave and holiday benefits, and other benefits required by law to be paid to, or on behalf of, employees. Other direct costs are costs incurred as a direct result of department staff working on a contaminated site including, for example, costs of: Travel related to the site, printing and publishing of documents about the site, purchase or rental of equipment used for the site, and contracted work for the site.

(b) Agency support costs are the costs of facilities, communications, personnel, fiscal, and other state-wide and agency-wide services. The agency support cost multiplier (ASCM) used shall be the agency indirect rate approved by the agency's federal cognizant agency (which, as of July 1, 1993, was the United States Department of the Interior) for each fiscal year.

(c) Program support costs are the costs of administrative time spent by site managers and other staff who work directly on sites and a portion of the cost of management, clerical, policy, computer, financial, and other support provided by other program staff to site managers and other staff who work directly on sites. Other activities of the toxics cleanup program not included in program support costs include, for example, community relations not related to a specific site, policy development, and a portion of the cost of nonsite management, clerical, policy, computer, financial, and other support staff. The program support cost multiplier (PSCM) used shall be calculated by dividing actual program support costs by the direct staff costs of all hours charged to site related work. This multiplier shall be evaluated at least biennially and any changes published in at least two publications of the *Site Register*. The calculation and source documents used in any revision shall be audited by either the state auditor's office or a private accounting firm. Audit results shall be available for public review. This multiplier shall not exceed 1.0 (one).

(d) The citizen technical advisor cost multiplier is the direct and indirect costs associated with the citizen technical advisor office within the department.

(3) Request for payment. When the department requests payment of remedial action costs it shall provide an itemized statement documenting the costs incurred.

(4) Interest charges. A minimum of twelve percent interest shall accrue on all remedial action costs not paid within ninety days of the billing date, or within

another longer time period designated by the department.

~~(5) Private rights of action. The purpose of this subsection is to facilitate private rights of action and minimize department staff involvement in these actions by providing guidance to potentially liable persons and the court on what remedial actions the department would consider the substantial equivalent of a department conducted or department supervised remedial action. In determining substantial equivalence, the department anticipates the requirements in this section will be evaluated as a whole and that a claim would not be disallowed due to omissions that do not diminish the overall effectiveness of the remedial action. For the purposes of this section, the department would consider the following remedial actions to be the substantial equivalent of a department conducted or department supervised remedial action.~~

~~(a) A remedial action conducted by the department;~~

~~(b) A remedial action that has been or is being conducted under an order or decree and the remedial requirements of the order or decree have been satisfied for those portions of the remedial action for which the private right of action is being sought; or~~

~~(c) A remedial action that has been conducted as an independent remedial action that includes the following elements:~~

~~(i) Information on the site and remedial actions conducted has been reported to the department in accordance with WAC 173-340-300 and 173-340-450, as applicable;~~

~~(ii) The department has not objected to the remedial action being conducted or any such objection has been cured as determined by the court;~~

~~(iii) Except for emergency remedial actions, prior to conducting an interim action or cleanup action, reasonable steps have been taken to provide advance public notice. The notice may be combined with any notices under another law. These public notice procedures apply only to interim actions or cleanup actions conducted as independent remedial actions after the effective date of this section. For interim actions or cleanup actions conducted as independent remedial actions prior to the effective date of this section, the department recognizes little or no public notification typically occurred because there were no department specified requirements other than the reporting requirements in this chapter. For these actions, this chapter contains no other specific public notice requirements or guidance, and the court will need to determine such requirements, if any, on a case-by-case basis. For independent remedial actions consisting of site investigations and studies, it is anticipated that public notice would not normally be done since often these early phases of work are to determine if a release even requires an interim action or cleanup action. For the purposes of this subsection only, unless the court determines other notice procedures are adequate for the site specific circumstances, the following constitutes adequate public notice and supersedes the requirements in WAC 173-340-600:~~

~~(A) Except for emergency remedial actions, written notification has been mailed at least fifteen days prior to beginning construction of the interim action or cleanup action to the last known address of the following persons: The department which shall publish a summary of the notice in the *Site Register*; the local jurisdictional health department/district; the town, city or county with land use jurisdiction; the land owners identified by the tax assessor at the time the action is commenced for that portion of the facility where the interim action or cleanup action is being conducted; and persons potentially liable under RCW 70.105D.040 known to the person conducting the interim action or cleanup action. In identifying other potentially liable persons who are to be noticed under this provision, the person doing the remedial action need only make a reasonable effort to review information currently readily available. Where the interim action or cleanup action is complex, notification prior to beginning detailed design is recommended but not required. For emergency remedial actions, written notice should be provided as soon as practicable;~~

~~(B) The notice includes: A brief statement describing the releases being remedied and the interim actions or cleanup actions expected to be conducted; the schedule for these interim actions or cleanup actions; and, for persons potentially liable under RCW 70.105D.040 known to the person conducting the interim actions or cleanup actions, a statement that they could be held liable for the costs of remedial actions being conducted; and~~

~~(C) Posting a sign at the site at a location visible to the general public indicating what interim actions or cleanup actions are being conducted and identifying a person to contact for more information. Except for emergency remedial actions this sign should be posted not later than the beginning of construction of any interim action or cleanup action and should remain~~

~~posted for the duration of the construction. For emergency remedial actions posting of a sign should be done as soon as practicable;~~

~~(iv) The remedial actions have been conducted substantially equivalent with the technical standards and evaluation criteria contained in the following sections, where applicable. Where documents are required by the following sections, the documents prepared need not be the same in title or format. Other documents can be used in place of the documents specified in these sections as long as sufficient information is included in the record to serve the same purpose. When using these sections to determine substantial equivalence it should be recognized that there are often many alternative methods for cleanup of a facility that would comply with these provisions. In applying these sections, reference should be made to the other applicable sections of this chapter, with particular attention to WAC 173-340-130 (Administrative principles), WAC 173-340-200 (Definitions) and WAC 173-340-210 (Usage):~~

~~(A) WAC 173-340-350 (State remedial investigation and feasibility study);~~

~~(B) WAC 173-340-360 (Selection of cleanup actions);~~

~~(C) WAC 173-340-400 (Cleanup actions);~~

~~(D) WAC 173-340-410 (Compliance monitoring requirements);~~

~~(E) WAC 173-340-430 (Interim actions);~~

~~(F) WAC 173-340-440 (Institutional controls);~~

~~(G) WAC 173-340-450 (Releases from underground storage tanks);~~

~~(H) WAC 173-340-700 through WAC 173-340-760 (Cleanup standards); and~~

~~(I) WAC 173-340-810 through WAC 173-340-850 (General provisions); and~~

~~(v) For facilities where hazardous substances have been disposed of as part of the remedial action, documentation is available indicating where these substances were disposed of and that this disposal was in compliance with applicable state and federal laws. It is not the intent of this provision to require extensive documentation. For example, if the remedial action results in solid wastes being transported off site for disposal, it would be sufficient to have records indicating the wastes have been disposed of at a permitted solid waste or hazardous waste landfill.~~

~~(6)~~ (5) Natural resource damages. Nothing in this section shall affect the authority of the department and the office of attorney general to recover natural resource damages.

~~(7)~~ (6) Independent remedial actions.

(a) The department may collect from persons requesting informal advice and assistance under WAC 173-340-515(3) the costs incurred by the department for staff time in providing such advice and assistance.

(b) The department may waive the collection of the costs referred to in paragraph (a)X

(i) to provide an appropriate level of technical assistance in support of public participation;

(ii) where collection of the costs would impose financial hardship on the person requesting the advice or assistance: or

(iii) where the amount of time required of the department to respond to the request is de minimis.

~~(8)~~ (7) Prepayment ~~of costs~~ agreements. (a) Persons potentially liable under this chapter or seeking a prospective purchaser agreement may request the department's oversight of remedial actions through a prepayment agreement. The purpose of such an agreement is to enable department oversight of remedial actions at lower priority sites. The department shall make a determination that such an agreement is in the public interest. A prepayment agreement requires a person to pay the department's remedial action costs, in advance, allowing the department to increase staff for the unanticipated workload. Agreements may cover one or more facilities.

(b) Prepayment agreements do not replace an order or decree but are preliminary to or work in conjunction with such documents. Persons entering into a prepayment agreement shall enter into good faith negotiations on an agreed order or consent decree governing remedial actions at the facility in accordance with the procedures described in WAC 173-340-520(1) or WAC 173-340-530(1). Failure to successfully conclude such negotiations may result in the department withdrawing from the prepayment agreement or initiating enforcement action.

WAC 173-340-560 Mixed funding. (1) Introduction. Under RCW 70.105D.070 (2)(d)(xi), the department may provide public funds from the state toxics control account to a potentially liable person for the purpose of assisting with the payment of remedial action costs regardless of when incurred. This assistance can be provided in the form of a loan or a contribution, in cash or in kind. Any funding decision

under this section is solely the responsibility of the director.

(2) Applicability and request.

(a) Mixed funding shall be provided only to potentially liable persons whom the department has found to be eligible and who have entered into a consent decree with the department under the requirements of this chapter.

(b) The consent decree shall identify remedial action tasks to be addressed by the mixed funding, costs to be borne by the potentially liable person, costs to be borne by the state toxics control account and terms of the agreement. In the case of loans, the consent decree shall also define any terms and conditions under which the potentially liable person receiving mixed funding has agreed to reimburse the state toxics control account.

(c) The potentially liable person shall submit sufficient documentation to support its request for mixed funding.

(3) Eligibility and mixed funding criteria. The director shall make a determination, based upon specific criteria whether a proposal is eligible for funding. The only circumstances under which mixed funding can be approved by the department are when the funding will achieve both:

(a) A substantially more expeditious or enhanced cleanup than would otherwise occur; and

(b) The prevention or mitigation of unfair economic hardship. In considering this criterion the department shall consider the extent to which mixed funding will either:

(i) Prevent or mitigate unfair economic hardship faced by the potentially liable person if the remedial action plan were to be implemented without public funding; or

(ii) Achieve greater fairness with respect to the payment of remedial action costs between the potentially liable person entering into a consent decree with the department and any nonsettling potentially liable persons.

(4) Funding decision. The department may have informal discussions on mixed funding. If a potentially liable person is found to be eligible for mixed funding, the director shall make a determination regarding the amount of funding to be provided, if any. This shall be determined at the discretion of the director and is not subject to review. A determination of eligibility is not a funding commitment. Actual funding will depend on the availability of funds.

(5) The department may recover the amount of public funding spent on investigations and remedial actions from potentially liable persons who have not entered into a consent decree under this chapter. For purposes of such cost recovery action, the amount in mixed funding attributed to the site shall be considered as remedial action costs paid by the department.

PART VI — PUBLIC PARTICIPATION

WAC 173-340-600 Public notice and participation. (1) Purpose. Public participation is an integral part of the department's responsibilities under the Model Toxics Control Act. The department's goal is to provide the public with timely information and meaningful opportunities for participation which are commensurate with each site. The department will meet this goal through a public participation program that includes: ~~T~~the early planning and development of a site-specific public participation plan; the provision of public notices; a site register; public meetings or hearings; and the participation of regional citizens' advisory committees.

(2) Inapplicability to independent remedial actions. This section does not apply to persons conducting independent remedial actions.

~~(2)~~ (3) Criteria. In order to promote effective and meaningful public participation, the department may determine that public participation opportunities in addition to those specifically required by chapter 70.105D RCW, or this chapter, are appropriate and should be provided. In making this determination, the department may consider:

(a) Known or potential risks to human health and the environment that could be avoided or reduced by providing information to the public;

(b) Public concerns about the facility;

(c) The need to contact the public in order to gather information about the facility;

(d) The extent to which the public's opportunity to affect subsequent departmental decisions at the facility may be limited or foreclosed in the future;

(e) The need to prevent disclosure of confidential, unverified, or enforcement-sensitive information;

(f) The routine nature of the contemplated remedial action; and

(g) Any other factors as determined by the department.

~~(3)~~ (4) Public notice. Whenever public notice is required by chapter 70.105D RCW, the department shall at a minimum provide or require notice as

described in this section except as specified for the biennial report in WAC 173-340-340.

(a) Requesting notice. ~~Notice shall be mailed~~ The department shall mail notice to persons who have made a timely request. A request for notice is timely if received prior to or during the public comment period for the current phase of remedial action at the facility. ~~However, t~~The receipt of a request for notice shall not require the department to extend the comment period associated with the notice.

(b) Mail. ~~Notice shall be mailed~~ The department shall mail notice to persons who reside within the potentially affected vicinity of the proposed action. The potentially affected vicinity shall include all property adjoining the site and any other area that the department determines to be directly affected by the proposed action.

(c) Newspaper publication. The department shall cause ~~N~~notice of the proposed action ~~shall~~ to be published in the newspaper of largest circulation in the city or county of the proposed action, by ~~one or more of the following methods: D~~display ad~~s~~, legal notice~~s~~, and/or any other appropriate format, as determined by the department.

(d) Other news media. The department shall mail ~~N~~notice of the proposed action ~~shall be mailed~~ to any other news media which the department determines to be appropriate. The department may consider how a medium compares with the newspaper of largest circulation in terms of~~:~~ ~~A~~audience reached~~s~~, timeliness~~s~~, adequacy in conveying the particular information in the notice~~s~~, cost~~s~~, or other relevant factors.

(e) Comment periods. All public notices shall indicate the public comment period on the proposed action. Unless stated otherwise, comment periods shall be for thirty days at a minimum.

(f) Combining public comment requirements. Whenever reasonable, the department shall consolidate public notice and opportunities for public comment under this chapter with public notice and comment requirements under other laws and regulations.

~~(4)~~ (5) Public meetings. During any comment period announced by a public notice issued under this chapter, if ten or more persons request a public meeting on the subject of the public notice, the department shall hold a public meeting for the purpose of receiving comments.

~~(5)~~ (6) Additional methods. In addition to "public notice" required by chapter 70.105D RCW, or this chapter, the department may use any of the following methods to provide information to the public:

(a) Press releases;

(b) Fact sheets;

(c) Public meetings;

(d) Publications;

(e) Personal contact by department employees;

(f) Posting signs at the facility;

(g) Notice in the site register;

(h) Any other methods as determined by the department.

~~(6)~~ (7) Site register. The department shall regularly publish and maintain a site register, giving notice of the following:

(a) Determinations of no further action under WAC 173-340-320;

(b) Results of site hazard rankings;

(c) Availability of annual and biennial reports;

(d) Issuance of enforcement orders, agreed orders, or proposed consent decrees;

(e) Public meetings or hearings;

(f) Scoping notice of department-conducted state remedial investigation/feasibility study;

(g) Availability of state remedial investigation/feasibility study reports and draft and final cleanup plans;

(h) Change in site status or placing sites on or removing sites from the hazardous sites list under WAC 173-340-330;

(i) Availability of engineering design reports under WAC 173-340-400;

(j) Schedules developed under WAC 173-340-140;

(k) Reports of independent cleanup actions received under WAC 173-340-300;

(l) Commencement of negotiations or discussions under WAC 173-340-520 and 173-340-530;

(m) Deadline extensions or missed deadlines under WAC 173-340-140;

(n) A summary of any notices received under WAC 173-340-545 for remedial actions where a private right of action is anticipated;

(o) A list of available department publications, including guidance, technical reports and policies pertinent to remedial actions;

(p) The results of department review of reports on independent remedial actions submitted under WAC 173-340-515; and

~~(n)~~ (q) Any other notice that the department deems appropriate for inclusion.

~~(7)~~ (8) Evaluation. As part of requiring or conducting a remedial action at any facility, the department shall evaluate public participation needs at the facility, including an identification of the potentially affected vicinity for the remedial action and, for sites where site-specific risk assessment is used, an evaluation of public interest, significant public concerns regarding future site use, and values to be addressed with the public participation plan.

~~(8)~~ (9) Public participation plans.

(a) Scope. The public participation plans required by this section are intended to encourage a coordinated and effective public involvement tailored to the public's needs at a particular facility. The scope of a plan shall be commensurate with the nature of the proposed remedial actions~~;~~, the level of public concern~~;~~, and the risks posed by the facility.

(b) Early planning encouraged. In order to develop an appropriate plan, the department or potentially liable person (if submitting a plan to the department) should engage in an early planning process to assess the public participation needs at the facility. This process may include identifying and conferring with individuals, community groups, local governments, tribes, public agencies, or any other organizations that may have an interest in or knowledge of the facility.

(c) Plan development. The department shall develop the plan, or work with the potentially liable person to develop the plan. If a plan already exists for a facility, the department shall consider whether the existing plan is still appropriate or whether the plan should be amended. For example, a plan originally developed to address a ~~state~~ remedial investigation/feasibility study may need to be amended to address implementation phases.

(d) Plans required. As part of requiring or conducting a remedial action, except emergency actions, at any site that has been assigned a hazard ranking score, the department shall ensure that a public participation plan is developed and implemented. With respect to a facility that has not been assigned a hazard ranking score, ~~T~~the department may ~~also~~ require the development of a public participation plan ~~for facilities which have not been assigned a hazard ranking score as part of~~ under an agreed order or consent decree with a potentially liable person.

(e)(i) Plan as part of order or decree. A potentially liable person will ordinarily be required to submit a proposed public participation plan as part of its request for an agreed order or a consent decree. If a plan already exists for the facility, the potentially liable person may either resubmit the existing plan with any proposed amendments or submit an entirely new proposed plan. The proposed plan may be revised during the course of discussions or negotiations on the agreed order or consent decree.

(ii) The final public participation plan may become part of the agreed order or consent decree.

(f) Contents. The public participation plan shall include the following:

(i) Applicable public notice requirements and how these will be met, including: When public notice will occur; the length of the comment periods accompanying each notice; the potentially affected vicinity and any other areas to be provided notice, to the extent known.

(ii) Information repositories. The plan should identify at least one location where the public can review information about the remedial action. Multiple locations may be appropriate.

(iii) Methods of identifying the public's concerns. Such methods may include~~:~~ ~~-~~ ~~I~~interviews~~;~~, questionnaires~~;~~, meetings~~;~~, contacts with community groups or other organizations which have an interest in the site~~;~~, establishing citizen advisory groups for sites~~;~~, or obtaining advice from the appropriate regional citizens' advisory committee.

(iv) Methods of addressing the public's concerns and conveying information to the public. These may include any of the methods listed in subsection ~~(5)~~ (6) of this section.

(v) Coordination of public participation requirements. The plan should identify any public participation requirements of other applicable federal, state or local laws, and address how such requirements can be coordinated. For example, if ~~Comprehensive Environmental Response, Compensation and Liability Act~~ (CERCLA) applies to the proposed action, the plan should explain how ~~CERCLA and this chapter's~~ the public comment periods under CERCLA and this chapter will be coordinated.

(vi) Amendments to the plan. The plan should outline the process for amending the plan. Any amendments must be approved by the department.

(vii) Any other elements that the department determines to be appropriate for inclusion in the final public participation plan.

(g) Implementation. The department shall retain approval authority over the actions taken by a potentially liable person to implement the plan.

~~(9)~~ (10) Consent decrees. In addition to any other applicable public participation requirements, the following shall be required for consent decrees.

(a) A public participation plan which meets the requirements of subsection ~~(8)~~ (9) of this section shall be developed when required by subsection ~~(8)(d)~~ (9)(d) of this section.

(b) Notice of negotiations. When the department decides to proceed with negotiations it shall place a notice in the site register advising the public that negotiations have commenced. This notice shall include the name of the facility, a general description of the subject of the ~~order~~ consent decree and the deadlines for negotiations.

(c) Notice of proposed decree. The department shall provide or require public notice of proposed consent decree. The notice may be combined with notice of other documents under this chapter, such as a cleanup action plan, or under other laws. The notice shall briefly:

(i) Identify and generally describe the facility;

(ii) Identify the person(s) who are parties to the consent decree;

(iii) Generally describe the remedial action proposed in the proposed consent decree;

(iv) Indicate the date, place, and time of the public hearing, if one is planned, on the proposed consent decree. Where a public hearing is not planned, indicate that no public hearing is planned and describe that a public hearing will be held if at least ten persons request one; and

(v) Invite the public to comment at the public hearing (if applicable) or in writing. The public comment period shall run for at least thirty days from the date of the issuance of the notice.

(d) Public hearing. The department shall hold a public hearing on the proposed consent decree for the purpose of providing the public with an opportunity to comment whenever ten or more persons request a public hearing or whenever the department determines a public hearing is necessary.

(e) Revisions. If the state and the potentially liable person agree to substantial changes to the proposed consent decree, the department shall provide additional public notice and opportunity to comment.

(f) Extensions. The department shall publish in the next site register the extension of deadlines for designated high priority sites.

~~(10)~~ (11) Agreed orders. In addition to any other applicable public participation requirements, the following shall be required for agreed orders under WAC 173-340-530.

(a) Public participation plan. A plan meeting the requirements of subsection ~~(8)~~ (9) of this section shall be developed when required by subsection ~~(8)(d)~~ (9)(d) of this section.

(b) Notice of discussions. When the department decides to proceed with discussions it shall place a notice in the site register advising the public that discussions have commenced. This notice shall include the name of the facility, a general description of the subject of the order and the deadlines for discussions.

(c) Notice of agreed orders. Public notice shall be provided by the department for any agreed order. For all agreed orders, notice shall be mailed no later than three days after the issuance of the agreed order. For agreed orders covering a ~~state~~ remedial investigation/feasibility study, the comment period shall be at least thirty days and shall be completed before the agreed order becomes effective. For other agreed orders, the agreed order may be effective before the comment period is over, unless the department determines it is in the public interest to complete the public comment period prior to the effective date of the agreed order. The department may determine that it is in the public interest to provide public notice prior to the effective date of any agreed order or to hold a public meeting or hearing on the agreed order. This notice shall briefly:

(i) Identify and generally describe the facility;

(ii) Identify the person(s) who are parties to the agreed order;

(iii) Generally describe the remedial action proposed in the proposed order; and

(iv) Invite the public to comment on the proposed order.

(d) Revisions. If the department and the potentially liable person agree to substantial changes to the proposed order, the department shall provide additional public notice and opportunity to comment.

(e) Extensions. The department shall publish in the next site register the extension of deadlines for designated high priority sites.

~~(11)~~ (12) Enforcement orders. In addition to any other applicable public participation requirements, the

department shall provide public notice of all enforcement orders. Except in the case of emergencies, notice shall be mailed no later than three days after the date of the issuance of the order. In emergencies, notice shall be mailed no later than ten days after the issuance of the order.

(a) Contents of notice. All notices shall briefly:

(i) Identify and generally describe the facility;

(ii) Identify the person(s) who are parties to the order;

(iii) Generally describe the terms of the proposed order; and

(iv) Invite the public to comment on the proposed order.

(b) The department may amend the order on the basis of public comments. The department shall provide additional public notice and opportunity to comment if the order is substantially changed.

~~(12)~~ (13) ~~State r~~Remedial investigation/feasibility study. In addition to any other applicable public participation requirements, the following shall be required during a ~~state~~-remedial investigation/feasibility study.

(a) Scoping. When the department elects to perform a ~~state~~-remedial investigation/feasibility study, public notice and an opportunity to comment on the scope of the ~~state~~-remedial investigation/feasibility study will be provided.

(b) Extensions. The department shall publish in the next site register the extension of deadlines for designated high priority sites.

(c) Report. The department shall provide or require public notice of ~~state~~-remedial investigation/feasibility study reports prepared under WAC 173-340-350. This public notice may be combined with public notice of the draft cleanup action plan. At a minimum, public notice shall briefly:

(i) Describe the site and ~~state~~-remedial investigation/feasibility study results;

(ii) If available, identify the department's selected cleanup action and provide an explanation for its selection;

(iii) Invite public comment on the report. The public comment period shall extend for at least thirty days from the date of mailing of the notice.

~~(13)~~ (14) Selection of cleanup actions. In addition to any other applicable public participation requirements, the department shall:

(a) Provide a notice of availability of draft or final cleanup action plans and a brief description of the proposed or selected alternative in the site register;

(b) Provide public notice of the draft cleanup action plan. A notice of a draft cleanup plan may be combined with notice on the ~~state~~-remedial investigation/feasibility study. Notice of a draft cleanup action plan may be combined with notice on a draft consent decree or on an order. At a minimum, public notice shall briefly:

(i) Describe the site;

(ii) Identify the department's proposed cleanup action and provide an explanation for its selection;

(iii) Invite public comment on the draft cleanup action plan. The public comment period shall run for at least thirty days from the date of issuance of the public notice.

~~(14)~~ (15) Cleanup action implementation. In addition to any other applicable public participation requirements, the following shall be required during cleanup action implementation.

(a) Public notice and opportunity to comment on any plans prepared under WAC 173-340-400 that represent a substantial change from the cleanup action plan.

(b) When the department conducts a cleanup action, public notice and an opportunity to comment shall be provided on the engineering design report and notice shall be given in the site register.

~~(15)~~ (16) Routine cleanup and interim actions. In addition to any other applicable public participation requirements, the following will be required for routine cleanup actions and interim actions.

(a) Public notice shall be provided for any proposed routine cleanup or interim actions under WAC 173-340-130 or 173-340-430. This public notice shall be combined with public notice of an order or settlement whenever practicable.

(b) At a minimum, public notice shall briefly:

(i) Describe the site;

(ii) Identify the proposed action;

(iii) Identify the likely or planned schedule for the action;

(iv) Reference any planning documents prepared for the action;

(v) Identify department staff who may be contacted for further information; and

(vi) Invite public comment on the routine cleanup or interim action.

(c) The public comment period shall extend for at least thirty days from the date of the mailing of notice.

(17) Citizen technical advisor. There is created within the department a citizen technical advisor office to provide technical assistance to citizens on remedial actions occurring under this chapter. This office shall be established on July 1, 1999, and shall end on June 30, 2002. Prior to July 1, 2002, the department shall work with citizen and business representatives to evaluate the effectiveness of this office and to determine whether the office should continue. Costs of this office shall be recovered by the department as provided for under WAC 173-340-550.

WAC 173-340-610 Regional citizens' advisory committees. (1) The department shall establish regional citizens' advisory committees as part of a public participation program. The regional citizens' advisory committees are intended to promote meaningful and effective public involvement in the department's remedial action program under chapter 70.105D RCW. The committees will advise the department as to the concerns of citizens locally and regionally regarding the remedial actions within each committee's region, with emphasis on issues that affect the region as a whole, rather than site-specific concerns.

(2) Location. There shall be a regional citizens' advisory committee representing each geographic region of the state served by a regional office of the department.

(3) Membership. At any time, each committee shall have no fewer than five and no more than twelve members. The director shall, no later than July 1, 1990, appoint five members to each committee to represent citizens' interests in the region. These members shall serve three-year terms that may be renewed at the director's discretion. These members should represent citizen interests in the region.

(a) The director may appoint up to seven additional members to represent communities that may be affected by the remedial actions within each region. These members shall serve two-year terms that may be renewed at the director's discretion.

(b) At no time shall more than twenty-five percent of the membership of any committee consist of persons who are elected or appointed public officials or their representatives.

(c) The department shall advise the public as to whether any vacancies exist on the committees, and shall accept applications from interested citizens.

(d) The following persons shall not be eligible to serve on any committee:

(i) Persons whom the department has found are potentially liable persons under WAC 173-340-500 with regard to any facility that is currently the subject of department investigative, remedial or enforcement actions, not including compliance monitoring;

(ii) Agents or employees of such potentially liable persons as described in (d)(i) of this subsection; and

(iii) Agents or employees of the department.

(e) A member shall refrain from participating in a committee matter if that member for any reason cannot act fairly and in the public interest with regard to that matter.

(f) The director may dismiss a member for cause in accordance with the terms of the regional citizens' advisory committee charter.

(4) Meetings. The committees shall meet at least twice a year at the regional offices or elsewhere as agreed upon by a committee and the department. Appropriate department staff may attend these meetings. The department shall brief the committees on the program's major planned and ongoing activities for the year.

(a) The department and the committees may agree to additional meetings.

(b) Each committee will designate one of its members to serve as chair. The committee chairs shall meet every year with the program manager or his/her designee.

(c) All committee meetings shall be open to the public. The department shall inform the public of committee meetings.

(5) Resources to be allocated to the committees.

(a) The department shall determine, after consulting with the committees, the amount of staff time and other department resources that shall be available to the committees for each biennium.

(b) The department shall designate staff to work with the committees.

(c) Members shall be reimbursed for travel expenses (as provided for in chapter 43.03 RCW) for any meetings approved by the department.

(6) Responsibilities. The committees are directed to:

(a) Meet at least twice annually;

(b) Inform citizens within each region as to the existence of the committees and their availability as a resource;

(c) Review the department's biennial program priorities, and advise the department of citizen concerns regarding the program priorities;

~~(d) Advise the department on a timely basis of citizen concerns regarding investigative or remedial activities within each region, and where possible, suggest ways in which the department can address those concerns.~~

(d) Advise the department of community concerns about the department's activities under this chapter, and develop proposals for addressing these concerns. Committees may use site-specific issues as a foundation for understanding regional issues.

(e) Annually prepare a brief report to the department describing:

(i) Major citizen concerns that have been brought to the committee's attention during the past year;

(ii) Any committee proposals or recommendations to address these concerns;

(iii) The committee's plans for the coming year; and

(iv) Any other information or issues which the committee believes appropriate for inclusion.

(7) The committees are encouraged to work with the department and the public to develop additional committee goals or responsibilities.

PART VII — CLEANUP STANDARDS

WAC 173-340-700 Overview of cleanup standards. (1) Purpose. This section provides an overview of the methods for establishing cleanup standards that apply to a release or threatened release ~~of a hazardous substance at a site~~. If there are any inconsistencies between this section and any specifically referenced section, the referenced section shall govern.

(2) Cleanup standards versus selection of cleanup actions.

(a) Cleanup standards are identified for the particular hazardous substances at a site and the specific areas or pathways, such as land or water, where humans and the environment can become exposed to these substances. This part provides uniform methods state-wide for identifying cleanup standards and requires that all cleanups under the act meet these standards. The actual degree of cleanup may vary from site to site and will be determined by the cleanup action alternative selected under WAC 173-340-360. Establishing cleanup standards for individual sites requires the specification of the following:;

(ii) The location on the site where those cleanup levels must be attained ("points of compliance"); and

(iii) Additional regulatory requirements, if any, that apply to a cleanup action because of the type of action and/or the location of the site. These requirements are specified in applicable state and federal laws and are generally established in conjunction with the selection of a specific cleanup action.

(b) For most sites, there are several cleanup ~~technologies~~ action components or combinations of ~~cleanup technologies~~ action components ("cleanup action alternatives") that may be used to comply with cleanup standards ~~at individual sites~~. Other parts of this rule govern the process for planning and deciding on the cleanup action to be taken at a site. For example, WAC 173-340-350 ~~(State remedial investigation and feasibility study) (RI/FS)~~ specifies the studies that are prepared to define the nature and extent of contamination ~~("RI")~~ and to identify and evaluate cleanup action alternatives ~~("FS")~~. WAC 173-340-360 ~~(Selection of cleanup actions)~~ specifies the criteria for selecting the preferred alternative. WAC 173-340-365 specifies the content of a cleanup action plan and the process for developing a draft and final cleanup action plan. WAC 173-340-410 specifies the monitoring required to assure that the remedy is effective.

(c) ~~The department recognizes that c~~Cleanup actions selected under WAC 173-340-360 may involve containment of hazardous substances. In these cases, the cleanup action may be determined to comply with cleanup standards, provided the compliance monitoring program is designed to ensure the long-term integrity of the containment system~~, and the other requirements for containment technologies in WAC 173-340-360(8) are met~~.

(3) ~~Three basic m~~Methods for establishing cleanup levels and remediation levels. These rules provide four~~three~~ approaches for establishing cleanup levels and remediation levels:

(a) Method A: Tables. On some sites, the cleanup action may be routine ~~(WAC 173-340-130)~~ or may involve relatively few hazardous substances. Under Method A, cleanup levels ~~for hazardous substances~~ are established at concentrations at least as stringent as concentrations specified in applicable state and federal laws and Tables ~~1, 2, or 3~~ 3, 4, or 5 of this chapter. Method A cleanup levels for hazardous substances not addressed under applicable state and federal laws or Tables ~~1, 2, or 3~~ 3, 4, or 5 are established at

concentrations which do not exceed the natural background concentration or the practical quantitation limit for the substance in question.

(b) Standard Method B: ~~Standard method~~. Standard Method B is the ~~standard~~ generally appropriate method for determining cleanup levels for ground water, surface water, soil, and air. Cleanup levels for individual hazardous substances are established using applicable state and federal laws or the risk equations or other methods specified in WAC 173-340-720 through 173-340-750. For individual carcinogens, cleanup levels are based upon the upper bound of the estimated excess lifetime cancer risk of one in one million (1×10^{-6}). For individual noncarcinogenic substances, cleanup levels are set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health and no significant adverse effects on the environment. Where a ~~hazardous waste~~ site involves multiple hazardous substances and/or multiple pathways of exposure, standard ~~m~~Method B cleanup levels for individual substances must be modified in accordance with the procedures in WAC 173-340-708. Under this method, the total excess lifetime cancer risk for a site shall not exceed one in one hundred thousand (1×10^{-5}) and the hazard index for substances ~~with similar noncarcinogenic toxic effects~~ acting through the same mechanisms of toxicity on similar target organs shall not exceed one (1).

(c) Standard Method C: ~~Conditional method~~. Compliance with cleanup levels developed under ~~the~~ ~~m~~Method A or B may be impossible to achieve or may cause greater environmental harm. In those situations, standard ~~m~~Method C cleanup levels for individual hazardous substances may be established on the basis of applicable state and federal laws and a site-specific risk assessment. Standard Method C industrial soil cleanup levels may also be established at industrial properties which meet the criteria in WAC 173-340-745. For individual carcinogens, standard ~~m~~Method C cleanup levels are based upon the upper bound of the estimated lifetime cancer risk of one in one hundred thousand (1×10^{-5}). For individual noncarcinogenic substances, standard ~~m~~Method C cleanup levels are set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health, ~~and~~ no significant adverse effects on the protection and propagation of aquatic ~~and terrestrial~~ organisms, and no significant adverse effects on plants and wildlife as identified under WAC 173-340-709. Where a ~~hazardous waste~~ site involves multiple hazardous substances and/or multiple pathways of exposure, standard ~~m~~Method C cleanup levels for individual substances must be modified in accordance with the procedures in WAC 173-340-708. Under this method, the total excess lifetime cancer risk for a site shall not exceed one in one hundred thousand (1×10^{-5}) and the hazard index for substances ~~with similar noncarcinogenic toxic effects~~ acting through the same mechanisms of toxicity on similar target organs shall not exceed one (1).

(d) Modified Method B and C. (i) In order to take into account site characteristics, cleanup levels and remediation levels may be established on the basis of applicable state and federal laws and a site-specific risk assessment. Where a site-specific risk assessment is conducted for this purpose, it will be performed as part of the remedial investigation and feasibility study activities under WAC 173-340-350. Factors that may be changed in the site-specific risk assessment process are identified under WAC 173-340-702, 173-340-708, and 173-340-720 through 173-340-750.

(ii) Cleanup levels. For individual carcinogens, cleanup levels established under a site-specific risk assessment shall be based upon the upper bound of the estimated lifetime cancer risk of one in one million (1×10^{-6}) for a modified Method B cleanup level, and one in one hundred thousand (1×10^{-5}) for a modified Method C cleanup level. For individual noncarcinogenic substances, cleanup levels established under a site-specific risk assessment shall be set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health, no significant adverse effects on the protection and propagation of aquatic organisms, and no significant adverse effects on plants and wildlife as identified under WAC 173-340-709. Where a site involves multiple hazardous substances and/or multiple pathways of exposure, Method B and C cleanup levels for individual substances shall be modified in accordance with the procedures in WAC 173-340-708. Under this method, the total excess lifetime cancer risk for a site shall not exceed one in one hundred thousand (1×10^{-5}) and the hazard index for substances acting through the same mechanisms of toxicity on similar target organs shall not exceed one (1).

(iii) Remediation levels. Modified Method B and C remediation levels may be established based on modified Method B and C reasonable maximum exposure scenarios and site-specific information in

accordance with 173-340-708(11)(b)(ii). It is anticipated that property used for commercial, recreational, and other uses will use this method to develop remediation levels for sites. Alternate reasonable maximum exposure scenarios may result in a change of the exposed individual from a child to an adolescent or adult as well as changes in factors such as exposure duration and exposure frequency as appropriate. Remediation levels shall achieve the levels of risk described in subparagraph (ii) of this paragraph, except that for individual carcinogens, where the exposure scenario is not residential, remediation levels shall be based upon the upper bound of the estimated lifetime cancer risk of one in one hundred thousand (1×10^{-5}).

(4) Additional requirements for setting cleanup ~~levels~~ standards. Several requirements apply to cleanups under any of the four~~three~~ basic methods. Some of these requirements, such as the identification of applicable state and federal laws, describe analyses used along with standard ~~m~~Methods A, B, ~~or~~ C, and modified Methods B or C in order to ~~set cleanup levels~~ establish cleanup standards for particular substances at a site. Others describe the technical procedures to be used.

(a) Applicable state and federal laws. ~~RCW 70.105D.030 (2)(d) requires the cleanup standards in these rules to be "at least as stringent as all applicable state and federal laws." In addition to establishing~~ Applicable state and federal laws establish minimum requirements for cleanup standards, ~~applicable state and federal laws~~ and may also impose certain technical and procedural requirements for performing cleanup actions. These requirements are described in WAC 173-340-710 and are similar to the "ARAR" (applicable, relevant and appropriate requirements) approach of ~~the federal superfund law~~ CERCLA.

(b) Cross-media contamination. In some situations, migration of hazardous substances from one medium may cause contamination in a second ~~media~~ medium. For example, the release of hazardous substances in soil may cause ground water contamination. Under standard ~~m~~Methods A, B, ~~and~~ C, and modified Methods B or C, cleanup ~~levels~~ standards must be established at concentrations which prevent violations of cleanup ~~levels~~ standards for other media following implementation of the cleanup action.

(c) Risk assessment procedures. The analyses performed under standard ~~m~~Methods B, ~~and~~ C, and modified Methods B or C use several factors for defining cleanup levels for carcinogens and noncarcinogens. The individual factors and procedures for modifying these factors based on new scientific information are specified in WAC 173-340-702, 173-340-708, and 173-340-720 through 173-340-750. WAC 173-340-708 also provides rules for use of indicator hazardous substances.

(d) Natural background. Cleanup levels shall not exceed concentrations established under ~~m~~Methods A, B, ~~or~~ C, or modified Method B or C, except where the natural background concentration is greater than the cleanup level established under those methods. In such situations, the cleanup level shall be established at a concentration equal to the natural background concentration.

(5) Threshold criteria for all cleanup actions. WAC 173-340-360 specifies that all cleanup actions conducted under this chapter shall protect human health and the environment, comply with cleanup standards and applicable state and federal laws, and provide for compliance monitoring. These are the threshold criteria and all cleanup actions must meet these criteria regardless of other factors such as cost or technical limitations.

(6) Measuring compliance. Setting cleanup standards also involves being able to demonstrate that they have been met. This involves specifying where on the site the cleanup levels must be met ("points of compliance"), how long it takes for a site to meet cleanup levels ("restoration time frame"), and conducting sufficient monitoring to demonstrate that the cleanup standards have been met and will continue to be met in the future. The provisions for establishing points of compliance are in WAC 173-340-720 through 173-340-750. The provisions for establishing restoration time frames are in WAC 173-340-360. The compliance monitoring plan prepared under WAC 173-340-410 specifies precisely how these are measured for each site. Where cleanup levels are below the practical quantitation limit, compliance with cleanup standards will be based upon the practical quantitation limit.

(7) Administrative principles for cleanup standards.

(a) Remedial actions under this chapter shall be conducted in a manner that is consistent with this section. This section shall be used in combination with WAC 173-340-130, the more specific sections in Part VII of this chapter and WAC 173-340-360.

(b) Establishing cleanup standards and selecting an appropriate cleanup action involves many technical and

public policy decisions. This chapter is intended to constrain the range of decisions needed to be made on individual sites to promote expeditious cleanups.

(c) The act contains policies which state, in part, each person has a fundamental and inalienable right to a healthful environment and it is essential that sites be cleaned up well. Consistent with these policies, cleanup standards under this chapter shall be established which provide conservative estimates of human health and environmental risks which protect susceptible individuals as well as the general population.

(d) Cleanup standards under this chapter shall be established which protect human health and the environment for current and potential future site and resource uses.

(e) Cleanup actions that achieve cleanup levels under methods A, B, or C (as applicable) or remediation levels and comply with applicable state and federal laws shall be presumed to be protective of human health and the environment.

(f) Except as provided for in applicable state and federal laws, cost shall not be a factor in determining what cleanup level is protective of human health and the environment. In addition, where specifically provided for in this chapter, cost may be appropriate for certain other determinations related to cleanup standards such as remediation levels, points of compliance, and restoration time frame. Cost shall, however, be considered when selecting an appropriate cleanup action.

(g) At most sites, there is more than one hazardous substance and more than one pathway for hazardous substances to get into the environment. For many sites there is more than one ~~technology~~ cleanup action component that could address each of these. When evaluating cleanup action alternatives it is appropriate to consider a representative range of ~~technologies~~ cleanup action components that could address each of these as well as different combinations of these ~~technologies~~ components to accomplish the overall site cleanup.

(h) The cleanup of a particular ~~media~~ medium of a site will often affect other media at the site. These cross-media impacts shall be considered when establishing cleanup standards and selecting a cleanup action. Cleanup actions conducted under this chapter shall use appropriate engineering controls or other measures to minimize these cross-media impacts.

~~(i) In general, cleanup levels must be met throughout a site before the site will be considered to be clean. A remedy that leaves hazardous substances on a site in excess of cleanup levels may qualify as a cleanup action as long as the remedy is protective of human health and the environment, meets cleanup levels at specified points of compliance, complies with applicable state and federal laws, provides for adequate monitoring, and incorporates appropriate institutional controls. However, these rules are intended to promote thorough cleanups rather than long-term partial cleanups or containment measures.~~

(i) A cleanup standard shall comply with the requirements of this chapter that are in effect at the time of the completion of the remedial investigation work plan. Requirements under this chapter that become effective subsequent to completion of the remedial investigation work plan may be required only with the consent of both the department and the potentially liable parties.

WAC 173-340-701 Overview of process for establishing risk-based cleanup levels for releases involving petroleum hydrocarbons.

(1) Purpose. This section describes the tiered process for evaluating releases that involve petroleum hydrocarbons and, if necessary, for establishing cleanup levels for such releases.

(2) Applicability. This section shall apply to a remedial action conducted by the department or by a potentially liable person under a decree or order. In using the tiered process described under this section, a person may proceed sequentially, starting at Method A, then proceeding through tiers 1, 2 and 3. Alternatively, a person may go directly to any tier. Different pathways at the same site may be evaluated under different tiers, or they may all be evaluated under the same tier.

(3) Free product removal. (i) The person conducting the remedial action determines whether any organic hazardous substances or petroleum products are present in ground water as free product, defined under WAC 173-340-200. This may be done by physical observations or by calculation of the solubility limit for the hazardous substance. If the solubility limit is used to determine the presence of free product and more than one hazardous substance is present, the solubility limit must be adjusted to account for mixture effects using either Raoult's Law

or another model approved by the department's site manager.

(ii) If free product is detected, the person conducting the remedial action shall conduct free product removal to the maximum extent practicable and in a manner which minimizes the spread of hazardous substances, by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site. The object of the free product removal system is, at a minimum, to stop the migration of free product in ground water.

(4) Using Method A to conduct a non-site-specific screening level evaluation.

(a) If the site qualifies for use of Method A under WAC 173-340-704, the person conducting the remedial action may use establish screening levels for one or more hazardous substances at the site under this subsection

(b) Indicator hazardous substances. The person conducting the remedial action takes the following actions with respect to indicator hazardous substances that are likely to be present at the site:

(i) Determine the location and concentration of such indicator hazardous substances at the area(s) of the site most likely to be impacted by the release.

(ii) Compare the concentration of each indicator hazardous substance for which data was collected to the appropriate Method A value in Tables 3, 4 or 5 to determine whether or not such concentrations exceed the screening levels. Compare such concentrations first to screening levels for carcinogenic effects, then to screening levels for non-carcinogenic effects.

(iii) With respect to any indicator hazardous substance for which the concentration at the site exceeds the appropriate Method A screening level(s), the person conducting the evaluation may eitherX

(A) use the Method A screening level as a cleanup level, and evaluate and select an interim action or cleanup action using the Method A cleanup level; or

(B) conduct a tier 1, 2 or 3 site-specific evaluation.

(c) Total petroleum hydrocarbons. After completing the evaluation of indicator hazardous substances at the site, the person conducting the remedial action takes the following actions with respect to total petroleum hydrocarbons, differentiated by fuel type, that are likely to be present at the site after conducting an interim action or cleanup action with respect to indicator hazardous substances, if such action has been or will be conducted:

(i) Determine the location and concentration of total petroleum hydrocarbons (which does not include the concentration of indicator hazardous substances), differentiated by fuel type, at the area(s) of the site most likely to be impacted by the release. Fraction-specific information is not required for Method A screening levels.

(ii) Compare the concentration of each petroleum hydrocarbon fuel type for which data was collected to the appropriate Method A value in Tables 3, 4, or 5 to determine whether or not such concentrations exceed the screening.

(iii) With respect to any petroleum hydrocarbon fuel type for which the concentration at the site exceeds the appropriate Method A screening level(s), the person conducting the evaluation may eitherX

(A) use the Method A screening level as a cleanup level, and evaluate and select an interim action or cleanup action using the Method A cleanup level; or

(B) conduct tier 1, 2 or 3 site-specific evaluation under subsection (4) of this section.

(d) Screening levels not exceeded. If Method A screening levels for indicator hazardous substances and total petroleum hydrocarbons are not exceeded, the site is protective of human health and the environment with respect to petroleum hydrocarbons, and no further action is required.

(5) Using the tiered process to conduct a site-specific evaluation. The person conducting the remedial action may use the following tiered process to conduct a site-specific evaluation, and, if necessary, to establish cleanup levels. Tier 1 is a screening level evaluation that relies heavily on standard approaches and default assumptions. Tier 2 enables the person to establish site-specific cleanup levels using standard approaches and some site-specific chemical and/or exposure data. Tier 3 involves the development of models, formulas, or other approaches not previously reviewed or approved by the department, but which are determined to be appropriate to the particular site, as well as site-specific chemical and/or exposure data.

(6) Tier 1. Using standard approaches and default assumptions to conduct a site-specific screening level evaluation.

(a) The person conducting the remedial action may use Method B or Method C to establish

screening levels for one or more hazardous substances at the site under this subsection.

(b) Default conceptual site model. A conceptual site model shall be developed, which shall include the following:

(i) The identification of the chemical source area(s), and the concentration of petroleum hydrocarbon fractions, and indicator hazardous substances likely to be present at the area(s) of the site most likely to be impacted by the release.

(ii) The identification of site conditions which affect or limit the movement of petroleum hydrocarbons or indicator hazardous substances likely to be present at the site.

(iii) The identification of each of the following exposure pathways that are actually or potentially complete at the site: direct contact with soil by humans (including ingestion and dermal); leaching of dissolved phase constituents from soil to ground water; and ingestion of ground water for drinking water purposes by humans. If there is reason to believe that an exposure pathway not identified in the default conceptual site model is complete at the site and is likely to contribute substantially to the risk to human health or the environment at the site, that pathway should be evaluated under tier 2 or 3.

(c) Comparison to tier 1 screening levels. The person conducting the remedial action compares the concentration of petroleum hydrocarbon fractions, or of the total petroleum hydrocarbons, and of indicator hazardous substances for which data was collected to the appropriate Method B or Method C value to determine whether or not petroleum hydrocarbons at the site exceed the site-specific screening levels.

(d) Appropriate action. With respect to any petroleum hydrocarbons or indicator hazardous substances for which the concentration at the site exceeds the tier 1 screening levels, the person conducting the remedial action may either:

(i) use the Method B or Method C screening level as a cleanup level, and evaluate and select an interim action or cleanup action using such cleanup level; or

(ii) conduct a tier 2 or 3 evaluation.

(e) Screening levels not exceeded. If tier 1 screening levels are not exceeded, the site is protective of human health and the environment with respect to petroleum hydrocarbons and indicator hazardous substances, and no further action is required except as provided in the next sentence. If the site-specific screening level is established under Method C, it may be necessary to maintain institutional or engineered controls if the screening level is based on such controls and such controls are necessary to protect human health or the environment.

(7) Tier 2. Using standard approaches and site-specific data to conduct a cleanup level evaluation.

(a) The person conducting the remedial action may elect to establish a site-specific Method B or Method C cleanup level under this subsection based on standard models, formulas, or other approaches that the department has found to be generally appropriate for establishing cleanup levels, including the use of site-specific values measured at the site and/or default values that the department has found to be generally appropriate when using these models, formulas, or other approaches.

(b) Conceptual site model. The person conducting the remedial action develops a conceptual site model that describes each exposure pathway that is actually or potentially complete at the site and is likely to contribute substantially to the risk to human health or the environment at the site. The person may elect to use the tier 1 default conceptual site model described in subsection (6)(b) of this section, refined to include only those complete exposure pathways that are likely to contribute substantially to the risk to human health or the environment at the site, and other complete pathways, if any, that are not described in the default conceptual site model and are likely to contribute substantially to the risk to human health or the environment at the site.

(c) Develop tier 2 cleanup levels. The person conducting the remedial action develops cleanup levels in accordance with This chapter.

(d) Comparison to tier 2 cleanup levels. The person conducting the remedial action compares the concentration of petroleum hydrocarbon fractions, or of the total petroleum hydrocarbons, and of indicator hazardous substances for which data was collected to the tier 2 cleanup levels to determine whether or not petroleum hydrocarbons at the site exceed the cleanup levels. If using total petroleum hydrocarbons, the cleanup level is determined in the same manner as a tier 1 screening level for total petroleum hydrocarbons under subsection (6)(c) of this section.

(e) Appropriate action. With respect to any petroleum hydrocarbons for which the concentration

at the site exceeds the tier 2 cleanup levels, the person conducting the remedial action may either:X

(i) use the cleanup level, and evaluate and select an interim action or cleanup action using such cleanup level; or

(ii) conduct a tier 3 evaluation.

(f) If tier 2 cleanup levels are not exceeded, the site is protective of human health and the environment with respect to petroleum hydrocarbons, and no further action is required except as provided in the next sentence. If the cleanup level is established under Method C, it may be necessary to maintain institutional or engineered controls if the cleanup level is based on such controls and such controls are necessary to protect human health or the environment.

(8) Tier 3. Using site-specific approaches and data to conduct a cleanup level evaluation.

(a) The person conducting the remedial action may elect to establish a site-specific Method B or Method C cleanup level under this subsection based on a model, formula, or other approach that has not previously been found by the department to be generally appropriate for establishing cleanup levels. If the remedial action is being conducted by the person under a decree or order, the person shall not use a model, formula, or other approach which the department has found to be inappropriate at the specific site.

(b) Conceptual site model. The person conducting the remedial action develops a conceptual site model as described in subsection (6)(b) of this section.

(c) Develop tier 3 cleanup levels. The person conducting the remedial action develops cleanup levels in accordance with this chapter.

(d) Comparison to tier 3 cleanup levels. The person conducting the remedial action compares the concentration of petroleum hydrocarbon fractions, or of the total petroleum hydrocarbons, and of indicator hazardous substances for which data was collected to the tier 3 cleanup levels to determine whether or not petroleum hydrocarbons at the site exceed the cleanup levels. If using total petroleum hydrocarbons, the cleanup level is determined in the same manner as a total petroleum hydrocarbon screening level under subsection (4)(b)(ii) of this section.

(e) If tier 3 cleanup levels are not exceeded, the site is protective of human health and the environment with respect to petroleum hydrocarbons, and no further action is required except as provided in the next sentence. If the cleanup level is established under Method C, it may be necessary to maintain institutional or engineered controls if the cleanup level is based on such controls and such controls are necessary to protect human health or the environment.

(f) Appropriate action. With respect to any petroleum hydrocarbons for which the concentration at the site exceeds the tier 3 cleanup levels, the person conducting the remedial action evaluates and selects an interim action or cleanup action using such cleanup level.

WAC 173-340-702 General policies. (1) Purpose. This section defines the policies and principles that the department shall utilize to ensure that cleanup standards under this chapter are established and implemented in a scientifically and technically sound manner.

(2) Relationship to ~~federal cleanup law~~ CERCLA. When evaluating cleanup actions performed under ~~the federal cleanup law~~ CERCLA, the department shall consider WAC 173-340-360 and 173-340-700 through 173-340-760 to be a legally applicable requirement under Ssection 121(d) of ~~the Federal Cleanup Law~~ CERCLA, 42 U.S.C. 9621(d).

(3) Regulation update. The department shall review and, as appropriate, update WAC 173-340-700 through 173-340-760 no less frequently than once every five years.

~~(4) Institutional controls. Institutional controls under WAC 173-340-440 shall be required whenever a cleanup action results in residual concentrations of hazardous substances which exceed method A or method B cleanup levels, as applicable, or conditional points of compliance are approved by the department under WAC 173-340-720 through 173-340-760. Institutional controls shall also be required when cleanup levels are established under WAC 173-340-745.~~

~~(5)~~ (4) Burden of proof. Any person responsible for undertaking a cleanup action under this chapter who proposes to establish a cleanup level under method C or a conditional point of compliance shall have the burden of demonstrating to the department that requirements in this part have been met to assure protection of human health and the environment. The department shall only approve cleanup levels under method C or conditional

points of compliance when it determines that that the person undertaking the cleanup actions met this burden of proof.

~~(6)~~ (5) New scientific information. The department shall consider new scientific information when establishing cleanup or remediation levels for individual sites. In making a determination on how to use this new information, the department shall, as appropriate, consult with the science advisory board, the department of health, and the United States Environmental Protection Agency.

(6) Quality of information. (a) The purpose of this subsection is to establish minimum criteria to be considered when evaluating information used by or submitted to the department proposing to modify the methods or factors specified in this chapter, or proposing methods or factors not specified in this chapter, for calculating cleanup levels and remediation levels. This subsection does not establish a burden of proof or alter the burden of proof provided for elsewhere in this chapter.

(b) When deciding whether to approve modifications to the default methods or factors specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve alternative or additional methods or factors, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information, the department shall consider the following factors, as appropriate for the type of information submitted:

(i) Whether the information is based on a theory or technique that has wide spread acceptance within the relevant scientific community;

(ii) Whether the information was derived using standard testing methods or other widely accepted scientific methods;

(iii) Whether a review of relevant information both in support of and not in support of the proposed modification has been provided along with the rationale explaining the reasons for the proposed modification;

(iv) Whether the assumptions used in applying the information to the facility are valid and would assure the proposed modification would err on behalf of protection of human health and the environment;

(v) Whether the information adequately addresses populations that are more highly exposed than the population as a whole and are reasonably likely to be present at the site; and

(vi) Whether adequate quality assurance and quality control procedures have been used, any significant anomalies are adequately explained, the limitations of the information are identified, and the known or potential rate of error is acceptable.

(c) The department shall prepare guidance, where appropriate, to facilitate implementation of this subsection.

WAC 173-340-704 Use of ~~m~~Method A. (1)(a) Except as provided under paragraph (b), Method A may be used to establish cleanup levels at the following types of sites:

~~(a)~~ (i) Sites undergoing routine cleanup actions ~~as defined in WAC 173-340-130~~; or

~~(b)~~ (ii) Sites where numerical standards are available in this chapter or applicable state and federal laws for all indicator hazardous substances and/or petroleum products ~~in all media of concern~~.

(b) Notwithstanding paragraph (a), Method A may not be used to establish cleanup levels at the following types of sites:

(i) Sites that are subject to a site-specific terrestrial evaluation under WAC 173-340-709(7); and

(ii) Sites where adjustments for additive risk are necessary (generally including sites with hazardous substances that act through the same mechanism of toxicity on similar target organs and sites with additive exposure pathways).

(2) Method A cleanup levels shall be established in accordance with the procedures in WAC 173-340-720 through 173-340-760. Method A cleanup levels shall be at least as stringent as all of the following:

(a) Concentrations of individual hazardous substances listed in the tables in WAC 173-340-720, 173-340-740, or 173-340-745;

(b) Concentrations of individual hazardous substances established under applicable state and federal laws; and

(c) For individual hazardous substances not addressed under (a) and (b) of this subsection, concentrations that do not exceed natural background levels or the practical quantitation limit for the substance in question.

(3) The department may establish method A cleanup levels more stringent than those required by subsection (2) of this section, when based on a site-specific evaluation, the department determines that

such levels are necessary to protect human health and the environment.

(4) Caution on misusing ~~m~~Method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

(5) If there are any inconsistencies between this section and any specifically referenced sections, the referenced section shall govern.

WAC 173-340-705 Use of ~~m~~Method B. (1) Method B is applicable to all sites. It shall be used to develop cleanup levels unless one or more of the conditions for using ~~m~~Method A, ~~or m~~Method C, or modified ~~m~~Method B or C are demonstrated to exist and the person conducting the cleanup action elects to utilize that method.

(2) Method B cleanup levels shall be established in accordance with the procedures in WAC 173-340-720 through 173-340-760. Method B cleanup levels shall be at least as stringent as all of the following:

(a) Concentrations of individual hazardous substances established under applicable state and federal laws;

(b) Concentrations which are estimated to result in no adverse effects on the protection and propagation of aquatic ~~and terrestrial~~ life, and no significant adverse effects on plants and wildlife as identified under WAC 173-340-709;

(c) For hazardous substances for which ~~sufficiently protective,~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(i) Concentrations which are estimated to result in no acute or chronic toxic effects on human health as determined using a hazard quotient of one (1) and the procedures specified in WAC 173-340-720 through 173-340-760; and

(ii) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one million as determined using the procedures specified in WAC 173-340-720 through 173-340-760.; ~~and~~

(iii) Concentrations which eliminate or minimize the potential for food chain contamination as necessary to protect human health; and

(3) The department may establish ~~m~~Method B cleanup levels that are more stringent than those required by subsection (2) of this section, when based upon a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision must comply with WAC 173-340-700, 173-340-702 and 173-340-708.

(4) Concentrations of individual hazardous substances established under subsections (2) and (3) of this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures in WAC 173-340-708. In making these adjustments, the hazard index shall not exceed one (1) and the total excess cancer risk shall not exceed one in one hundred thousand. These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by one exposure pathway, including cleanup levels based on applicable state and federal laws.

(5) Method B cleanup levels and/or remediation levels may be modified based on the procedures identified in WAC 173-340-700, 173-340-702, and 173-340-708 to calculate site-specific cleanup levels and/or remediation levels. In instances where a modified Method B remediation level is based on a non-residential exposure scenario, the individual carcinogen remediation level shall be based on a lifetime cancer risk of one in one hundred thousand (1×10^{-5}).

~~(5)~~ (6) If there are any inconsistencies between this section and any specifically referenced sections, the referenced section shall govern.

WAC 173-340-706 Use of ~~m~~Method C. (1) Method C cleanup levels represent concentrations

which are protective of human health and the environment for specified site uses. A site (or portion of a site) that qualifies for a ~~m~~Method C cleanup level for one medium does not necessarily qualify for a ~~m~~Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(a) Method C cleanup levels may be established where the person conducting the cleanup action can demonstrate that such levels comply with applicable state and federal laws, ~~that all practicable methods of treatment are utilized,~~ that institutional controls are implemented in accordance with WAC 173-340-440, and that one or more of the following conditions exist:

(i) Where ~~m~~Method A or B cleanup levels are below area background concentrations, ~~m~~Method C cleanup levels may be established at concentrations that are equal to area background concentrations, but in no case greater than concentrations specified in subsection (2) of this section; or

(ii) Where attainment of ~~m~~Method A or B cleanup levels ~~has the potential for creating~~ may create a significantly greater overall threat to human health or the environment than attainment of ~~m~~Method C cleanup levels ~~established under this chapter~~, ~~m~~Method C cleanup levels may be established at concentrations which minimize those overall threats, but in no case greater than concentrations specified in subsection (2) of this section. Factors that shall be considered in making this determination include:

(A) Results of a site-specific risk assessment;

(B) Duration of threats;

(C) Reversibility of threats;

(D) Magnitude of threats; and

(E) Nature of affected population.

(iii) Where ~~m~~Method A or B cleanup levels are below technically possible concentrations, ~~m~~Method C cleanup levels may be established at the technically possible concentrations, but in no case greater than levels specified in subsection (2) of this section.

(b) For soil cleanup levels only, Method C cleanup levels may also be established where the person conducting the cleanup action can demonstrate that the area under consideration is an industrial property and meets the criteria for establishing industrial soil cleanup levels under WAC 173-340-745.

(2) Method C cleanup levels shall be established in accordance with the procedures in WAC 173-340-720 through 173-340-760. Method C cleanup levels shall be at least as stringent as all of the following:

(a) Concentrations established under applicable state and federal laws;

(b) Concentrations which are estimated to result in no significant adverse effects on the protection and propagation of aquatic ~~and terrestrial~~ life, and no significant adverse effects on plants and wildlife as identified under WAC 173-340-709;

(c) For hazardous substances for which ~~sufficiently protective,~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which are protective of human health and the environment as determined by the following methods:

(i) Concentrations which are estimated to result in no significant adverse acute or chronic toxic effects on human health as estimated using a hazard quotient of one and the procedures defined in WAC 173-340-720 through 173-340-760;

(ii) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one hundred thousand as determined using the procedures defined in WAC 173-340-720 through 173-340-760; and

(iii) Concentrations which eliminate or minimize the potential for food chain contamination as necessary to protect human health.

(3) The department may establish ~~m~~Method C cleanup levels that are more stringent than those required by subsection (2) of this section when based upon a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision must comply with WAC 173-340-700, 173-340-702, and 173-340-708.

(4) Concentrations of individual hazardous substances established under subsections (2) and (3) of this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with WAC 173-340-708. In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand. These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous

substance by one exposure pathway, including cleanup levels based on applicable state and federal laws.

(5) Method C cleanup levels and/or remediation levels may be modified based on the procedures identified in WAC 713-340-702 and 173-340-708 to calculate site-specific cleanup levels or remediation levels.

~~(5)~~(6) If there are any inconsistencies between this subsection and any specifically referenced sections, the referenced section shall govern.

WAC 173-340-707 Analytical considerations. (1) Analytical methods used to evaluate the effectiveness of a cleanup action shall comply with the requirements in WAC 173-340-830.

(2) ~~The department recognizes that there may be situations w~~Where a hazardous substance is not detected, or is detected at a concentration below the practical quantitation limit utilizing sampling and analytical procedures which comply with the requirements of WAC 173-340-830.~~ If those situations arise~~ and the practical quantitation limit is higher than the cleanup level for that substance, the cleanup level shall be considered to have been attained, subject to subsection (4) of this section, only when the more stringent of the following conditions are met:

(a) The practical quantitation limit is no greater than ten times the method detection limit; or

(b) The practical quantitation limit for the particular hazardous substance, medium, and analytical procedure is no greater than the practical quantitation limit established by the United States Environmental Protection Agency and used to establish requirements in 40 CFR 136, 40 CFR 141 through 143, or 40 CFR 260 through 270.

(3) ~~In cases w~~Where a cleanup level required by this chapter is less than the practical quantitation limit using an approved analytical procedure, the department may also require one or more of the following:

(a) Use of surrogate measures of hazardous substance contamination;

(b) Use or development of specialized sample collection or analysis techniques to improve the method detection limit or practical quantitation limit for the hazardous substances at the site; or

(c) Monitoring to assure that the concentration of a hazardous substance does not exceed detectable levels.

(4) When the practical quantitation limit is above the cleanup level, the department shall consider the availability of improved analytical techniques when performing periodic reviews under WAC 173-340-420. Subsequent to those reviews, the department may require the use of improved analytical techniques with lower practical quantitation limits and other appropriate actions.

(5) Retrofitting existing petroleum hydrocarbon data. The department shall identify and publish standard fraction-specific compositions for various petroleum hydrocarbon fuel types. These standard compositions may be used to establish Method B and method C screening levels and/or cleanup levels for petroleum hydrocarbons for which sampling took place prior to the effective date of this subsection and for which analytical results were obtained in accordance with the methods identified in *"Total Petroleum Hydrocarbons Analytical Methods for Soil and Water,"* dated April 1992, and/or *"Analytical Methods for Petroleum Hydrocarbons."* dated June 1997.

WAC 173-340-708 Human health risk assessment procedures. (1) Purpose. (a) This section defines the risk assessment framework that the department will utilize to establish cleanup levels and remediation levels. As used in this section, cleanup levels and remediation levels mean the human health risk assessment component of these levels. This chapter defines certain default values and methods to be used in calculating cleanup levels and remediation levels. This section allows varying from these default values and methods under certain circumstances. When deciding whether to approve alternate values and methods the department shall ensure that the use of alternative values and methods will not significantly delay site cleanups.

(b) The department shall determine if the variables proposed to be modified in a site-specific risk assessment or alternative reasonable maximum exposure scenario may affect significant public concerns regarding future land uses and exposure scenarios. If the department finds that those concerns may be affected, then the department shall assure that appropriate public involvement and comment opportunities will occur as identified in the public participation plan.

(2) Selection of indicator hazardous substances.

(a) When defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, the department may eliminate from consideration those hazardous substances that contribute a small percentage of the overall threat to

human health and the environment. The remaining hazardous substances shall serve as indicator hazardous substances for purposes of defining site cleanup requirements.

(b) If the department considers this approach appropriate for a particular site, the factors evaluated when eliminating individual hazardous substances from further consideration shall include:

(i) The toxicological characteristics of the hazardous substance that influence its ability to adversely affect human health or the environment relative to the concentration of the hazardous substance at the site;

(ii) The chemical and physical characteristics of the hazardous substance which govern its tendency to persist in the environment;

(iii) The chemical and physical characteristics of the hazardous substance which govern its tendency to move into and through environmental media;

(iv) The natural background concentrations of the hazardous substance;

(v) The thoroughness of testing for the hazardous substance at the site;

(vi) The frequency that the hazardous substance has been detected at the site; and

(vii) Degradation by-products of the hazardous substance.

(c) When the department determines that the use of indicator hazardous substances is appropriate for a particular site, it may also require biological testing to address potential toxic effects associated with hazardous substances eliminated from consideration under this subsection.

(d) Petroleum hydrocarbons.

(i) The carcinogenic human health effects of a release, or threatened release, of petroleum hydrocarbons may be evaluated based on the indicator hazardous substances benzene and carcinogenic polycyclic aromatic hydrocarbons.

(ii) The noncarcinogenic human health effects of a release, or threatened release, of petroleum hydrocarbons may be evaluated based on an evaluation of the noncarcinogenic human health effects of the petroleum hydrocarbon fractions present in the release or threatened release as provided in subsection (d)(ii)(A), and of indicator hazardous substances as provided in subsection (d)(ii)(B).

(A) Surrogate hazardous substances for petroleum hydrocarbon fractions shall be used to represent the noncarcinogenic human health effects of such fractions resulting from oral and dermal exposure and inhalation. The department shall use best professional judgment, in consultation with the Science Advisory Board, to identify the fractions and surrogates to be used, and the oral, dermal, and inhalation reference doses for each such surrogate, and shall publish such reference doses.

(B) With respect to any release, or threatened release, of petroleum hydrocarbons other than heavy fuel oils, the indicator hazardous substances shall be 1,2 dibromoethane (for oral exposures), dichloroethane, ethylbenzene, methyl tert-butyl ether (MTBE), naphthalene (for inhalation exposures), toluene, and total xylenes. With respect to a release, or threatened release, known to involve gasoline, n-hexane shall also be used as an indicator hazardous substance. With respect to any indicator hazardous substance described in this provision for which an oral, dermal, and/or inhalation reference dose is not available through IRIS or HEAST, the department shall use best professional judgment, in consultation with the Science Advisory Board, to identify such reference dose, and shall publish such reference dose.

(3) Reasonable maximum exposure.

(a) Cleanup levels and remediation levels shall be based on estimates of current and future resource uses and reasonable maximum exposures expected to occur under both current and potential future site use conditions.

(b) The reasonable maximum exposure is defined as the highest exposure that is reasonably expected to occur at a site under current and potential future site use. WAC 173-340-720 through 173-340-760 define the reasonable maximum exposures for ground water, surface water, soil, and air. These reasonable maximum exposures will apply to most sites where individuals or groups of individuals are or could be exposed to hazardous substances. ~~For example, the reasonable maximum exposure for most ground water is defined as exposure to hazardous substances in drinking water and other domestic uses.~~

(c) Persons performing cleanup actions under this chapter may utilize the evaluation criteria in WAC 173-340-720 through 173-340-760 to demonstrate that the reasonable maximum exposure scenarios specified in those sections are not appropriate for cleanup levels for a particular site. The use of an alternate exposure scenario shall be documented by the person performing the cleanup action. Documentation for the use of alternate exposure scenarios under this provision shall

be based on the results of investigations performed in accordance with WAC 173-340-350.

(d) Persons performing cleanup actions under this chapter may also use alternate reasonable maximum exposure scenarios to assess the protectiveness of a remedy that uses engineered controls and/or institutional controls to limit exposure to the contamination remaining on the site. An alternate reasonable maximum exposure scenario shall reflect the highest exposure that is reasonably expected to occur under current and potential future site exposure considering, among other appropriate factors, the potential for institutional controls to fail and the extent of the time period of failure under these scenarios.

~~(d)~~ (e) Individuals or groups of individuals may be exposed to hazardous substances through more than one exposure pathway. For example, a person may be exposed to hazardous substances from a site by drinking contaminated ground water, eating contaminated fish, and breathing contaminated air. At sites where the same individuals or groups of individuals are or could be consistently exposed through more than one pathway, the reasonable maximum exposure shall represent the total exposure through all of those pathways. At such sites, the cleanup levels and remediation levels derived for individual pathways under WAC 173-340-720 through 173-340-760 shall be adjusted downward to take into account multiple exposure pathways.

(4) Cleanup ~~levels~~ standards for individual hazardous substances. Cleanup ~~levels~~ standards for individual hazardous substances will generally be based on a combination of requirements ~~in~~ under this chapter and applicable state and federal laws ~~and risk assessment~~.

(5) Multiple hazardous substances.

(a) Cleanup levels and remediation levels for individual hazardous substances established under methods B and C shall be adjusted downward to take into account exposure to multiple hazardous substances. Adverse effects resulting from exposure to two or more hazardous substances ~~with similar types of toxic response~~ acting through the same mechanisms of toxicity on similar target organs are assumed to be additive unless scientific evidence is available to demonstrate otherwise.

(b) Cancer risks resulting from exposure to two or more carcinogens are assumed to be additive unless scientific evidence is available to demonstrate otherwise.

(c) For purposes of establishing cleanup levels and remediation levels for noncarcinogens under ~~m~~Methods B and C, the health threats resulting from exposure to two or more hazardous substances ~~with similar types of toxic response~~ acting through the same mechanisms of toxicity on similar target organs may be apportioned between those hazardous substances in any combination as long as the hazard index does not exceed one (1).

(d) For purposes of establishing cleanup levels and remediation levels for carcinogens under ~~m~~Methods B and C, the cancer risks resulting from exposure to multiple hazardous substances may be apportioned between hazardous substances in any combination as long as the total excess cancer risk does not exceed one in one hundred thousand.

(e) The department may require biological testing to assess the potential interactive effects associated with chemical mixtures.

(f) When making adjustments to cleanup levels and remediation levels for multiple hazardous substances, the concentration for individual hazardous substances shall not be adjusted downward to less than the practical quantitation limit or natural background.

(6) Multiple pathways of exposure.

(a) Estimated doses of individual hazardous substances resulting from more than one pathway of exposure are assumed to be additive unless scientific evidence is available to demonstrate otherwise.

(b) Cleanup levels and remediation levels based on one pathway of exposure shall be adjusted downward to take into account exposures from more than one exposure pathway. The number of exposure pathways considered at a given site shall be based on the reasonable maximum exposure scenario as defined in WAC 173-340-708(3).

(c) For purposes of establishing cleanup levels and remediation levels for noncarcinogens under ~~m~~Methods B and C, the health threats associated with exposure via multiple pathways may be apportioned between exposure pathways in any combination as long as the hazard index does not exceed one (1).

(d) For purposes of establishing cleanup levels and remediation levels for carcinogens under ~~m~~Methods B and C, the cancer risks associated with exposure via multiple pathways may be apportioned between exposure pathways in any combination as long as the

total excess cancer risk does not exceed one in one hundred thousand.

(e) When making adjustments to cleanup levels and remediation levels for multiple pathways of exposure, the concentration for individual hazardous substances shall not be adjusted downward to less than the practical quantitation limit or natural background.

(7) ~~Reference doses~~ Noncarcinogenic toxicity values.

(a) The chronic reference dose/reference concentration and the developmental reference dose/reference concentration shall be used to establish cleanup levels and remediation levels under this chapter. Cleanup levels and remediation levels shall be established using the value which results in the most protective concentration.

(b) Inhalation reference doses/reference concentrations shall be used in WAC 173-340-750. Where the inhalation reference dose/reference concentration is reported as a concentration in air, that value shall be converted to a corresponding inhaled intake (mg/kg-day) using a human body weight of 70 kg and an inhalation rate of 20 m^3/day, and take into account, where available, the respiratory deposition and absorption characteristics of the gases and inhaled particles.

(c) A subchronic reference dose/reference concentration may be utilized to evaluate potential noncarcinogenic effects resulting from exposure to hazardous substances over short periods of time. This value may be used in place of the chronic reference dose/reference concentration where it can be demonstrated that a particular hazardous substance will degrade to negligible concentrations during the exposure period.

(d) For purposes of establishing cleanup levels for hazardous substances under this chapter, a reference dose/reference concentration established by the United States Environmental Protection Agency and available through the ~~"integrated risk information system"~~ IRIS data base shall be used. If a reference dose/reference concentration is not available through the IRIS data base, a reference dose/reference concentration from the HEAST data base shall be used.

(e) If a reference dose/reference concentration is available through the IRIS or HEAST data bases, it shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of this value is inappropriate.

~~(e)~~ (f) If a reference dose/reference concentration is not available through the IRIS~~the "integrated risk information system"~~ or HEAST data bases or is demonstrated to be inappropriate under ~~(d)~~ (e) of this subsection, a reference dose/reference concentration shall be established utilizing the methods described in the most appropriate EPA risk assessment/toxicological guidance documents. ~~Risk Assessment Guidance for Superfund. Human Health Evaluation Manual, Part A. (October 1989.)~~

(g) The reference dose values identified by the department under subsection (5) shall be used to evaluate the noncarcinogenic effects of petroleum hydrocarbons and indicator hazardous substances unless reference dose values are otherwise available through the IRIS or HEAST data bases, or the department, in consultation with the Science Advisory Board, determines that there is clear and convincing scientific data which demonstrates the use of the values identified by the department under subsection (5) are inappropriate.

~~(f)~~ (h) In estimating a reference dose/reference concentration for a hazardous substance under ~~(e)~~ (f) of this subsection, the department shall consult with the science advisory board, the department of health, and the United States Environmental Protection Agency, and may, as appropriate, consult with other qualified persons. Scientific data supporting such a change shall be subject to the requirements under WAC 173-340-702(6).

~~(g)~~ (i) Where a reference dose/reference concentration other than those established under (d) of this subsection is used to establish a cleanup level or remediation level at individual sites, the department shall summarize the scientific rationale for the use of those values in the cleanup action plan. The department shall provide the opportunity for public review and comment on this value in accordance with the requirements of WAC 173-340-360 and 173-340-600.

(8) Carcinogenic ~~potency factor~~ toxicity values.

(a) For purposes of establishing cleanup levels and remediation levels for hazardous substances under this chapter, a carcinogenic potency factor established by the United States Environmental Protection Agency and available through the ~~"integrated risk information system"~~ IRIS data base shall be used. If a carcinogenic potency factor is not available from the IRIS data base, a carcinogenic potency factor from the HEAST data base shall be used.

(b) If a carcinogenic potency factor is available from the IRIS or HEAST data bases it shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of this value is inappropriate.

~~(b)~~ (c) If a carcinogenic potency factor is not available from IRIS or HEAST data bases ~~through the "integrated risk information system"~~ or is demonstrated to be inappropriate under ~~(a)~~ (b) of this subsection, one of the following methods shall be utilized to establish a carcinogenic potency factor:

(i) The carcinogenic potency factor may be derived from appropriate human epidemiology data on a case-by-case basis; or

(ii) The carcinogenic potency factor may be derived from animal bioassay data using the following procedures:

(A) All carcinogene~~city~~~~sis~~ bioassays shall be reviewed and data of appropriate quality shall be used for establishing the carcinogenic potency factor.

(B) ~~The linearized multistage e~~Extrapolation models and associated assumptions based on the most recent U.S. Environmental Protection Agency risk assessment or toxicological guidance shall be utilized to estimate the slope of the dose-response curve unless the department determines that there is clear and convincing scientific data which demonstrates that the use of an alternate extrapolation model or assumptions is more appropriate.~~;~~

(C) All doses shall be adjusted to give an average daily dose over the study duration; and

(D) An interspecies scaling factor shall be used to take into account differences between animals and humans. For oral carcinogenic potency factors, t~~T~~his scaling factor shall be based on the assumption that milligrams per surface area is an equivalent dose between species unless the department determines there is clear and convincing scientific data which demonstrates that an alternate procedure is more appropriate. The slope of the dose response curve for the test species shall be multiplied by this scaling factor in order to obtain the carcinogenic potency factor, except where such scaling factors are incorporated into the extrapolation model under (B) of this subsection. The procedure to derive a human equivalent concentration of inhaled particles and gases shall take into account, where available, the respiratory deposition and absorption characteristics of the gases and inhaled particles. Where adequate pharmacokinetic and metabolism studies are available, data from these studies may be utilized to adjust the interspecies scaling factor.

(d) When assessing the potential carcinogenic risk of mixtures of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans either of the following methods shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of these methods is inappropriate:

(i) The entire mixture is assumed to be as toxic as 2,3,7,8 TCDD. This is generally used when laboratory analyses do not sufficiently distinguish the components of the mixture.~~: or.~~

(ii) The toxicity equivalency factors and methodology described in: EPA. 1989. "Interim procedures for estimating risks associated with exposure to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs) and 1989 update", USEPA, Risk Assessment Forum, Washington , D.C., publication number EPA/625/3-89/016.

(e) When assessing the potential carcinogenic risk of mixtures of polycyclic aromatic hydrocarbons, either of the following methods shall be used unless the department determines that there is clear and convincing scientific data which demonstrates that the use of these methods is inappropriate:

(i) The entire mixture is assumed to be as toxic as benzo[a]pyrene. This is generally used when laboratory analyses do not sufficiently distinguish the components of the mixture.

(ii) The toxicity equivalency factors and methodology described in CalEPA. 1994. *Benzo(a)pyrene as a toxic air contaminant. Part B: Health Assessment.* Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Berkeley, CA. When using this methodology, at a minimum, the following compounds shall be analyzed for and included in the calculations: benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene.

~~(c)~~ (f) In estimating a carcinogenic potency factor for a hazardous substance under ~~(b)~~ (c) of this subsection, the department shall consult with the science advisory board, the department of health, and the United States Environmental Protection Agency, and may, as appropriate, consult with other qualified persons. Scientific data supporting such a change shall

be subject to the requirements under WAC 173-340-702(6).

~~(d)~~ (g) Where a carcinogenic potency factor other than that established under (a), (d), or (e) of this subsection is used to establish cleanup levels or remediation levels at individual sites, the department shall summarize the scientific rationale for the use of that value in the cleanup action plan. The department shall provide the opportunity for public review and comment on this value in accordance with the requirements of WAC 173-340-360 and 173-340-600.

(9) Lead toxicity. When assessing the human toxicity of lead contaminated soil, any of the following methods may be used:

(a) The values for soil lead cleanup provided in tables 4 and 5.

(b) The United States Environmental Protection Agency X Integrated Exposure Uptake Biokinetic Model (IEUBK model) for lead in children, version 0.99d., released February, 1994. When using this model, the following shall apply:

(i) Soil lead cleanup and remediation levels shall be based on protecting at least 95% of children modeled from having blood lead levels that exceed 10 micrograms/deciliter.

(ii) The default values provided for in the model and supporting guidance shall be used. Any proposed changes to the default values for exposure assumptions shall comply with subsection (11) of this section.

(iii) Any other method for calculating soil lead cleanup levels that complies with WAC 173-340-702.

~~(9)~~ (10) Bioconcentration factors.

(a) For purposes of establishing cleanup levels and remediation levels for a hazardous substance under WAC 173-340-730, a bioconcentration factor established by the United States Environmental Protection Agency and utilized to establish the ambient water quality criterion for that substance under section 304 of the Clean Water Act. For organic substances, where no value is available from the USEPA, the octanol-water partitioning coefficient may be used to calculate the bioconcentration factor. These methods shall be used unless the department determines that there is ~~clear and convincing~~ adequate scientific data which demonstrates that the use of an alternate value is more appropriate for the conditions present at the site.

(b) When utilizing a bioconcentration factor other than that utilized to establish the ambient water quality criterion, the department may, as appropriate ~~shall~~ consult with the science advisory board, the department of health, and the United States Environmental Protection Agency. Scientific data supporting such change shall be subject to the requirements under WAC 173-340-702(6)

(c) Where a bioconcentration factor other than that established under (a) of this subsection is used to establish cleanup levels or remediation levels at individual sites, the department shall summarize the scientific rationale for the use of that factor in the draft cleanup action plan. The department shall provide the opportunity for public review and comment on the value in accordance with the requirements of WAC 173-340-360 and 173-340-600.

~~(10)~~ (11) Exposure parameters.

(a) As a matter of policy, the department has defined in WAC 173-340-720 through 173-340-760 default values for ~~the~~ exposure parameters to be used when establishing cleanup levels under this chapter. ~~With the exception of the parameters identified~~ Except as provided for in (b) and (c) of this subsection and in WAC 173-340-720 through 173-340-760, these default values ~~parameters~~ shall not be changed ~~modified~~ for individual hazardous substances or sites. ~~in a manner which results in a less stringent cleanup level. The scientific and technical basis for these parameters shall be reviewed when updating this chapter under WAC 173-340-704(3).~~

~~(b) The department may approve the use of values other than those specified in WAC 173-340-720 through 173-340-760 where there is clear and convincing scientific data which demonstrates that one or more of the following parameters should be modified for an individual hazardous substance or site:~~

~~(i) Gastrointestinal absorption rate;~~

~~(ii) Inhalation correction factor;~~

~~(iii) Bioconcentration factor; or~~

~~(iv) Inhalation absorption rate.~~

(b) Exposure parameters that are primarily a function of the exposed population characteristics (such as body weight and lifetime) and those that are primarily a function of human behavior that cannot be controlled through an engineering or institutional control (such as fish consumption rate, soil ingestion rate, drinking water ingestion rate, and breathing rate) are not expected to vary on a site by site basis. The default values for these exposure parameters shall not be changed when calculating cleanup levels. For remediation levels, the default values for these exposure parameters may only be changed when an

alternate reasonable maximum exposure scenario is used, as provided for in WAC 173-340-708(3)(d), that reflects a different exposed population (such as using an adult instead of a child exposure scenario). Other exposure parameters may be changed only as follows:

(i) For calculation of cleanup levels, the types of exposure parameters that may be changed are those that are (A) primarily a function of reliably measurable characteristics of the hazardous substance, soil, hydrologic or hydrogeologic conditions at the site, and (B) are not dependent on the success of engineered controls or institutional controls for controlling exposure of persons to the hazardous substances at the site. The default values for these exposure parameters may be changed where there is adequate scientific data to demonstrate that use of an alternative or additional value would be more appropriate for the conditions present at the site. Examples of exposure parameters for which the default values may be changed under this provision include contaminant leaching and transport variables (such as the soil organic carbon content, aquifer permeability and soil sorption coefficient), inhalation correction factor, fish bioconcentration factor, soil gastrointestinal absorption rate, and inhalation absorption percentage.

(ii) For calculation of remediation levels, in addition to the exposure parameters that may be changed under paragraph (b)(i) above, the types of exposure parameters that may be changed from the default values are those where a demonstration can be made that the proposed remedy uses engineered controls and/or institutional controls that can be successfully relied on, for the reasonably foreseeable future, to control contaminant mobility and/or exposure to the contamination remaining on the site. In general, exposure parameters that may be changed under this subdivision are those that define the exposure frequency, exposure duration and exposure time. The default values for these exposure parameters may be changed where there is adequate scientific data to demonstrate that use of an alternative or additional value would be more appropriate for the conditions present at the site. Examples of exposure parameters for which the default value changed under this provision include infiltration rate, frequency of soil contact, duration of soil exposure, duration of drinking water exposure, duration of air exposure, drinking water fraction, and fish diet fraction.

(c) When the modifications provided for in (b) of this subsection result in significantly higher values for cleanup levels or remediation levels than would be calculated using the default values for exposure parameters, the risk from other potentially relevant pathways of exposure shall be addressed under the procedures provided for in WAC 173-340-720 through 173-340-760. For exposure pathways and parameters for which default values are not specified in this chapter, the framework provided for by this subsection, along with the quality of information requirements in WAC 173-340-702, shall be used to establish appropriate or additional assumptions for these parameters and pathways.

~~(c)~~ (d) Where the department approves the use of exposure parameters other than those established under WAC 173-340-720 through 173-340-760 ~~are used~~ to establish cleanup levels or remediation levels at individual sites, the department shall summarize the scientific rationale for the use of those parameters in the cleanup action plan. The department shall provide the opportunity for public review and comment on those values in accordance with the requirements of WAC 173-340-360 and 173-340-600. Scientific data supporting such a change shall be subject to the requirements under WAC 173-340-702(6)

~~(11)~~ (12) Methods for defining background concentrations.

(a) Sampling of hazardous substances in background areas may be conducted to distinguish site-related concentration from nonsite related concentrations of hazardous substances or to support the development of a ~~m~~Method C cleanup level under the provisions of WAC 173-340-706. For purposes of this chapter, two types of background may be determined, natural background and area background concentrations.

(b) For purposes of defining background concentrations, samples shall be collected from areas that have the same basic characteristics as the medium of concern at the site, have not been influenced by releases from the site and, in the case of natural background concentrations, have not been influenced by releases from other localized human activities.

(c) The statistical method used to evaluate available data shall be appropriate for the distribution of each hazardous substance. If the distribution of the hazardous substance data is inappropriate for statistical

methods based on a normal distribution, then the data may be transformed. If the distributions of individual hazardous substances differ, more than one statistical method may be required at a site. In general, appropriate statistical methods include the following:

(i) A tolerance interval procedure in which an interval for each hazardous substance is established from the distribution of background data and the cleanup level of each hazardous substance is compared to the upper ~~lower~~ tolerance limit; and

(ii) Other statistical methods proposed by the person undertaking the cleanup action and approved by the department.

(d) If a tolerance interval approach is used to evaluate natural background data, the tolerance interval shall have a coverage of ninety-five percent and a tolerance coefficient of ninety-five percent. When determining natural background concentrations for soil, sample size of ten or more background soil samples shall be required. When determining area background concentrations for soil, a sample size of twenty or more soil samples shall be required. The number of samples for other media shall be sufficient to provide a representative measure of background concentrations and shall be determined on a case-by-case basis.

(e) For purposes of estimating background concentrations, values below the method detection limit shall be assigned a value equal to one-half of the method detection limit. Measurements above the method detection limit, but below the practical quantitation limit shall be assigned a value equal to the method detection limit. The department may approve the use of alternate statistical procedures for handling data below the method detection limit or practical quantitation limit. Alternate statistical procedures may include probit analysis and regression analysis.

~~(12)~~ (13) Significant figures. Risk assessment results shall be presented using one significant figure.

(14) Probabilistic Risk Assessment. Probabilistic risk assessment methods may be used under this chapter on an informational basis for evaluating alternative remedies. Such methods shall not be used to replace cleanup standards and remediation levels derived using deterministic methods under this chapter until the department has promulgated rules describing adequate technical protocols and policies for the use of probabilistic risk assessment under this chapter.

WAC 173-340-709 Terrestrial ecological evaluation procedures (pilot rules).

(1) Applicability. (a) This section contains pilot rules as part of a pilot rule project being conducted by the department. The pilot rule project is to be conducted consistently with RCW 34.05.313. The results of the project will be used to determine whether these or similar rules should be adopted as final rules of general applicability to achieve the goals stated in subsection (3)(a), and to assure that any rules finally adopted are simple, efficient and economical.

(b) The department shall conduct the pilot project for a minimum of one year, and shall not adopt final rules of general applicability until after the department has produced a report on the pilot rule project, published it with a request for public comment, and addressed comments received. These pilot rules will be used in their current form until the department completes the pilot rule project.

(c) The department may request that persons participate in the pilot project when entering into a consent decree or agreed order, or when submitting a request to the department for a determination that no further action is required at an independent cleanup site.

(2) Purpose. (a) This section defines the goals and procedures for:

(i) determining whether a release of hazardous substances to the environment may pose a threat to the terrestrial environment that would not be adequately addressed by remedies addressing human health concerns; and

(ii) evaluating such residual threats to the terrestrial environment as appropriate to support remedy selection.

(b) Terrestrial evaluations should be conducted in the context of site conditions expected to exist after human health based remedies and future land use are determined. Thus, it is generally most appropriate to conduct any site-specific evaluation under subsection (7) as part of the feasibility study for a site.

(c) These procedures are not intended to be used to evaluate potential ecological impacts to sediment, wetlands or surface water.

(3) Goals. (a) The overall goal of the terrestrial ecological evaluation process is to protect terrestrial species from significant adverse effects.

(b) The simplified evaluation process described in subsection (6) of this section supports a conclusion of protectiveness without further analysis.

(c) If a site-specific evaluation is conducted under subsection (7), then the evaluation shall focus upon adverse effects related to impaired reproduction, growth or survival. For the purposes hereof, the significance of an adverse effect relates to the ecological significance of an impairment of reproduction, growth or survival for the impacted species at a site. When site-specific studies are performed, the measurement endpoints should be relevant to the management goals of protecting the terrestrial environment from significant adverse effects. Not all statistically significant changes in measurement endpoints are ecologically significant. For threatened and endangered species, the significance of an adverse effect is evaluated relative to an impacted individual. For all other species, the significance of an adverse effect is evaluated relative to an impacted local population of species of concern, rather than to a particular individual or subgroup, and refers to an adverse effect that is significant in the way that it alters important structural or functional characteristics or components of the affected ecosystem.

(d) For properties with industrial, agricultural or commercial land uses, protectiveness is evaluated relative to wildlife only, and not for plants, except for threatened or endangered non-wildlife species. For all other sites, protectiveness is evaluated relative to wildlife and plants.

(4) Process. There are three processes for determining whether additional analysis is needed to address potential terrestrial ecological concerns at a site:

(a) Sites meeting the exclusions set forth in subsection (5) require no further action;

(b) Most non-excluded sites may conduct a simplified evaluation as set forth in subsection (6); and

(c) Some sites may need a site-specific evaluation as set forth in subsection (7).

(5) Exclusions. This section does not apply to a site that meets any one of the following criteria:

(a) There are less than 1.5 acres of contiguous undeveloped land within 500 feet of any area of the site contaminated with hazardous substances other than those specified in subsection (5)(b).

(b) There is less than ¼ acre of contiguous undeveloped land within 500 feet of any area of the site contaminated with any of the following hazardous substances: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

(c) Soil contaminants of concern either are, or will be, located at least six feet below the ground surface. To qualify for this exclusion, a restrictive covenant and/or financial assurance addressing the activity and implementation timeframe may be required by the department under WAC 173-340-440.

(d) Soil contaminants of concern are covered or expected to be covered by buildings, roads, pavement, constructed soil or gravel layers, or other physical barriers that prevent wildlife from contacting contaminated soil and from feeding on plants or soil biota in the contaminated area. Suitable physical barriers include, but are not limited to, 1 foot of clean topsoil, or 6 inches of crushed rock or gravel, or 6 inches of clean fill compacted to 90% Proctor covered by 3 inches of crushed rock or gravel. To qualify for this exclusion, a restrictive covenant and/or financial assurance addressing the activity and implementation timeframe may be required by the department under WAC 173-340-440.

(e) Concentrations of soil contaminants of concern do not exceed natural background levels, as those levels are determined under WAC 173-340-708(12).

(f) For the purposes of subsections (5)(a) and (5)(b), "undeveloped land" shall mean land that is characterized by native or semi-native vegetation, and shall not include land which is, or is reasonably expected to be, covered by buildings or roads or otherwise substantially altered as part of its land use, such as lands used for agriculture, industry, commercial development, high density residential development, transportation, or intensive recreation.

(6) Simplified evaluation.

(a) Applicability. (i) A terrestrial ecological evaluation may be conducted using the simplified process described under this subsection unless:

(A) Any of the following are known to live or feed at the site: wildlife species listed by the Washington State Department of Fish and Wildlife as endangered, threatened or sensitive species in WAC 232-12; or plant species listed in *Endangered, Threatened and Sensitive Plants of Washington*

published [DATE] by the Washington State Department of Natural Resources; or

(B) The area of contamination at the site is located on, or directly adjacent to, a terrestrial environment meeting the definition of "sensitive environment" under WAC 173-340-200.

(ii) If one of the above criteria applies, then the requirements for a site-specific evaluation set forth in subsection (7) should be met when conducting a terrestrial evaluation.

(b) Process Overview. The simplified process is a series of steps intended to screen out sites that do not have a substantial potential for posing a threat of significant adverse effects to terrestrial ecological receptors. The department expects that most sites will be screened out in this process, and that a site-specific evaluation will be needed for relatively few sites. The process is structured with an intent to only protect wildlife at industrial and commercial properties, and to protect wildlife and plants at other properties.

(c) Process. The following screening steps are organized to focus upon habitat, pathways and contaminants as key factors in evaluating potential ecological risk. The steps need not be followed in order, and any one step may be used to determine that no further evaluation is necessary to conclude that a site does not pose a substantial threat of significant adverse effects to terrestrial species.

(i) Habitat analysis. No further evaluation is necessary if there is no undeveloped land within 500 feet of an area of contamination, or the undeveloped land does not provide habitat of sufficient quantity or quality to be of significant ecological concern. "Undeveloped land" shall have the meaning set forth in subsection (5)(f). Table 1 shall be used to evaluate the quality and quantity of available habitat under this subsection.

(ii) Pathways analysis. No further evaluation is necessary if there are, or will be, no complete pathways from soil impacted by a release of hazardous substances to wildlife, or in the case of properties with other than commercial, agricultural or industrial uses, to wildlife or plants. Incomplete pathways may be due to the presence of man-made physical barriers, either currently existing or to be placed as part of a remedy or land use. To assure that such man-made barriers are maintained, a restrictive covenant and/or financial assurance addressing the activity and implementation timeframe may be required by the department under WAC 173-340-440.

(iii) Contaminants analysis. No further evaluation is necessary if any of the following are true:

(A) The surface area of contamination not covered by a physical exposure barrier is less than or equal to 350 square feet.

(B) No hazardous substance listed in Table 2 will be present in the soil within 6 feet of the surface at the site exceeding the screening levels identified in the Table for the applicable land use.

(C) No hazardous substance listed in Table 2 will be present in the soil within 6 feet of the surface at the site in concentrations indicating toxicity or potential to biomagnify based on bioassays using methods approved by the Department.

(7) Site-specific evaluation.

(a) Applicability. This subsection sets forth the procedures for conducting a site-specific terrestrial evaluation if either of the criteria specified in subsection (6)(a)(i) apply to the site, or if a simplified evaluation conducted under subsection (6) has not supported a conclusion of protectiveness. A potentially liable party may elect at any time to conduct a site-specific evaluation under this subsection, whether or not a simplified evaluation has been conducted under subsection (6).

(b) Process overview. The scope and focus of a site-specific terrestrial ecological evaluation should be determined based upon information gathered at the site regarding contaminants, pathways and receptors. There shall be no minimum level of effort associated with conducting the evaluation beyond addressing the elements specified in subsection (7)(c). Sufficient information should be collected to either determine that a site poses no substantial threat of significant adverse effects to ecological receptors, or to facilitate selection of a remedy that is protective of ecological receptors that live or feed at the site. Development of a quantitative cleanup level is not necessary or expected where a qualitative evaluation is sufficient to facilitate remedy selection. Given the developing nature of the science of ecological evaluation, the number of variables affecting the relevance of any measurement endpoint to any assessment endpoint, and the disparate societal value of different receptors, it is expected that evaluations will have a significant qualitative component.

(c) Process. There are two elements to a site-specific evaluation: problem formulation and, if a problem is determined to exist, effects analysis.

(i) Problem formulation. As necessary to evaluate the potential for significant adverse effects, the following should be identified through site investigation:

(A) Chemicals of concern. Identify any hazardous substances present at the site that have a potential to cause significant adverse effects to ecological receptors in concentrations below those considered protective of human health. If there are none, then no further evaluation is necessary. Indicator chemicals may be selected as the chemicals of concern using the criteria specified in WAC 173-340-708(2).

(B) Identify receptor species of concern that live or feed at the site or are otherwise representative of local species populations. Surrogate species for which greater information is available may be selected as receptors of concern when appropriate for reasonably identifying the ecological risks posed to receptors actually present at the site. Soil biota may be used as surrogates if measurable effects on the soil biota are reasonably indicative of potential effects upon plants, or upon wildlife or their food sources.

(C) Identify any complete pathways for exposure of the receptor species of concern to the chemicals of concern within the biologically active zone relevant to the receptor species of concern, to a maximum of six feet below the ground surface. Incomplete pathways may be due to man-made physical barriers, either currently existing or to be placed as part of a remedy or land use. To assure that man-made barriers are maintained, a restrictive covenant and/or financial assurance addressing the activity and implementation timeframe may be required by the department under WAC 173-340-440. If there are no complete pathways of exposure of receptor species of concern to the chemicals of concern, then no further evaluation is necessary.

(D) Evaluate whether the potential adverse effects to the receptors of concern relate to impaired reproduction, growth or survival, and whether such potential effects could be significant relative to the goals identified in subsection (3). If there are no potentially significant adverse effects posed to receptor species of concern by the chemicals of concern, then no further evaluation is necessary.

(ii) Effects analysis.

(A) Approach. If it is determined during the problem formulation step that further evaluation is necessary, then an effects analysis should be conducted. The effects analysis may focus upon establishing that there is not a substantial potential for significant adverse effects on receptors of concern resulting from exposure to the chemicals of concern, or on developing cleanup levels or remediation levels for use in the remedy selection process, or on identifying areas where current exposure pathways could be altered to prevent significant adverse effects.

(B) Methodology. (I) The methodology used for the effects analysis should be appropriate for the site given the results of the problem formulation. If published literature values exist for the chemicals and receptor species of concern, then either a literature survey or a weight of evidence approach shall be used which takes the literature values into account. Otherwise, any one or more of the following methodologies may be used to conduct an effects analysis:

- Wildlife exposure or food web modeling.
- Literature survey.
- Soil Bioassays.
- Field Studies.
- Other methodologies approved by the department.
- Weight of evidence approaches using one or more of the above methods.

(II) The parameters used for a site specific evaluation should be appropriate for the site, and may differ from those used by the department in deriving the hazardous substance concentrations contained in Table 2 for use in a simplified evaluation under subsection (6).

(C) Analysis to support remedy selection.

(I) The results of the analysis under subsection (7)(c)(ii)(B) should be interpreted in light of the goals set forth in subsection (3) and the approach identified in subsection (7)(c)(ii)(A).

(II) The analysis may include consideration of the likelihood of reduction of impacts to receptors over time, and the resilience of the receptors or receptor populations.

(III) The analysis may include consideration of the likelihood that adverse impacts to receptors from implementing a remedial action may be more significant than a less disruptive action or no action.

(8) Criteria for altering chemical information. The department shall only include or alter the types

and concentrations of hazardous substances set forth in subsection (5)(b) and Tables 1 and 2 as follows:

(a) The chemicals identified in subsection (5)(b) and Table 1 shall be limited to those hazardous substances for which current peer-reviewed data indicate a significant tendency to biomagnify.

(b) The hazardous substances and corresponding concentrations of those substances identified in Table 2 shall be limited to those which meet all of the following criteria:

(I) The data supporting the information included in Table 2 shall meet the quality of information standards set forth in WAC 173-340-702(15);

(II) The data indicate a significant tendency of the hazardous substance to persist, biomagnify, or be highly toxic to ecological receptors of concern;

(III) The concentrations for hazardous substances listed in Table 2 shall be based on wildlife studies for industrial, agricultural and commercial land uses, and upon plant and wildlife studies for other land uses. Studies based on effects upon soil biota may be used as a surrogate for deriving concentrations only in the absence of data for wildlife and plants; and

(IV) The concentrations for hazardous substances listed in Table 2 shall be based upon the 50th percentile of LOAELs identified in studies meeting the quality requirements specified herein for the species of concern.

(9) Regulatory Review. The department shall undertake a review of this section at least every two years after its effective date to assure that the provisions hereof are practicable and appropriate for achieving the goals set forth in subsection (3).

Table 1
Ecological Evaluation of Soil - Habitat Calculation [a]

1) Estimate the area of undeveloped land to the nearest 1/2 acre (1/4 acre if the area is small). From the table below, find the number of points corresponding to the area and enter this number in this box.	

Area (acres)	Points
0.25 or less	4
0.5	5
1.0	6
1.5	7
2.0	8
2.5	9
3.0	10
3.5	11
4.0 or more	12

2) Is this is an industrial, agricultural or commercial property? (Yes = 3, No = 1)	
3) Enter a score for the habitat quality of the undeveloped land, using the rating system shown below [b]. (High = 1, Intermediate = 2, Low = 3)	
4) Is the undeveloped land likely to attract wildlife? (Yes = 1, No = 2)[c]	
5) Are there any of the following soil contaminants present: chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? (Yes = 1, No = 4)	
6) Add the numbers from lines 2 through 5. If line 6 is larger than line 1, the quantity and/or quality of potential habitat is not considered adequate to warrant further analysis for significant adverse effects.	

[a] This analysis applies to contiguous undeveloped land within 500 feet of the soil contamination. "Undeveloped land" means land that is characterized by native or semi-native vegetation, and that is not covered by buildings or roads, or otherwise substantially altered as part of its land use, such as lands used for agriculture, commercial development, industry, high-density residential development, transportation, or intensive recreation.

[b] Habitat rating system. Rate the quality of the habitat as high, intermediate or low. This is best based on the professional judgment of a qualified scientist such as a field biologist. The following are suggested factors to consider in making this evaluation:

Low: Bare soil or early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; critical habitat (as defined by the Washington Department of Fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

s Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: birds frequently visit the area to feed; evidence of high use by mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

Table 2
Screening Levels for Contaminants of Ecological Concern

Contaminant	Industrial/Commercial/ Agricultural Land Uses (mg/kg)	Other Land Uses (mg/kg)
METALS:	[VALUES TO BE CONFIRMED AS CONSISTENT WITH NEW SUBSECTION 709(8)]	
Arsenic III		
Arsenic V		
Cadmium		
Chromium VI		
Copper		
Lead		
Mercury, inorganic		
Mercury, organic		
Molybdenum		
Nickel		
Selenium		
Silver		
Tin, organic		
Vanadium		
Zinc		
OTHER CHEMICALS:		
Benzo[a]pyrene		
Acenaphthene		
PESTICIDES:		
Aldicarb/aldicarb sulfone		
Aldrin		
Carbofuran		
Chlordane		
Chlorpyrifos/chlorpyrifos-methyl		
DDT/DDD/DDE		
Dieldrin		
Endosulfan		
Endrin		
Heptachlor/heptachlor epoxide		
BHC (incl. lindane)		
Parathion/methyl parathion		
Toxaphene		
Hexachlorobenzene		
Pentachlorophenol		
OTHER CHLORINATED ORGANICS:		
PCBs		
Dioxins		
Chlorinated dibenzofurans		
Pentachlorobenzene		

Hexachlorobenzene

[a] Caution on misusing screening levels. These values have been developed for use at sites that do not meet any of the exclusion criteria but where a more careful site-specific terrestrial evaluation is not necessary. Exceedances of the values in this table do not necessarily trigger requirements for cleanup action under this chapter. The table is not intended for purposes such as evaluating sludges or wastes.

This list does not imply that sampling must be conducted for each of these hazardous substances at every site. Sampling should be conducted for those hazardous substances that might be present based on available information, such as current and past uses of the hazardous substances at the site.

WAC 173-340-710 Applicable state and federal laws. (1) Applicable state and federal laws.

(a) All ~~cleanup~~ remedial actions conducted under this chapter shall comply with applicable state and federal laws. ~~For purposes of this chapter, the term "applicable state and federal laws" shall include legally applicable requirements and those requirements that the department determines, based on consideration of the criteria in subsection (2) of this section, are relevant and appropriate requirements.~~

(b) The person conducting a ~~cleanup~~ remedial action shall identify all applicable state and federal laws. The department shall make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate.

(2) Legally applicable requirements. Legally applicable requirements include those cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations promulgated under state or federal law that specifically address a hazardous substance, cleanup action, location or other circumstances at the site.

(3) Relevant and appropriate requirements. Relevant and appropriate requirements include those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site. WAC 173-340-710 through 173-340-760 identifies several requirements the department shall consider relevant and appropriate for establishing cleanup standards. For other regulatory requirements, the following criteria shall be evaluated, where pertinent, to determine whether such requirements are relevant and appropriate for a particular hazardous substance, remedial action, or site:

(a) Whether the purpose for which the statute or regulations under which the requirement was created is similar to the purpose of the cleanup action;

(b) Whether the media regulated or affected by the requirement is similar to the media contaminated or affected at the site;

(c) Whether the hazardous substance regulated by the requirement is similar to the hazardous substance found at the site;

(d) Whether the entities or interests affected or protected by the requirement are similar to the entities or interests affected by the site;

(e) Whether the actions or activities regulated by the requirement are similar to the cleanup action contemplated at the site;

(f) Whether any variance, waiver, or exemption to the requirements are available for the circumstances of the site;

(g) Whether the type of place regulated is similar to the site;

(h) Whether the type and size of structure or site regulated is similar to the type and size of structure or site affected by the release or contemplated by the cleanup action; and

(i) Whether any consideration of use or potential use of affected resources in the requirement is similar to the use or potential use of the resources affected by the site or contemplated cleanup action.

(4) Variances. For purposes of this chapter, a regulatory variance or waiver provision included in an applicable state and federal law shall be considered potentially applicable to ~~interim actions and cleanup~~ remedial actions and the department may determine that a particular regulatory variance or waiver is appropriate if the substantive conditions for such a regulatory variance or waiver are met. In all such cases, ~~interim actions and cleanup~~ remedial actions shall be protective of human health and the environment.

~~(5) New requirements. The department shall consider new applicable state and federal laws as part of the periodic review under WAC 173-340-420. Cleanup actions shall be evaluated in light of these new requirements to determine whether the cleanup action is still protective of human health and the environment.~~

~~(6)~~ (5) Selection of cleanup actions. (a) To demonstrate compliance with WAC 173-340-360, cleanup actions shall comply with all applicable state and federal laws in addition to the other requirements of this chapter. ~~The following, which is not a complete list, are selected applications of specific applicable state and federal laws to cleanup actions.~~

~~(a) Water discharge requirements. Hazardous substances which are directly or indirectly released or proposed to be released to waters of the state shall be provided with all known, available and reasonable methods of treatment consistent with the requirements of chapters 90.48 and 90.54 RCW and the regulations that implement those statutes.~~

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~~(b) Air emission requirements. Best available control technologies consistent with the requirements of chapter 70.94 RCW and the regulations that implement this statute shall be applied to releases of hazardous substances to the air resulting from cleanup actions at a site.~~

~~(c) Solid waste landfill closure requirements. For solid waste landfills, the solid waste closure requirements in chapter 173-304 WAC shall be minimum requirements for cleanup actions conducted under this chapter. In addition, when the department determines that the closure requirements in chapter 173-303 WAC are applicable requirements, the more stringent closure requirements under that law shall also apply to cleanup actions conducted under this chapter.~~

~~(d) Sediment management requirements. Sediment cleanup actions conducted under this chapter shall comply with the sediment cleanup standards in chapter 173-204 WAC. In addition, a state remedial investigation/feasibility study conducted under WAC 173-340-350 shall also comply with the cleanup study plan requirements under chapter 173-204 WAC. The process for selecting sediment cleanup actions under this chapter shall comply with the requirements in WAC 173-340-360.~~

(b) A remedial action that is conducted by the department or by a potentially liable person under an order or decree, is exempt from the procedural requirements of the following laws:

(i) Chapter 70.94 RCW;

(ii) Chapter 70.95 RCW;

(iii) Chapter 70.105 RCW;

(iv) Chapter 75.20 RCW;

(v) Chapter 90.48 RCW;

(vi) Chapter 90.58 RCW; and

(vii) Any law requiring or authorizing local government permits or approvals for the remedial action.

(c) Remedial actions exempt from procedural requirements under (b) of this subsection shall comply with the substantive requirements of such laws. The department shall ensure compliance with the substantive requirements and provide an opportunity for comment by the public and by the state agencies and local governments that would otherwise implement these laws, by any one or more of the following means:

(i) Prior to proposing any permit exemption, a potentially liable person and/or the department may informally consult with the state agencies and local governments to identify potential permits and substantive requirements.

(ii) The permits proposed for exemption and the substantive requirements, to the extent they are known, should be identified in the order, decree, or if the cleanup is being conducted by the department, in the work plan prepared by the department.

(iii) Any public notice issued in accordance with WAC 173-340-600 may specifically identify the permits proposed for exemption and seek comment on these exemptions. This notice shall be mailed to the state agencies and local governments that would otherwise implement the relevant permits. This notice may also be mailed to the same individuals that the state agencies and local government would normally mail notice to if a permit were being issued.

(iv) A substantive requirement of a law referred to under (b) of this subsection that the department determines to be applicable to the remedial action shall be incorporated into the order, decree, or work plan if it has been identified by a state agency or local government prior to or during the public comment period. A state agency or local government that fails to comment on substantive requirements during the public comment period may not thereafter identify new or additional substantive requirements.

(v) Nothing in this subsection is intended to prohibit a state or local agency from charging a fee to the person conducting the remedial action to defray the costs of services rendered relating to the substantive requirements under this subsection.

(d) An exemption under (b) of this subsection shall not apply if the department determines that the particular exemption would result in loss of approval from a federal agency necessary for the state to administer any federal law. Such determination shall not affect the applicability of the exemptions to other specified statutes.

~~(7)~~(6) Interim actions. Interim actions conducted under this chapter shall comply with legally applicable requirements. The department may also determine, based on the criteria in subsection (3) of this section, that other requirements, criteria, or limitations are relevant and appropriate for interim actions.

WAC 173-340-720 Ground water cleanup standards. (1) Overview. [RESERVED]

~~(1) General considerations.~~

(2) Determining the protected beneficial use and reasonable maximum exposure scenario.

(a) Basis for ground water cleanup levels. (i) Ground water cleanup levels shall be based on ~~estimates of the highest~~ protection of the anticipated beneficial use or uses of the ground water and the reasonable maximum exposure expected to occur under both current and potential future site use conditions, as determined under this subsection. Ground water may have one or more beneficial uses, and cleanup levels for a particular ground water shall be the most stringent of those levels specified under paragraphs (b), (c) and (d) of this subsection that are applicable to the ground water based on its beneficial uses.

(ii) Where a release of a hazardous substance to ground water may present a threat to human health or the environment, a ground water cleanup standard shall be established for the hazardous substance as provided in this section.

(b) Protection of ground water as drinking water. (i) The department has determined that ~~for~~ at most sites the use of ground water as a source of drinking water is the beneficial use requiring the highest quality of ground water and that exposure to hazardous substances ~~via~~ through ingestion of drinking water and other domestic uses represents the reasonable maximum exposure. ~~In the event of a release of a hazardous substance, treatment, removal, or containment measures shall be conducted to reduce the concentration of the hazardous substance in ground water to a concentration consistent with this use unless the following can be demonstrated:~~

(ii) Except as provided in subsection (b)(iii) of this section, a ground water cleanup level established for a hazardous substance released at the facility shall be protective of ground water as drinking water unless:

~~(i)~~ (A) The ground water does not serve as a current source of drinking water;

~~(ii)~~ (B) The ground water is not a potential future source of drinking water for any of the following reasons:

~~(A)~~ (I) The ground water is present in insufficient quantity to yield greater than 0.5 gallon per minute on a sustainable basis to a well constructed in compliance with chapter 173-160 WAC and in accordance with normal domestic water well construction practices for the area in which the site is located; or

~~(B)~~ (II) The ground water contains natural background concentrations of organic or inorganic constituents ~~which~~ that make use of the water ~~for~~ as a source of drinking water not practicable, including, but not limited to, ~~G~~ground water containing total dissolved solids at concentrations greater than 10,000 mg/l; and ~~shall normally be considered to have fulfilled this requirement; or~~

~~(C) The ground water is situated at a great depth or location which makes recovery of water for drinking water purposes technically impossible; and~~

~~(iii)~~ (C) ~~The department determines it~~ It is unlikely that hazardous substances will be transported from the contaminated ground water to ground water that is a current or potential future source of drinking water, as defined in paragraph ~~(a)(ii)~~ (c)(i)(B) of this subsection, at concentrations which exceed ground water quality criteria published in chapter 173-200 WAC. ; or

~~(iv) More stringent concentrations are necessary to protect human health or the environment.~~

~~(b) In making a determination under (a)(iii) of this subsection, the department shall~~ taking into consideration site-specific factors including:

~~(i)~~ (I) The extent of affected ground water;

~~(ii)~~ (II) The distance to existing water supply wells;

~~(iii)~~ (III) The likelihood of interconnection between the contaminated ground water and ground water that is a current or potential future source of drinking water due to well construction practices in the area of the state where the site is located;

~~(iv)~~ (IV) The physical and chemical characteristics of the hazardous substance;

~~(v)~~ (V) The hydrogeologic characteristics of the site;

~~(vi)~~ (VI) The presence of discontinuities in the affected geologic stratum; and

~~(vii)~~ (VII) The degree of confidence in any predictive modeling performed.

~~(c)~~ (iii) Notwithstanding the provisions of paragraph (b)(ii) of this subsection, ~~T~~the department recognizes that there may be sites where there is an extremely low probability that ground water ~~classified as potential future source of drinking water under (b) of this subsection~~ will actually be used ~~for that purpose (i.e., the shallow ground waters on Harbor Island)~~ as drinking water, even though it may meet the technical criteria under subsection (b)(ii). At such sites, ~~the department may approve~~ ground water cleanup levels ~~that are~~ may be based on protecting beneficial uses of

~~adjacent surface water~~ other than drinking water under paragraphs (c) and/or (d) of this subsection if the person undertaking the cleanup action can demonstrate all of the following:

~~(i) There are known or projected points of entry of the ground water into the surface water;~~

~~(ii) The surface water is not classified as a suitable domestic water supply source under chapter 173-201 WAC;~~

~~(iii)~~ (i) Ground water that flows into surface waters will ~~result in no~~ not cause exceedances of surface water cleanup levels at the point of entry or at any downstream location where it is reasonable to believe that hazardous substances may accumulate;

(ii) The ground water does not serve as a source of drinking water for any current developments on the site or any other areas potentially affected by the release.

(iii) The use of a ground water cleanup level based on protection of surface waters would not otherwise pose a threat to human health or the environment as a result of cross-media contamination.

(iv) The local government with land use planning jurisdiction and any water purveyors with water supply jurisdiction for the site and any other areas potentially affected by the release have been mailed a notice of the proposal to base cleanup levels on protection of surface water or other beneficial uses rather than as a potential future source of drinking water. The notice shall be in addition to any notice provided under WAC 173-340-600 and invite comments, including providing information on planned uses of the ground water. The department will give greater weight to information based on an adopted or pending plan or similar preexisting document.

(v) The property owners located within the site and within any other areas potentially affected by the ground water contamination have been mailed a notice of the proposal to base cleanup levels on protection of surface water beneficial uses rather than as a potential future source of drinking water. The notice shall be in addition to any notice provided under WAC 173-340-600 and shall invite comments, including providing information on planned uses of the ground water;

~~(iv)~~ (vi) To the extent necessary, ~~T~~the cleanup action includes institutional controls complying with WAC 173-340-440 that will prevent the use of contaminated ground water ~~at any point between the source of hazardous substances and the point(s) of entry of the ground water into the surface water~~ for drinking water purposes and other uses that are inconsistent with the cleanup level; and

~~(v)~~ (vii) ~~The department determines i~~It is unlikely that hazardous substances will be transported from the contaminated ground water to ground water that is a current or potential future source of drinking water, as defined in ~~(b)~~ paragraph (c)(i)(B) of this subsection, at concentrations which exceed ground water quality criteria published in chapter 173-200 WAC.

(c) Protection of surface water. (i) Cleanup levels for ground waters that actually discharge to surface water shall be protective of the surface water. Cleanup levels protective of surface water shall be consistent with WAC 173-340-730. This paragraph shall apply in addition to the requirements under paragraph (b) of this subsection if the ground water, or surface water to which the ground water discharges, is required to be protected as drinking water.

(ii) Cleanup levels for ground water that is not required to be protected as drinking water under paragraph (b) of this subsection may be based on protection of surface water or other beneficial uses as provided under paragraph (d) of this subsection.

(d) Protection of other uses of ground water. (i) Ground water cleanup levels should be protective of other reasonably anticipated beneficial uses of ground water.

(ii) The department has determined that generally use of ground water as drinking water is the highest beneficial use of the ground water. Cleanup levels that protect drinking water uses shall be considered protective of other beneficial uses of the ground water unless the department determines that such levels are not sufficiently protective. Where more stringent cleanup levels are necessary to protect a current or potential future beneficial uses of ground water other than drinking water, the cleanup level shall be established ~~by the department under methods B or C~~ under subsection (3), (4) or (5) of this section, as appropriate, based on such beneficial use.

(iii) For ground water that is not required to be cleaned up to levels protective of a drinking water use under paragraph (b) of this subsection or of surface water under paragraph (c) of this subsection, cleanup

levels either shall be based on protection of surface water or on the results of a site-specific assessment of other beneficial uses of the ground water. Any site-specific assessment shall be conducted in accordance with subsection (6) of this section.

(e) Releases of hazardous substances to ground waters of the state shall not directly or indirectly cause violations of surface water, sediments, soil, or air cleanup standards established under this chapter or other applicable state and federal laws.

~~(2)~~(3) Method A cleanup levels.

(a) Where the ground water is a current or potential future source of drinking water, ~~m~~Method A cleanup levels may be established under this section unless more stringent cleanup levels are necessary to protect a current or potential future beneficial use of ground water other than drinking water. Method A cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations listed in Table ~~1~~ 3:

DISCUSSION DRAFT (SEPTEMBER 25, 2000~~SEPTEMBER 11, 2000OCTOBER 8, 1998~~)

PROPOSED MODEL TOXICS CONTROL ACT RULE REVISIONS

Table ~~1~~ 3
Method A Cleanup Levels - Ground Water[a]

Hazardous Substance	CAS Number	Cleanup Level	
Arsenic	7440-38-2	5.0 ug/liter[b]	
Benzene	71-43-2	5.0 ug/liter[c]	
Cadmium	7440-43-9	5.0 ug/liter[d]	
Chromium (Total)	7440-47-3	50.0 ug/liter[e]	
DDT	50-29-3	0.1 ug/liter[f]	
1,2 Dichloroethane	107-06-2	5.0 ug/liter[g]	
Ethylbenzene	100-41-4	~~30.0 ug/liter[h]~~	700 ug/liter[h]
Ethylene dibromide	106-93-4	0.01 ug/liter[i]	
Gross Alpha Particle Activity		15.0 pCi/liter[j]	
Gross Beta Particle Activity		4.0 mrem/yr[k]	
n-Hexane	110-54-3	480 ug/liter[l]	
Lead	7439-92-1	~~5.0 ug/liter[i]~~	15.0 ug/liter[m]
Lindane	58-89-9	0.2 ug/liter[n][q]	
Methylene chloride	75-09-2	5.0 ug/liter[n][o]	
Methyl tertiary-butyl ether	1634-04-4	40.0 ug/liter[n]	
Mercury	7439-97-6	2.0 ug/liter[n][q]	
Naphthalene	91-20-3	180 ug/liter[r]	
PAHs (carcinogenic)[s]		~~0.1 ug/liter[p]~~	
Benzo[a]anthracene	56-55-3	0.12 ug/liter	
Benzo[b]fluoranthene	205-99-2	0.12 ug/liter	
Benzo[k]fluoranthene	65-85-0	0.12 ug/liter	
Benzo[a]pyrene	50-32-8	0.12 ug/liter	
Chrysene	218-01-9	1.2 ug/liter	
Dibenz[a,h]anthracene	53-70-3	0.3 ug/liter	
Indeno[1,2,3-c,d]pyrene	193-39-5	0.12 ug/liter	
PCB mixtures		0.1 ug/liter[q]	
Radium 226 and 228		5.0 pCi/liter[n][q]	
Radium 226		3.0 pCi/liter[n][t]	
Tetrachloroethylene	127-18-4	5.0 ug/liter[n][u]	
Toluene	108-88-3	~~40.0 ug/liter[n]~~	1,000 ug/liter[x]
Total Petroleum Hydrocarbons[w]		~~1000.0 ug/liter[v]~~	
TPH (gasoline)		1,000 ug/liter	
TPH (diesel)		1,000 ug/liter	
TPH (mineral oil)		1,500 ug/liter	
TPH (other or unknown)		1,000 ug/liter	
1,1,1 Trichloroethane	71-55-6	200.0 ug/liter[n][z]	
Trichloroethylene	79-01-5	5.0 ug/liter[n][aa]	
Vinyl chloride	75-01-4	0.2 ug/liter[n][bb]	
Xylenes	1330-20-7	~~20.0 ug/liter[n]~~	10,000 ug/liter[cc]

[a] Caution on misusing method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with

relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

[b] Arsenic. Cleanup level based on background concentrations for state of Washington.

[c] Benzene. Cleanup level based on applicable state and federal law (WAC 296-290-310 and 40 CFR 141.61).

[d] Cadmium. Cleanup level based on applicable state and federal law and concentration derived using procedures in subsection (3)(a)(ii)(A)(I) of this section and a hazard quotient of 0.2.

[e] Chromium (Total). Cleanup level based on applicable state and federal law.

[f] DDT. Cleanup levels based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section.

[g] 1,2 Dichloroethane. Cleanup level based on applicable state and federal law (WAC 296-290-310 and 40 CFR 141.61).

[h] Ethylbenzene. Cleanup level based on applicable state and federal law (WAC 296-290-310 and 40 CFR 141.61) ~~and prevention of adverse aesthetic characteristics~~.

[i] Ethylene dibromide. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section and modified based on analytical considerations (i.e., Method B value adjusted upward to PQL).

[j] Gross Alpha Particle Activity, excluding uranium. Cleanup level based on applicable state and federal law.

[k] Gross Beta Particle Activity, including gamma activity. Cleanup level based on applicable state federal law.

[l] n-Hexane. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(A)(I) of this section.

[~~l~~m] Lead. Cleanup level based on applicable state and federal law (WAC 173-340-310 and 40 CFR 141.80) ~~and prevention of unacceptable blood lead levels~~.

[~~m~~n] Lindane. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section.

[~~n~~o] Methylene chloride. Cleanup level based on concentration derived using the procedures in subsection (3)(a)(ii)(B) of this section.

[p] Methyl tertiary-butyl ether. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(A)(I) of this section.

[~~o~~q] Mercury. Cleanup level based on applicable state and federal law.

[r] Naphthalene. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(A)(I) of this section.

[~~p~~s] PAHs (carcinogenic). Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section ~~and modified based on analytical considerations~~.

[~~q~~t] PCB mixtures. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section and modified based on analytical considerations.

[~~r~~u] Radium 226 and 228. Cleanup level based on applicable state and federal law.

[~~s~~v] Radium 226. Cleanup level based on applicable state and federal law.

[~~t~~w] Tetrachloroethylene. Cleanup level based on applicable state and federal law.

~~ss~~ Toluene. Cleanup level based on applicable state and federal law (WAC 296-290-310 and 40 CFR 141.61) ~~and prevention of adverse aesthetic characteristics~~.

~~tt~~ Total Petroleum Hydrocarbons. Cleanup level based on prevention of adverse aesthetic characteristics.

~~uu~~ 1,1,1 Trichloroethane. Cleanup level based on applicable state and federal law.

~~vv~~ Trichloroethylene. Cleanup level based on applicable state and federal law.

~~ww~~ Vinyl chloride. Cleanup level based on concentration derived using procedures in subsection (3)(a)(ii)(B) of this section and modified based on analytical considerations.

~~xx~~ Xylenes. Cleanup level based on applicable state and federal law (WAC 296-290-310 and 40 CFR 141.61) ~~and prevention of adverse aesthetic characteristics~~; and

(ii) Concentrations established under applicable state and federal laws, including the following requirements:

(A) Maximum contaminant levels established under the Safe Drinking Water Act and published in 40 C.F.R. 141, as amended;

(B) Maximum contaminant level goals for non-carcinogens established under the Safe Drinking Water Act and published in 40 C.F.R. 141, as amended; and

~~(C) Secondary maximum contaminant levels established under the Safe Drinking Water Act and published in 40 C.F.R. 143, as amended; and~~

~~(D)~~ (C) Maximum contaminant levels established by the state board of health and published in ~~chapter 248-54 WAC, as amended~~ WAC 246-290-310.

(b) If free product is found floating on ground water, it shall be removed to the maximum extent practicable.

~~(b)~~ (c) The department may establish ~~m~~Method A cleanup levels more stringent than those required ~~by~~ under paragraph (a) of this subsection when, based upon site-specific evaluations, the department determines that such levels are necessary to protect human health and the environment. Any imposition of more stringent cleanup levels under this paragraph shall comply with WAC 173-340-702 and 173-340-708.

~~(c)~~ (d) Cleanup levels to protect a current or potential beneficial uses of ground water other than drinking water shall be established by the department under standard or modified ~~m~~Methods B or C, as appropriate.

(e) Use of Method A cleanup levels is elective with the potentially liable person. A potentially liable person may always establish a cleanup level under standard or modified Method B, or standard or modified Method C at appropriate sites, rather than use a Method A cleanup level.

~~(3)~~ (4) Standard Method B cleanup levels.

(a) Drinking water. Except as provided under paragraph (b) of this subsection. ~~W~~where the ground water is a current or potential future source of drinking water, as provided under subsection (1)(b) of this section, standard ~~m~~Method B cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws, including the requirements in subsection (2)(a)(ii) of this section;

(ii) For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health as determined by the following methods:

(A)(I) Concentrations which are estimated to result in no acute or chronic toxic effects on human health as determined using the following equation and standard exposure assumptions:

$$\text{Ground water cleanup level (ug/l)} = \frac{\text{RFD} \times \text{ABW} \times \text{UCF} \times \text{HQ}}{\text{DWIR} \times \text{INH} \times \text{DWF}}$$

Where:

RFD	= Reference Dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	= Average body weight during period of exposure (16 kg)
UCF	= Unit conversion factor (1,000 ug/mg)
HQ	= Hazard quotient (1)
DWIR	= Drinking water ingestion rate (1.0 liter/day)
INH	= Inhalation correction factor as defined in WAC 173-340-720(7)
DWF	= Drinking water fraction (1.0);

(II) For total petroleum hydrocarbon fractions, the following equation shall be used in lieu of the equation under (I):

$$\text{Ground water cleanup level (ug/l)} = \frac{HI}{E \times 3[INH_i \times F_i/RFD_i]}$$

Where:

HI	= Hazard index (1)
E	= Exposure ((DWIR x DWF)/(ABW x UCF))
INH_i	= Inhalation correction factor for Fraction i, as defined in WAC 173-340-720(7)
F_i	= Percentage of total petroleum hydrocarbons contributed by Fraction i
RFD_i	= Reference Dose for Fraction i as specified in WAC 173-340-708(7) (mg/kg-day)
DWIR	= Drinking water ingestion rate (1.0 liter/day)
DWF	= Drinking water fraction (1.0);
ABW	= Average body weight during period of exposure (16 kg)
UCF	= Unit conversion factor (1,000 ug/mg).

(B) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 1,000,000 (1×10^{-6}) as determined using the following equation and standard exposure assumptions:

$$\text{Ground water cleanup level (ug/l)} = \frac{RISK \times ABW \times LIFE \times UCF}{CPF \times DWIR \times DUR \times INH \times DWF}$$

Where:

RISK	= Acceptable cancer risk level (1 in 1,000,000)
ABW	= Average body weight during the period of exposure (70 kg)
LIFE	= Lifetime (75 years)
UCF	= Unit conversion factor (1,000 ug/mg)
CPF	= Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
DWIR	= Drinking water ingestion rate (2.0 liters/day)
DUR	= Duration of exposure (30 years)
INH	= Inhalation correction factor as defined in WAC 173-340-720(7)
DWF	= Drinking water fraction (1.0);

(iii) If free product is found floating on ground water, it shall be removed to the maximum extent practicable.

(b) Standard Method B cleanup levels for ground water discharging to surface water. (i) Standard Method B cleanup levels for ground water that discharges to surface water shall be at least as stringent as the following:

(A) Concentrations established under applicable state and federal laws, which do not include the requirements referred to under subsection (2)(a)(ii) of this section;

(B) concentrations needed to protect the beneficial uses of the receiving surface waters as provided under subparagraph (iii) of this paragraph; and

(C) If ground water that discharges to surface water is a current or potential future source of drinking water, standard Method B cleanup levels shall also be at least as stringent as those provided for under paragraph (a) of this subsection, except that this shall not apply to ground water that meets the criteria under subsection (1)(d) of this section.

(ii)(A) Cleanup levels based on protecting the beneficial uses of the surface water shall be established at levels that will not result in exceedances of surface water cleanup levels at the point of entry of the ground water or at any downstream location where it is reasonable to believe that hazardous substances may accumulate.

(B) Compliance with this cleanup level shall be measured at a point upland as close as practicable to the point of entry of the ground water into the surface water, allowing an estimate of the dilution that occurs between the upland monitoring well and the point of entry.

~~(b)~~ (c) More stringent standard Method B cleanup levels. The department may establish ~~m~~Method B cleanup levels that are more stringent than those required by paragraphs (a), (b), or (c) of this subsection ~~(3)(a) of this section~~, when, based on site-specific evaluations, the department determines such levels are necessary to protect human health and the environment. Any imposition of more stringent cleanup levels under this paragraph shall comply with WAC 173-340-702 and 173-340-708. ~~This may~~ Examples of situations that may trigger the need for a site-specific evaluation under this paragraph include the following:

(i) Concentrations which are necessary to protect sensitive sub-groups;

(ii) Concentrations which eliminate or minimize the potential for food chain contamination;

(iii) Concentrations which eliminate or minimize the potential for damage to soils or biota in the soils which could impair the use of the soil for agricultural or silvicultural purposes;

(iv) Concentrations which eliminate or minimize the potential for the accumulation of vapors in

buildings or other structures to concentrations which pose a threat to human health or the environment; and

(v) Concentrations which protect nearby surface waters. In general, these will be based on attaining surface water cleanup levels in the surface water as close as technically possible to the point or points where the ground water flows into the surface water.

~~(c)~~ (d) Standard Method B cleanup levels for other ground water. Standard Method B cleanup levels to protect beneficial uses of ground water other than drinking water or discharge to surface water shall be established by ~~the department on a case-by-case basis.~~ use of one of the following approaches:

(i) Method A or standard Method B cleanup levels for drinking water may be used; or

(ii) Standard Method B cleanup levels for ground water discharging to surface water may be used; or

(iii) Cleanup levels may be established by use of a site-specific risk assessment if the person undertaking the cleanup action can demonstrate all of the following:

(A) The extent of the contamination, and the hydrogeology of the site and the area in the vicinity of the site, have been sufficiently defined so that the potential migration pathways and potential ultimate extent of the ground water contamination are known or can be reasonably projected;

(B) The ground water does not serve as a source of drinking water for any current developments on the site or any other areas potentially affected by the release;

(C) The use of a ground water cleanup level less stringent than one based on protection of drinking water or surface waters would not pose a threat to human health or the environment as a result of cross-media contamination;

(D) The local government with land use planning jurisdiction and any water purveyors with water supply jurisdiction for the site and any other areas potentially affected by the release have been mailed a notice of the proposal to base cleanup levels on other than a drinking water beneficial use. The notice shall be in addition to any notice provided under WAC 173-340-600 and shall invite comments, including providing information on planned uses of the ground water. The department will give greater weight to information based on an adopted or pending plan or similar preexisting document;

(E) The property owners located within the site and within the area between the source of hazardous substances and any other areas potentially affected by the ground water contamination have been mailed a notice of the proposal to base cleanup levels on other than a drinking water use. The notice shall be in addition to any notice provided under WAC 173-340-600 and invite comments, including providing information on planned uses of the ground water;

(F) To the extent necessary, the cleanup action includes institutional controls complying with WAC 173-340-440 that will prevent the use of contaminated ground water for drinking water purposes and other uses that are inconsistent with the cleanup level;

(G) It is unlikely that hazardous substances will be transported from the contaminated ground water to ground water that is a current or potential future source of drinking water, as defined in paragraph (c)(i)(B) of this subsection, at concentrations which exceed ground water quality criteria published in chapter 173-200 WAC; and

(H) The cleanup levels will meet concentrations established under applicable state and federal laws, which do not include the requirements referred to under subsection (2)(a)(ii) of this section;

~~(4)~~ (5) Standard Method C cleanup levels.

(a) Standard Method C cleanup levels may be approved by the department if the person undertaking the cleanup action can demonstrate that such levels are consistent with applicable state and federal laws, ~~that all practicable methods of treatment have been utilized,~~ that institutional controls are implemented in accordance with WAC 173-340-440, and that one or more of the conditions in WAC 173-340-706(1) exist.

(b) Where the ground water is a current or potential future source of drinking water as defined in subsection (1)(a) of this section, ~~m~~Method C cleanup levels for ground water shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws, including the requirements in subsection (2)(a)(ii) of this section;

(ii) For hazardous substances for which sufficiently protective, health-based standards or criteria have not been established under applicable state and federal laws, those concentrations that protect human health as determined using the following methods:

(A) Concentrations which are estimated to result in no significant acute or chronic toxic effects on human

health and are estimated in accordance with WAC 173-340-720 (3)(a)(ii)(A) except that the average body weight shall be 70 kg and the drinking water intake rate shall be 2 liters/day;

(B) Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 100,000 and are estimated in accordance with WAC 173-340-720 (3)(a)(ii)(B);

(c) The department may establish standard ~~m~~Method C cleanup levels that are more stringent than those required by (b) of this subsection when, based on a site-specific evaluation, the department determines such levels are necessary to protect human health and the environment. This may include consideration of those factors listed in subsection (3)(b) of this section.

(d) Standard Method C cleanup levels that protect beneficial uses of ground water other than drinking water shall be established by the department on a case-by-case basis.

(6) Modified Method B and C cleanup levels.

(a) Cleanup levels. A site-specific risk assessment may be conducted to establish modified Method B and C cleanup levels based on factors described under WAC 173-340-708(11)(b)(i), including inhalation correction factor.

(b) Remediation levels. A site-specific risk assessment described in paragraph (a) of this section may also be used to establish remediation levels based on factors described under WAC 173-340-708(11)(b)(ii), including factors identified under paragraph (a), duration of exposure, and drinking water fraction. A remediation level established as described in this paragraph may be used in developing cleanup action alternatives to be evaluated in a feasibility study under WAC 173-340-350(8)(d).

(c) Site-specific risk assessments shall be performed in a manner consistent with WAC 173-340-700, 173-340-702, and 173-340-708.

~~(5)~~ (7) Multiple hazardous substances/multiple pathways of exposure.

(a) Ground water cleanup levels for individual hazardous substances developed in accordance with ~~subsections (3) and (4) of~~ this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand.

~~(b) The overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by one exposure pathway, including cleanup levels based on applicable state and federal laws.~~

(b) Applicable laws. Where a cleanup level developed under this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.

~~(6)~~ (8) Point of compliance.

(a) General. For ground water, the point of compliance is the point or points where the ground water cleanup levels established under ~~subsections (2), (3), (4), and (5) of~~ this section must be attained. Ground water cleanup levels shall be attained in all ground waters from the point of compliance to the outer boundary of the hazardous substance plume.

(b) Protection of drinking water. The point of compliance for ground water cleanup levels protective of drinking water subsection (2)(b) of this section shall be established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.

(c) Protection of surface water or other beneficial uses. The point of compliance for ground water cleanup levels protective of surface water under subsection (2)(c) of this section or of other beneficial uses under subsection (2)(d) of this section shall be the point of entry into the nearest surface water body, which may be offsite.

~~(c)~~ (d) Conditional point of compliance. ~~Where hazardous substances remain on-site as part of the cleanup action,~~ Where it can be demonstrated under WAC 173-340-360 that it is not practicable to meet the cleanup level at the point of compliance within a reasonable restoration timeframe, the department may approve a conditional point of compliance which shall be as close as practicable to the source of hazardous substances, not to exceed the property boundary except as provided in paragraph (e) of this subsection. ~~Where a conditional point of compliance is proposed, the person responsible for undertaking the cleanup action~~

~~shall demonstrate that all practicable methods of treatment are to be utilized in the site cleanup.~~

~~(d)~~ (e) Off-property conditional point of compliance. ~~At sites where the affected ground water flows into nearby surface water, the cleanup level may be based on protection of the surface water. At these sites,~~

(i) Sites abutting surface water. Where the ground water cleanup level is based on protection of surface water, and the property containing the source of contamination directly abuts the surface water, the department may approve a conditional point of compliance that is located within the surface water as close as technically possible to the point or points where ground water flows into the surface water. ~~Conditional points of compliance may be approved only if the following requirements are met~~ subject to the following conditions:

(A) It has been demonstrated that the contaminated ground water is currently entering the surface water or will enter the surface water even after all the requirements of WAC 173-340-360 have been met;

(B) It has been demonstrated under WAC 173-340-360 that it is not practicable to meet the cleanup level at the point of compliance or at any other point within the ground water prior to entry into the surface water, within a reasonable restoration timeframe.

~~(i)~~ (C) Use of dilution within the surface water or a ~~dilution~~ mixing zone under WAC ~~173-201-035~~ 173-201A-100 to demonstrate compliance with surface water cleanup levels shall not be allowed except as allowed for approval of mixing zones under WAC 173-201A-100;

~~(ii) Ground water discharges shall be provided with all known available and reasonable methods of treatment prior to release into surface waters;~~

~~(iii)~~ (D) Ground water discharges shall not result in violations of sediment quality values published in chapter 173-204 WAC; and

~~(iv)~~ (E) Ground water monitoring shall be ~~performed~~ conducted as necessary to estimate contaminant flux rates, verify the long-term performance of source control and containment measures, and to ~~address~~ evaluate potential bioaccumulation problems resulting from ~~surface water concentrations~~ the discharge to surface water of contaminants below method detection limits.

(ii) Sites not abutting surface water. Where the ground water cleanup level is based on protection of surface water and the property that is the source of the contamination does not directly abut a surface water body, the department may approve a conditional point of compliance that is located as close as practicable to the source, not to exceed a location within the surface water as close as practicable to the source, not to exceed a location within the surface water as close as technically possible to the point or points where ground water flows into the surface water. For a conditional point of compliance to be approved under this provision the conditions in paragraph (e)(i) of this subsection and the following conditions must be met:

(A) The owners of the property between the source of contamination and the surface water body agree, in writing, to the use of a conditional point of compliance; and

(B) The person conducting the cleanup action has demonstrated to the department under WAC 173-340-360 that it is not practicable to meet a point of compliance at any point closer to the source(s) within a reasonable cleanup action time frame.

(iii) Areawide conditional point of compliance. As part of remedy selection, the department may approve an areawide conditional point of compliance to address an areawide groundwater contamination problem. The areawide conditional point(s) of compliance shall be as close as praticable to each source of hazardous substances, not to exceed the extent of groundwater contamination at the time the department approves an areawide conditional point of compliance. This provision may be applied only at areas that are affected by hazardous substances released from multiple sources that have resulted in commingled plumes of contaminated groundwater that are not practicable to address separately. A site may have more than one areawide conditional point of compliance to address multiple sources and types of contaminants. An areawide conditional point of compliance may be approved under this provision only if all of the following conditions have been met:

(A) The person conducting the cleanup action has complied with the requirements for a remedial

investigation and feasibility study under WAC 173-340-350, and complied with the requirements for selection of a cleanup action under WAC 173-340-360, including a demonstration that it is not practicable to meet a point of compliance throughout the groundwater contamination within a reasonable cleanup action time frame;

(B) A plan has been developed for implementation of the remedy, including a description of how any necessary access to the affected properties will be obtained;

(C) If the contaminated groundwater is considered to be potable under WAC 173-340-720(1), current developments in the area encompassed by the areawide conditional point of compliance and any other areas potentially affected by the groundwater contamination are served by a public water system that obtains its water from an offsite source and it can be demonstrated that the water system has sufficient capacity to serve future development in these areas;

(D) All property owners, local governments with jurisdiction, and water purveyors with jurisdiction, in the area potentially affected by the groundwater contamination, have been mailed a notice of the proposal to establish an areawide conditional point of compliance and provided an opportunity to comment. The notice shall specifically ask for information on existing and planned uses of the groundwater. The notice shall be in addition to any notice provided under WAC 173-340-600. The department will give greater weight to information based on an adopted or pending plan or similar pre-existing document; and

(E) Other conditions as determined by the department on a case-by-case basis.

~~(7)~~ (9) Inhalation correction factors.

(a) The inhalation correction factor is an adjustment factor which takes into account exposure to hazardous substances which are volatilized and inhaled during showering and other domestic activities. When available, hazardous substance-specific information shall be used to estimate these values.

(b) Where hazardous substance-specific information is not available, inhalation correction factors shall be one of the following:

(i) For volatile organic hazardous substances, 2; or

(ii) Other hazardous substances, 1.

(c) Where separate toxicity factors (reference doses and carcinogenic potency factors) are available for inhalation and oral exposures, the health hazards associated with the inhalation of hazardous substances in ground water during showering and other domestic activities may be evaluated separately from the health hazards associated with ingestion of drinking water. In these cases, the ground water cleanup level based on ingestion of drinking water shall be modified to take into account multiple exposure pathways in accordance with WAC 173-340-708(6).

~~(8)~~ (10) Compliance monitoring.

(a) Compliance with ground water cleanup levels shall be determined by analyses of unfiltered ground water samples, unless it can be demonstrated that a filtered sample provides a more representative measure of ground water quality. ~~Ecology~~ The department expects that filtering will generally be acceptable for inorganic substances where:

(i) A properly constructed monitoring well cannot be sufficiently developed to provide low turbidity water samples;

(ii) Due to the natural background concentration of hazardous substances in the aquifer material, unfiltered samples would not provide a representative measure of ground water quality; and

(iii) Filtering is performed in the field with all practicable measures taken to avoid exposing the ground water sample to the ambient air prior to filtering.

(iv) ~~Ecology~~ The department expects that filtering will generally be allowed for hazardous substances such as iron and manganese.

(b) Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data which are representative of the site.

(c) The data analysis and evaluation procedures used to evaluate compliance with ground water cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. These procedures shall meet the following general requirements:

(i) Methods of data analysis shall be consistent with the sampling design;

(ii) When cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be utilized to evaluate compliance with cleanup levels unless those procedures conflict with the intent of this section;

(iii) Where procedures for evaluating compliance are not specified in an applicable state and federal law, statistical methods used shall be appropriate for the

distribution of sampling data for each hazardous substance. If the distribution of sampling data for a hazardous substance is inappropriate for statistical methods based on a normal distribution, then the data may be transformed. If the distributions for hazardous substances differ, more than one statistical method may be required;

(iv) Compliance with ground water cleanup levels shall be determined for each ground water monitoring well or other monitoring points such as a spring;

(v) The data analysis procedures identified in the compliance monitoring plan shall specify the statistical parameters to be used to determine compliance with ground water cleanup levels.

(A) For ~~clean~~ cleanup levels based on short-term or acute toxic effects on human health or the environment, an upper percentile concentration shall be used to evaluate compliance with ground water cleanup levels.

(B) For cleanup levels based on chronic or carcinogenic threats, the mean concentration shall be used to evaluate compliance with ground water cleanup levels unless there are large variations in concentrations relative to the mean concentration or a large percentage of concentrations below the detection limit;

(vi) When active ground water restoration is performed, or containment technologies are used that incorporate active pumping of ground water, compliance with ground water cleanup levels shall be determined when the ground water characteristics at the site are no longer influenced by the cleanup action.

(d) Appropriate statistical methods include the following:

(i) A procedure in which a confidence interval for each hazardous substance is established from ground water sampling data and the ground water cleanup level is compared to the upper confidence interval; and

(ii) A parametric test for percentiles based on tolerance intervals to test the proportion of ground water samples having concentrations less than the ground water cleanup level; or

(iii) Other statistical methods approved by the department.

(e) If a confidence interval approach is used to evaluate compliance with a ground water cleanup level, the decision rule is a one-tailed test of the null hypothesis that the true ground water concentration exceeds the ground water cleanup level. Compliance with a ground water cleanup level shall be determined using the following criteria:

(i) The upper confidence limit on the true ground water concentration shall be less than the ground water cleanup level. Statistical tests shall be performed at a Type I error level of 0.05;

(ii) No single sample concentration shall be greater than two times the ground water cleanup level; and

(iii) Less than ten percent of the sample concentrations shall exceed the ground water cleanup level during a representative sampling period.

(f) If a method to test the proportion of ground water samples is used to evaluate compliance with a ground water cleanup level, compliance shall be determined using the following criteria:

(i) The true proportion of samples that exceed the ground water cleanup level shall be less than fifty percent. Statistical tests shall be performed with a Type I error level of 0.05; and

(ii) No single sample concentration shall be greater than two times the ground water cleanup level; and

(iii) Less than ten percent of the sample concentrations shall exceed the ground water cleanup level during a representative sampling period.

(g) For purposes of demonstrating compliance with ground water cleanup levels, measurements below the method detection limit shall be assigned a value equal to one-half the method detection limit. Measurement above the method detection limit but below the practical quantitation limit shall be assigned a value equal to the method detection limit. The department may approve alternate statistical procedures for handling nondetected values or values below the practical quantitation limit. Alternate procedures may include probit analysis and regression analysis.

WAC 173-340-730 Surface water cleanup standards. (1) Overview. [RESERVED]

~~(1)~~ (2) General considerations.

(a) Surface water cleanup levels shall be based on estimates of the highest beneficial use and the reasonable maximum exposure expected to occur under both current and potential future site use conditions. The classification and the highest beneficial use of a surface water body shall be determined in accordance with chapter 173-201A WAC, as amended. ~~In the event of a release of a hazardous substance, treatment,~~

~~removal, or containment measures shall be conducted to reduce the level of hazardous substances in surface water to concentrations consistent with uses specified under this section and chapter 173-201 WAC, as amended.~~

(b) Surface water cleanup levels established under this section apply to those surface waters of the state affected or potentially affected by releases of hazardous substances from sites addressed under this chapter. ~~Ecology~~ the department does not expect that cleanup standards will be applied to storm water runoff that is in the process of being conveyed to a treatment system.

(c) Releases of hazardous substances to surface waters of the state shall not directly or indirectly cause violations of groundwater, soil, sediment, or air cleanup standards established under this chapter or other applicable state and federal laws.

~~(2)~~ (3) Method A cleanup levels.

(a) Method A cleanup levels shall be at least as stringent as concentrations established under applicable state and federal laws, including the following requirements:

(i) All water quality criteria published in the water quality standards for surface waters of the state of Washington, chapter 173-201A WAC, as amended;

(ii) Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published pursuant to section 304 of the Clean Water Act.

(b) The department may establish ~~a~~Method A cleanup levels that are more stringent than those required under subsection (2)(a) of this section, when, based on site-specific evaluations, the department determines that such levels are necessary to protect human health and the environment.

(c) Use of Method A cleanup levels is elective with the potentially liable person. A potentially liable person may always establish a cleanup level under standard or modified Method B, or standard or modified Method C at appropriate sites, rather than use a Method A cleanup level.

~~(3)~~ (4) Standard Method B cleanup levels.

(a) Standard Method B cleanup levels for surface waters shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws, including the following requirements:

(A) All water quality criteria published in the water quality standards for surface waters of the state of Washington, chapter 173-201A WAC, as amended; and

(B) Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published pursuant to section 304 of the Clean Water Act unless it can be demonstrated that such criteria are not relevant and appropriate for a specific surface water body or hazardous substance.

(ii) Concentrations which are estimated to result in no significant adverse effects on the protection and propagation of wildlife, fish, and other aquatic life;

(iii) For hazardous substances for which ~~sufficiently protective,~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health as determined by the following methods:

(A) For surface waters which support or have the potential to support fish or shellfish populations, concentrations which are anticipated to result in no acute or chronic toxic effects on human health as determined using the following equations and standard exposure assumptions:

$$\text{Surface water cleanup level (ug/l)} = \frac{RFD \times ABW \times UCF1 \times UCF2 \times HQ}{BCF \times FCR \times FDF}$$

Where:

RFD	= Reference Dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	= Average body weight during the exposure period (70 kg)
UCF1	= Unit conversion factor (1,000 ug/mg)
UCF2	= Unit conversion factor (1,000 grams/liter)
BCF	= Fish bioconcentration factor as defined in WAC 173-340-708(9) (unitless)
FCR	= Fish consumption rate (54 grams/day)
FDF	= Diet fraction (0.5)
HQ	= Hazard Index (1)

(B) For surface waters which support fish or shellfish populations, concentrations which are anticipated to result in an excess cancer risk less than or equal to 1 in 1,000,000 as determined using the following equation and standard exposure assumptions:

$$\text{Surface water cleanup level (ug/l)} = \frac{RISK \times ABW \times LIFE \times UCF1 \times UCF2}{CPF \times BCF \times FCR \times FDF \times DUR}$$

Where:

CPF	= Carcinogenic Potency Factor as specified in WAC 173-340-708(8) (kg-day/mg)
RISK	= Acceptable cancer risk level (1 in 1,000,000)

ABW = Average body weight during the exposure period (70 kg)
LIFE = Lifetime (75 years)
UCF1 = Unit conversion factor (1,000 ug/mg)
UCF2 = Unit conversion factor (1,000 grams/liter)
BCF = Fish bioconcentration factor as defined in WAC 173-340-708(9) (unitless)
FCR = Fish consumption rate (54 grams/day)
FDF = Diet fraction (0.5)
DUR = Duration of exposure (30 years);

(C) For surface waters which represent a source or potential future source of drinking water, concentrations which are anticipated to result in no adverse impacts on human health as established in accordance with WAC 173-340-720(3).

(b) More stringent standard Method B cleanup levels. The department may establish ~~m~~Method B cleanup levels more stringent than those required by subsection (3)(a) of this section, when, based on site-specific evaluations, the department determines that such levels are necessary to protect human health and the environment.

~~(4)~~ (5) Standard Method C cleanup levels.

(a) Method C cleanup levels may be approved by the department if the person undertaking the cleanup action can demonstrate that such levels are consistent with applicable state and federal laws, ~~that all practicable methods of treatment have been utilized,~~ that institutional controls are implemented in accordance with WAC 173-340-440, and that one or more of the conditions in WAC 173-340-706(1) exist.

(b) Standard Method C cleanup levels for surface waters shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws, including the requirements identified in subsection (3)(a)(i) of this section;

(ii) Concentrations which are estimated to result in no significant adverse effects on the protection and propagation of wildlife, fish and other aquatic life;

(iii) For hazardous substances for which ~~sufficiently protective.~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A) For surface waters which support or have the potential to support fish or shellfish populations, concentrations which are estimated to result in no significant acute or chronic toxic effects on human health or the environment and are estimated in accordance with WAC 173-340-730 (3)(a)(iii)(A) except that the fish diet fraction shall be twenty percent;

(B) For surface waters which support or have the potential to support fish or shellfish populations, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 100,000 and are estimated in accordance with WAC 173-340-730 (3)(a)(iii)(B) except that the fish diet fraction shall be twenty percent;

(C) For surface waters which represent a source or potential future source of drinking water, concentrations which are estimated to result in no adverse impacts on human health and are established in accordance with WAC 173-340-720(4); and

(c) The department may establish ~~m~~Method C cleanup levels that are more stringent than those required by (b) of this subsection when, based on site-specific evaluations, the department determines that such levels are necessary to protect human health and the environment.

(6) Modified Method B and C cleanup levels.

(a) Cleanup levels. A site-specific risk assessment may be conducted to establish modified Method B and C cleanup levels based on factors described under WAC 173-340-708(11)(b)(i), including fish bioconcentration factor.

(b) Remediation levels. A site-specific risk assessment described in paragraph (a) of this section may also be used to establish remediation levels based on factors described under WAC 173-340-708(11)(b)(ii), including factors identified under paragraph (a) and diet fraction. A remediation level established as described in this paragraph may be used in developing cleanup action alternatives to be evaluated in a feasibility study under WAC 173-340-350(8)(d).

(c) Site-specific risk assessments shall be performed in a manner consistent with WAC 173-340-700, 173-340-702, and 173-340-708.

~~(5)~~ (7) Multiple hazardous substances/multiple pathways of exposure.

(a) Surface water cleanup levels for individual hazardous substances developed in accordance with ~~subsections (3) and (4) of~~ this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand.

~~(b) These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by one exposure pathway, including cleanup levels based on applicable state and federal laws.~~

(b) Applicable laws. Where a cleanup level developed under this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.

~~(6)~~ (8) Point of compliance.

(a) The point of compliance shall be the point or points at which hazardous substances are released to surface waters of the state unless the department has authorized a dilution zone in accordance with WAC 173-201-035.

(b) Where hazardous substances are released to the surface water as a result of ground water flows, no dilution zone shall be allowed to demonstrate compliance with surface water cleanup levels. See WAC 173-340-720 (6)(d) for additional requirements.

~~(7)~~ (9) Compliance monitoring.

(a) Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data which are representative of the site.

(b) The data analysis and evaluation procedures used to evaluate compliance with surface water cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410.

(c) Compliance with surface water cleanup standards shall be determined by analyses of unfiltered surface water samples, unless it can be demonstrated that a filtered sample provides a more representative measure of surface water quality.

(d) When surface water cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be utilized to evaluate compliance with surface water cleanup levels unless these procedures conflict with the intent of this section.

(e) Where procedures for evaluating compliance are not specified in an applicable state and federal law, the statistical methods used to evaluate compliance with surface water cleanup levels shall be appropriate for the distribution of the hazardous substance sampling data. If the distribution of the hazardous substance sampling data is inappropriate for statistical methods based on a normal distribution, then the data may be transformed. If the distributions of individual hazardous substances differ, more than one statistical method may be required.

(f) For purposes of demonstrating compliance, measurements below the method detection limit shall be assigned a value equal to one-half of the method detection limit. Measurements above the method detection limit but below the practical quantitation limit shall generally be assigned a value equal to the method detection limit. The department may approve alternate statistical procedures for handling nondetected values or values below the practical quantitation limit. Alternate statistical procedures may include probit analysis and regression analysis.

(g) Sampling and analysis of fish tissue or shellfish may be required to supplement water column sampling during compliance monitoring.

WAC 173-340-740 Soil cleanup standards. (1) Overview. [RESERVED]

~~(1)~~ (2) General considerations.

(a) Presumed exposure scenario soil cleanup levels shall be based on estimates of the reasonable maximum exposure expected to occur under both current and future site use conditions. The department has determined that residential land use is generally the site use requiring the most protective cleanup levels and that exposure to hazardous substances under residential land use conditions represents the reasonable maximum exposure scenario for land used for residential, child day care facilities, and schools. Soil cleanup levels for ~~these~~is presumed exposure scenarios shall be established in accordance with method A or method B

cleanup levels described in subsections (2) and (3) of this section. Method A and B cleanup levels are considered protective of all land uses. ~~In the event of a release of a hazardous substance, treatment, removal, and/or containment measures shall be implemented for those soils with hazardous substance concentrations which exceed soil cleanup levels based on this use unless the following can be demonstrated:~~

~~(i) The property does not serve as a current residential area;~~

~~(ii) The property does not have the potential to serve as a future residential area based on the consideration of zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors; and~~

~~(iii) Appropriate use restrictions are implemented at the property; or~~

~~(iv) More stringent concentrations are necessary to protect human health and the environment.~~

(b) Industrial property soil cleanup levels. Soil cleanup levels for qualifying industrial properties may be established in accordance with the requirements in WAC 173-340-745.

~~(c) Commercial property soil cleanup levels. For ndustrial land uses not qualifying under WAC 173-340-745 and commercial land uses, the presumption is that soil cleanup levels shall be established in accordance with residential areas unless it can be clearly demonstrated that this is inappropriate.~~

~~(i) For a property to qualify under this subsection, it must be clearly demonstrated that:~~

~~(A) The property is currently zoned for or otherwise officially designated for industrial/commercial use;~~

~~(B) The property is currently used for industrial/commercial purposes or has a history of use for industrial/commercial purposes;~~

~~(C) Properties adjacent to and in the general vicinity of the property are used or are designated for use for industrial/commercial purposes; and~~

~~(D) The property and properties adjacent to and in the general vicinity are expected to be used for industrial/commercial purposes for the foreseeable future due to site zoning, statutory or regulatory restrictions, comprehensive plans, adjacent land use, and other relevant factors.~~

~~(ii) For industrial/commercial land uses qualifying under this subsection, soil cleanup levels shall be established as close as practicable to the method B soil cleanup levels established under subsection (3) of this section and shall be at least as stringent as the method C soil cleanup levels established under subsection (4) of this section. The overall limits on hazard index and total excess cancer risk specified in subsections (3) through (5) of this section shall apply to these sites.~~

~~(iii) Institutional controls under WAC 173-340-440 shall be required for industrial/commercial land uses qualifying under this subsection where soil cleanup levels are less stringent than method B soil cleanup levels established under subsection (3) of this section.~~

~~(iv) Soil cleanup levels for areas beyond the commercial/industrial property boundary that do not qualify for commercial soil cleanup levels under this subsection (including implementation of institutional controls and a covenant restricting use of the property to commercial or industrial use, as applicable) shall use method A or method B cleanup levels as described in subsections (2) or (3) of this section.~~

~~(v) The department expects that only industrial/commercial properties located in the interior portion of a large industrial/commercial area will qualify for other than method A or method B cleanup levels under this subsection.~~

~~(d)~~ (c) Other land use~~nonresidential properties~~ soil cleanup and remediation levels. For land used for urban residential, recreational, commercial, or agriculture, or other non-residential purposes, soil remediation levels may be based on an alternate reasonable maximum exposure scenario. Standard Method B is the default approach for establishing cleanup levels for commercial sites. It is expected that many commercial sites will use the modified Method B or modified Method C approaches, and develop alternate exposure scenarios, to develop site-specific cleanup levels and remediation levels.

~~(i) Soil cleanup levels for childcare facilities and schools shall be established in accordance with method A or method B cleanup levels as described in subsections (2) and (3) of this section.~~

~~(ii) For other land uses such as recreational or agricultural uses, soil cleanup levels shall be established on a case-by-case basis.~~

~~(A)~~ (i) The overall limits on the hazard index and cancer risk specified in subsections (3) through (5) of this section shall apply to these types of sites.

~~(B) Soil cleanup levels for these types of sites shall be at least as stringent as method C cleanup levels established under subsection (4) of this section.~~

~~(C)~~ (ii) Where other than a ~~m~~Method A (residential) or ~~m~~Method B soil cleanup level is proposed at these properties, the cleanup action shall include appropriate institutional controls implemented in accordance with WAC 173-340-440 to limit potential exposure to residual contamination. ~~This shall include, at a minimum, placement of a covenant on the property restricting use of the property to the land use(s) the cleanup level is based on.~~

(iii) The property is not a current or potential future residential area (other than urban residential) based on the considerations of zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.

(iv) For purposes of this section, "urban residential" means residential properties that are not developed as or zoned for single-family use and that do not include yards or similar areas of exposed soil.

~~(c)~~ (d) Relationship between soil cleanup levels and other cleanup standards. Soil cleanup levels shall be established at concentrations which do not directly or indirectly cause violations of ground water, surface water, sediment, or air cleanup standards established under this chapter or applicable state and federal laws. A property that qualifies for other than a ~~m~~Method A or ~~m~~Method B soil cleanup level under this subsection does not necessarily qualify for other than a ~~m~~Method A or ~~m~~Method B cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

~~(2)~~ (3) Method A cleanup levels.

(a) Method A cleanup levels for soils, other than soils covered under WAC 173-340-745, shall be at least as stringent as all of the following:

(i) Concentrations in the following table; and

PROPOSED MODEL TOXICS CONTROL ACT RULE REVISIONS

Table ~~2~~ 4
Method A Cleanup Levels - Soil[a]

Hazardous Substance	CAS Number	Cleanup Level	
Arsenic	7440-38-2	20.0 mg/kg[b]	
Benzene	71-43-2	~~0.5 mg/kg~~	0.0265 mg/kg[c]
Cadmium	7440-43-9	~~2.0 mg/kg~~	10.0 mg/kg[d]
Chromium	7440-47-3	100.0 mg/kg[e]	
DDT	50-29-3	1.0 mg/kg[f]	
1,2 Dichloroethane	107-06-2	0.0186 mg/kg[g]	
Ethylbenzene	100-41-4	~~20.0 mg/kg~~	8.9 mg/kg[gh]
Ethylene dibromide	106-93-4	~~0.001 mg/kg~~	0.002 mg/kg[hi]
n-Hexane	110-54-3	35 mg/kg[j]	
Lead	7439-92-1	~~250.0 mg/kg~~	370 mg/kg[jk]
Lindane	58-89-9	1.0 mg/kg[kl]	
Methylene chloride	75-09-2	0.5 mg/kg[klm]	
Methyl tertiary-butyl ether	1634-04-4	0.15 mg/kg[n]	
Mercury (inorganic)	7439-97-6	1.0 mg/kg[lo]	
Naphthalene	91-20-3	6.9 mg/kg[p]	
PAHs (carcinogenic)[q]		~~1.0 mg/kg~~[m]	
Benzo[a]anthracene	56-55-3	0.018 mg/kg	
Benzo[b]fluoranthene	205-99-2	0.018 mg/kg	
Benzo[k]fluoranthene	65-85-0	0.018 mg/kg	
Benzo[a]pyrene	50-32-8	0.0018 mg/kg	
Chrysene	218-01-9	0.18 mg/kg	
Dibenz[a,h]anthracene	53-70-3	0.0449 mg/kg	
Indeno[1,2,3-c,d]pyrene	193-39-5	0.018 mg/kg	
PCB Mixtures		1.0 mg/kg[tr]	
Tetrachloroethylene	127-18-4	0.5 mg/kg[rs]	
Toluene	108-88-3	~~40.0 mg/kg~~[st]	14 mg/kg[ff]
TPH (gasoline)		100.0 mg/kg[tu]	
TPH (diesel)		200.0 mg/kg[uv]	
TPH (mineral oil)		3,500 mg/kg[w]	
TPH (other or unknown)		200.0 mg/kg[vx]	
1,1,1 Trichloroethane	71-55-6	20.0 mg/kg[xy]	
Trichloroethylene	79-01-5	0.5 mg/kg[yz]	
Xylenes	1330-20-7	~~20.0 mg/kg~~[z]	140 mg/kg[zz]

[a] Caution on misusing method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup action under this chapter.

[b] Arsenic. Cleanup level based on background concentrations in the state of Washington.

[c] Benzene. Cleanup level based on protection of ground water.

[d] Cadmium. Cleanup level based on ~~plant~~ protection of ground water.

[e] Chromium. Cleanup level based on health risks associated with inhalation of resuspended dust.

[f] DDT. Cleanup level based on concentrations derived using the procedures in subsection ~~(3)(a)(iii)(B)~~ (3)(c)(ii) of this section. This value may not be protective where terrestrial ecological impacts are a concern at a site. See WAC 173-340-709 for further information on how to determine which sites must address terrestrial ecological impacts.

[g] 1,2 Dichloroethane. Cleanup level based on protection of ground water.

[~~g~~h] Ethylbenzene. Cleanup level based on protection of ground water.

[~~h~~i] Ethylene dibromide. Cleanup level based on protection of ground water and modified based on analytical considerations.

[i] n-Hexane. Cleanup level based on protection of ground water.

[~~i~~k] Lead. Cleanup level based on preventing unacceptable blood lead levels due to ingestion of soil. This value may not be protective where terrestrial ecological impacts are a concern at a site. See WAC 173-340-709 for further information on how to determine which sites must address terrestrial ecological impacts.

[~~j~~l] Lindane. Cleanup level based on concentration derived using the procedures in subsection ~~(3)(a)(iii)(B)~~ (3)(c)(ii) of this section.

[~~k~~m] Methylene chloride. Cleanup level based on protection of ground water.

[n] Methyl tertiary-butyl ether. Cleanup level based on protection of ground water.

[~~l~~o] Mercury. Cleanup level based on protection of ground water.

[p] Naphthalene. Cleanup level based on protection of ground water.

[~~m~~q] PAHs (carcinogenic). Cleanup level based on concentration derived using the procedures in subsection (3)(a)(iii)(B) of this section.

[~~n~~r] PCB Mixtures. Cleanup level based on concentration derived using the procedures in subsection ~~(3)(a)(iii)(B)~~ (3)(c)(ii) of this section.

[~~o~~s] Tetrachloroethylene. Cleanup level based on protection of ground water.

[~~p~~t] Toluene. Cleanup level based on protection of ground water.

[~~q~~u] Total Petroleum Hydrocarbons (gasoline). Cleanup level based on protection of ground water.

[~~r~~v] Total Petroleum Hydrocarbons (diesel). Cleanup level based on protection of ground water.

[w] Total Petroleum Hydrocarbons (mineral oil). Cleanup level based on protection of ground water.

[~~s~~x] Total Petroleum Hydrocarbons (other or unknown). Cleanup level based on protection of ground water.

[~~t~~y] 1,1,1 Trichloroethane. Cleanup level based on protection of ground water.

[~~u~~z] Trichloroethylene. Cleanup level based on protection of ground water.

[~~v~~aa] Xylenes. Cleanup level based on protection of ground water.

(ii) Concentrations established under applicable state and federal laws;

(b) For sites with additional hazardous substances which are deemed indicator hazardous substances

under WAC 173-340-708(2) for which there is no value in Table ~~2~~ 4 or applicable state and federal laws, cleanup levels for these additional hazardous substances shall be established at the natural background concentration or the practical quantification limit, subject to the limitations in this chapter.

(c) The department may establish ~~m~~Method A cleanup levels that are more stringent than those required by subsection (2)(a) of this section, when based on a site-specific evaluation, the department determines that such levels are necessary to protect human health or environment. Any imposition of more stringent requirements under this provision must comply with WAC 173-340-700, 173-340-702, and 173-340-708.

(d) Use of Method A cleanup levels is elective with the potentially liable person. A potentially liable person may always establish a cleanup level under Method B, Method C at appropriate sites, or a modified Method B or C, rather than use a Method A cleanup level.

~~(3)~~ (4) Standard Method B cleanup levels.

~~(a)~~ Standard Method B cleanup levels for soils, other than soils covered under WAC 173-340-745, shall be at least as stringent as all of the following:

~~(i)~~ (a) Applicable laws. Concentrations established under applicable state and federal laws;

~~(ii)~~ (b) Ground water protection. Soil concentrations are protective of ground water if soil leaching to ground water is not a complete pathway at the site. Where one or both of these pathways is complete at the site, ~~c~~concentrations which will not cause contamination of ground water at levels which exceed ~~m~~Method B ground water cleanup levels established under WAC 173-340-720 as determined using the following criteria:

~~(A)~~ (i) For individual hazardous substances or mixtures, concentrations that are equal to or less than one hundred (100) times the ground water cleanup level established in accordance with WAC 173-340-720 unless it can be demonstrated that a higher soil concentration is protective of ground water at the site;

~~(B)~~ (ii)(A) For total petroleum hydrocarbons, the person undertaking the cleanup may elect to make this demonstration on the basis of data on individual hazardous substances that comprise the total petroleum hydrocarbons.

(B) For total petroleum hydrocarbons, the person conducting the evaluation may elect to make the demonstration referred to under subsection (4)(b)(i) of this section on the basis of any of the following methods:

(I) Empirical demonstration. A soil concentration that is protective of ground water may be determined through an empirical demonstration that soil concentrations are not resulting in an exceedance of ground water cleanup levels. Where the person conducting the evaluation elects to make such an empirical demonstration, it shall be preferred over all other methods.

(II) Equilibrium partition solutions identified by the department. A soil concentration that is protective of ground water may be determined using a three-phase or four-phase equilibrium partition solution that has been identified by the department as generally appropriate for that purpose, including use of site-specific values measured at the site and/or default values identified by the department.

(III) A soil concentration that is protective of ground water may be determined using a computer model that has been identified by the department as generally appropriate for that purpose. Input parameters may be site-specific values measured at the site and/or default values or within acceptable ranges identified by the department.

(IV) Leach tests. A soil concentration that is protective of ground water may be determined using the Synthetic Precipitation Leaching Procedure (EPA Method 1312) or any other method that complies with WAC 173-340-702 and 173-340-708.

(V) Other methods. A soil concentration that is protective of ground water may be determined using any of the methods described above with more site-specific information, or using any other appropriate method. Site-specific data or alternative methods used under this provision shall comply with WAC 173-340-702 and 173-340-708.

~~(iii)~~ (c) For those hazardous substances for which health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and

the environment as determined by the following methods:

~~(A)~~ (i)(A) Concentrations which are estimated to result in no acute or chronic toxic effects on human health via direct contact with contaminated soil and are determined using the following equation and standard exposure assumptions:

$$\text{Soil Cleanup Level (mg/kg)} = \frac{RFD \times ABW \times UCF2 \times HQ}{SIR \times AB1 \times FOC}$$

Where:

RFD	= Reference Dose as defined in WAC 173-340-708(7) (mg/kg-day)
ABW	= Average body weight over the period of exposure (16 kg)
UCF2	= Units conversion factor (1,000,000 mg/kg)
SIR	= Soil ingestion rate (200 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
FOC	= Frequency of contact (1.0)
HQ	= Hazard quotient (1);

(B) For total petroleum hydrocarbon fractions, the following equation shall be used in lieu of the equation under (I):

$$\text{Soil cleanup level (mg/kg)} = \frac{HI}{E_I \times 3(F_i/oRFD_i) + E_D \times 3(F_i/dRFD_i)}$$

Where:

HI	= Hazard index (1)
E_I	= Exposure through ingestion: (SIR x AB1 x FOC)/(ABW x UCF2)
E_D	= Dermal exposure: (SA x AF x ABS_i)/(UCF3 x ABW)
F_i	= Percentage of total petroleum hydrocarbons contributed by Fraction i
$oRFD_i$	= Oral reference dose for Fraction i as specified in WAC 173-340-708(7) (mg/kg-day)
$dRFD_i$	= Dermal reference dose for Fraction i as specified in WAC 173-340-708(7) (mg/kg-day)
SIR	= Soil ingestion rate (200 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
FOC	= Frequency of contact (1.0)
ABW	= Average body weight during period of exposure (16 kg)
UCF2	= Unit conversion factor (1,000,000 mg/kg)
SA	= Surface area (3,400 cm^2)
AF	= Adherence factor (0.3 mg/cm^2-event)
ABS_i	= Absorption factor for Fraction i (unitless)
UCF3	= Conversion factor (1,000,000 mg/kg)

~~(B)~~ (ii) Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 1,000,000 via direct contact with contaminated soil and are determined using the following equation and standard exposure assumptions:

$$\text{Soil Cleanup Level (mg/kg)} = \frac{RISK \times ABW \times LIFE \times UCF1}{CPF \times SIR \times AB1 \times DUR \times FOC}$$

Where:

RISK	= Acceptable cancer risk level (1 in 1,000,000)
ABW	= Average body weight over the period of exposure (16 kg)
LIFE	= Lifetime (75 years)
UCF1	= Unit conversion factor (1,000,000 mg/kg)
CPF	= Carcinogenic Potency Factor as defined in WAC 173-340-708(8) (kg-day/mg)
SIR	= Soil ingestion rate (200 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
DUR	= Duration of exposure (6 years)
FOC	= Frequency of contact (1.0);

(d) Method B remediation levels established under this paragraph for a site that is, or is reasonably expected to be, used as a commercial retail gasoline station shall use the equations under subparagraphs (i) and (ii), as appropriate, except that the average body weight shall be 16 kilograms and the frequency of contact shall be 0.25.

~~(iv)~~ (e) To assure that unacceptable risks do not result from inhalation of hazardous substances in or released from contaminated soils, soil concentrations which ensure that releases of hazardous substances shall not result in ambient air concentrations which exceed method B cleanup levels established under WAC 173-340-750.

~~(b) The department may establish method B cleanup levels that are more stringent than those required under (a) of this subsection, when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health or environment, including the following:~~

(5) More stringent standard Method B cleanup levels. Where a site-specific evaluation determines that the method B cleanup levels established under subsection (3) are not adequate to protect human health or the environment, the department may base the cleanup standard on a lower cleanup level or on appropriate actions to eliminate, minimize, reduce or otherwise manage the risks at the site. Any imposition of more stringent requirements under this provision

must comply with WAC 173-340-700, 702, 708, and 709. Situations where a more stringent Method B cleanup level may be established by the department include:

~~(i)~~ (a) Concentrations or actions which eliminate or substantially reduce the potential for food chain contamination as necessary to protect human health;.

~~(ii) Concentrations which eliminate or substantially reduce the potential for damage to soils or biota in the soils which could impair the use of soils for agricultural or silvicultural purposes;~~

~~(iii) Concentrations which eliminate or substantially reduce the potential for adverse effects on vegetation or wildlife;~~

(b) Concentrations, if any, identified under WAC 173-340-709 as necessary to prevent significant adverse effects on plants or wildlife.

~~(iv)~~ (c) Concentrations or actions ~~more stringent than those in (b) of this subsection where the department determines that such levels are~~ where necessary to protect the ground water at a particular site;.

~~(v)~~ (d) Concentrations or actions necessary to protect nearby surface waters from hazardous substances in runoff from the site,~~; and~~

~~(vi)~~ (e) Concentrations which eliminate or minimize the potential for the accumulation of vapors in buildings or other structures to concentrations which pose a threat to human health or the environment.

~~(4)~~ (6) Standard Method C cleanup levels.

(a) Standard Method C soil cleanup levels, other than soils covered under WAC 173-340-745, may be utilized if the person conducting the cleanup action can demonstrate that such levels are consistent with applicable state and federal laws, ~~that all practicable methods of treatment have been utilized,~~ that institutional controls are implemented in accordance with WAC 173-340-440, and that one or more of the conditions in WAC 173-340-706 (1)(a) exist.

(b) Standard Method C cleanup levels for soils shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws;

(ii) Concentrations which will not cause contamination of ground water at levels which exceed ground water cleanup levels established under WAC 173-340-720 as determined using the ~~following~~ procedures: under subsection (3)(b) of this section.

~~(A) For individual hazardous substances or mixtures, concentrations that are equal to or less than one hundred times the ground water cleanup level established in accordance with WAC 173-340-720 unless it can be demonstrated that a higher soil concentration is protective of ground water at the site;~~

~~(B) For total petroleum hydrocarbons, the person undertaking the cleanup may elect to make this demonstration on the basis of data on individual hazardous substances that comprise the total petroleum hydrocarbons;~~

(iii) For those hazardous substances for which health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A) Concentrations which are anticipated to result in no significant acute or chronic toxic effects on human health and estimated in accordance with WAC 173-340-740 (3)(a)(iii)(A) except that the frequency of contact shall be 0.5, the soil ingestion rate shall be 100 milligrams per day, and the average body weight shall be 16 kilograms;

(B) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 100,000 and are estimated in accordance with WAC 173-340-740 (3)(a)(iii)(B) except that the frequency of contact shall be 0.5 and the soil ingestion rate shall be 100 milligrams per day; and

(iv) To assure that unacceptable risks do not result from inhalation of hazardous substances in or released from contaminated soils, soil concentrations which ensure that releases of hazardous substances shall not result in ambient air concentrations which exceed method C cleanup levels established under WAC 173-340-750.

~~(C)~~ (c) The department may establish method C cleanup levels that are more stringent than those required by ~~(a) through (c)~~ (b) of this subsection when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment, including consideration of those factors listed in subsection (3)(b)

of this section. Any imposition of more stringent requirements under this provision must comply with WAC 173-340-700, 702, 708, and 709.

(7) Modified Method B and C cleanup levels.

(a) Cleanup levels. A site-specific risk assessment may be performed to establish modified Method B and C cleanup levels based on factors described under WAC 173-340-708(11)(b)(i), including contaminant leaching and transport variables (e.g., soil organic carbon content, aquifer permeability, and soil sorption coefficient).

(b) Remediation levels. A site-specific risk assessment described in paragraph (a) of this subsection may also be used to establish remediation levels based on factors described under WAC 173-340-708(11)(b)(ii), including factors identified under paragraph (a), duration of exposure, frequency of contact, and infiltration rate. A remediation level established as described in this paragraph may be used in developing cleanup action alternatives to be evaluated in a feasibility study under WAC 173-340-350(8)(d).

(c) Site-specific risk assessments shall be performed in a manner consistent with WAC 173-340-700, 173-340-702, and 173-340-708.

~~(5)~~ (8) Multiple hazardous substances/multiple pathways of exposure.

(a) Soil cleanup levels for individual hazardous substances developed in accordance with ~~subsections (3) and (4) of~~ this section, including cleanup levels based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand.

~~(b) These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by one exposure pathway, including cleanup levels based on applicable state and federal laws.~~

(b) Adjustments to applicable laws. Where a cleanup level developed under this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.

~~(6)~~ (9) Point of compliance.

(a) The point of compliance is the point or points where the soil cleanup levels established under subsections (2), (3), (4), and (5) of this section shall be attained.

(b) For soil cleanup levels based on the protection of ground water, the point of compliance shall be established in the soils throughout the site.

(c) For soil cleanup levels based on human exposure via direct contact, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities.

(d) ~~The department recognizes that, for~~ For those cleanup actions selected under WAC 173-340-360 that involve ~~containment of hazardous substances~~ engineered controls or a model remedy, the soil cleanup levels will typically not be met at the points of compliance specified in (b) and (c) of this subsection. In these cases, the cleanup action may be determined to comply with cleanup standards, provided the compliance monitoring program is designed to ensure the long-term integrity of the ~~containment system, and the other requirements for containment technologies in WAC 173-340-360(8) are met~~ engineered controls or model remedy.

~~(7)~~ (10) Compliance monitoring.

(a) Compliance with soil cleanup levels shall be based on total analyses of the soil fraction less than two millimeters in size. When it is reasonable to expect that larger soil particles could be reduced to two millimeters or less during current or future site use and this reduction could cause an increase in the concentrations of hazardous substances in the soil, soil cleanup levels shall also apply to these larger soil particles. Compliance with soil cleanup levels shall be based on dry weight concentrations. The department may approve the use of alternate procedures for stabilized soils.

(b) Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall

provide data which are representative of the area where exposure to hazardous substances may occur.

(c) The data analysis and evaluation procedures used to evaluate compliance with soil cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. These procedures shall meet the following general requirements:

(i) Methods of data analysis shall be consistent with the sampling design. Separate methods may be specified for surface soils and deeper soils;

(ii) When cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be utilized to evaluate compliance with cleanup levels unless those procedures conflict with the intent of this section;

(iii) Where procedures for evaluating compliance are not specified in an applicable state and federal law, statistical methods shall be appropriate for the distribution of sampling data for each hazardous substance. If the distribution of sampling data for a hazardous substance is inappropriate for statistical methods based on a normal distribution, then the data may be transformed. If the distributions for hazardous substances differ, more than one statistical method may be required; and

(iv) The data analysis plan shall specify which parameters are to be used to determine compliance with soil cleanup levels.

(A) For cleanup levels based on short-term or acute toxic effects on human health or the environment, an upper percentile soil concentration shall be used to evaluate compliance with cleanup levels.

(B) For cleanup levels based on chronic or carcinogenic threats, the mean soil concentration shall be used to evaluate compliance with cleanup levels unless there are large variations in hazardous substance concentrations relative to the mean hazardous substance concentration or a large percentage of concentrations are below the detection limit.

(d) Appropriate statistical methods include the following:

(i) A procedure in which a confidence interval for each hazardous substance is established from site sampling data and the soil cleanup level is compared to the upper confidence interval;

(ii) A parametric test for percentiles based on tolerance intervals to test the proportion of soil samples having concentrations less than the soil cleanup level; or

(iii) Other statistical methods approved by the department.

(e) If a confidence interval approach is used to evaluate compliance with a soil cleanup level, the decision rule is a one-tailed test of the null hypothesis that the true soil concentration of a hazardous substance exceeds the soil cleanup level. Compliance with soil cleanup levels shall be determined using the following criteria:

(i) The upper confidence interval on the true soil concentration is less than the soil cleanup level. Statistical tests shall be performed at a Type I error level of 0.05;

(ii) No single sample concentration shall be greater than two times the soil cleanup level; and

(iii) Less than ten percent of the sample concentrations shall exceed the soil cleanup level.

(f) If a method to test the proportion of soil samples is used to evaluate compliance with a soil cleanup level, compliance shall be determined using the following criteria:

(i) No single sample concentrations shall be greater than two times the soil cleanup level; and

(ii) Less than ten percent of the sample concentrations shall exceed the soil cleanup level; and

(iii) The true proportion of samples that do not exceed the soil cleanup level shall not be less than ninety percent. Statistical tests shall be performed with a Type I error level of 0.05.

(g) For purposes of demonstrating compliance with soil cleanup levels, measurements below the method detection limit shall be assigned a value equal to one-half the method detection limit. Detectable levels below the practical quantitation limit shall be assigned a value equal to the method detection limit. The department may approve alternate statistical procedures for handling nondetected values or values below the practical quantitation limit. Alternate statistical procedures may include probit analysis and regression analysis.

WAC 173-340-745 Soil cleanup standards for industrial properties. (1) Overview. [RESERVED]

~~(1)~~(2) General considerations.

(a) Use of this section. This section shall be used to establish soil cleanup levels where the department has determined that industrial land use represents the reasonable maximum exposure.

(b) Criteria. Cleanup levels shall not be based on industrial land use unless the following criteria can be demonstrated:

(i) The area of the site where industrial property soil cleanup levels are proposed meets the definition of an industrial property under WAC 173-340-200;

Industrial soil cleanup levels are based on an adult worker exposure scenario. It is essential to evaluate land uses and zoning for compliance with this definition in the context of this exposure scenario. Local governments use a variety of zoning categories for industrial land uses so a property does not necessarily have to be in a zone called "industrial" to meet the definition of "industrial property." Also, there are land uses allowed in industrial zones that are actually commercial or residential, rather than industrial, land uses. Thus, an evaluation to determine compliance with this definition should include a review of the actual text in the comprehensive plan and zoning ordinance pertaining to the site and a visit to the site to observe land uses in the zone. When evaluating land uses to determine if a property use not specifically listed in the definition is a "traditional industrial use" or to determine if the property is "zoned for industrial use," the following characteristics shall be considered:

- People do not normally live on industrial property. The primary potential exposure is to adult employees of businesses located on the industrial property;
- Access to industrial property by the general public is generally not allowed. If access is allowed, it is highly limited and controlled due to safety or security considerations;
- Food is not normally grown/raised on industrial property. (However, food processing operations are commonly considered industrial facilities);
- Operations at industrial properties are often (but not always) characterized by use and storage of chemicals, noise, odors and truck traffic;
- The surface of the land at industrial properties is often (but not always) mostly covered by buildings or other structures, paved parking lots, paved access roads and material storage areas, minimizing potential exposure to the soil;
- Industrial properties may have support facilities consisting of offices, restaurants, and other facilities that are commercial in nature but are primarily devoted to administrative functions necessary for the industrial use and/or are primarily intended to serve the industrial facility employees and not the general public;

(ii) The cleanup action provides for appropriate institutional controls implemented in accordance with WAC 173-340-440 to limit potential exposure to residual hazardous substances. This shall include, at a minimum, placement of a covenant on the property restricting use of the area of the site where industrial soil cleanup levels are proposed to industrial property uses; and

(iii) Hazardous substances remaining at the property after remedial action would not pose a threat to human health or the environment at the site or in adjacent nonindustrial areas. In evaluating compliance with this criterion, at a minimum the following factors shall be considered:

- The potential for access to the industrial property by the general public, especially children. The proximity of the industrial property to residential areas, schools or childcare facilities shall be considered when evaluating access. In addition, the presence of natural features, manmade structures, arterial streets or intervening land uses that would limit or encourage access to the industrial property shall be considered. Fencing shall not be considered sufficient to limit access to an industrial property since this is insufficient to assure long term protection;
- The degree of reduction of potential exposure to residual hazardous substances by the selected remedy. Where the residual hazardous substances are to be capped to reduce exposure, consideration shall be given to the thickness of the cap and the likelihood of future site maintenance activities, utility and drainage work, or building construction reexposing residual hazardous substances.
- The potential for transport of residual hazardous substances to off-property areas, especially residential areas, schools and childcare facilities;

- The potential for significant adverse effects on ~~vegetation or~~ wildlife caused by residual hazardous substances as determined under WAC 173-340-709; and
- The likelihood that these factors would not change for the foreseeable future.

(c) ~~Ecology c~~Expectations. In applying the criteria in WAC 173-340-745 (1)(b), the department expects the following results:

(i) The department expects that properties zoned for heavy industrial or high intensity industrial use and located within a city or county having completed a comprehensive plan and adopted implementing zoning regulations under the Growth Management Act (chapter 36.70A RCW) will meet the definition of industrial property. For cities and counties not planning under the Growth Management Act, the department expects that spot zoned industrial properties will not meet the definition of industrial property but that properties that are part of a larger area zoned for heavy industrial or high intensity industrial use will meet the definition of an industrial property;

(ii) For both GMA and non-GMA cities and counties, the department expects that light industrial and commercial zones and uses should meet the definition of industrial property where the land uses are comparable to those cited in the definition of industrial property or the land uses are an integral part of a qualifying industrial use (such as, ancillary or support facilities). This will require a site-by-site evaluation of the zoning text and land uses;

(iii) The department expects that for portions of industrial properties in close proximity to ~~(generally, within a few hundred feet)~~ residential areas, schools or childcare facilities, residential soil cleanup levels will be used unless:

(A) Access to the industrial property is very unlikely or, the hazardous substances that are not treated or removed are contained under a cap of clean soil (or other materials) of substantial thickness so that it is very unlikely the hazardous substances would be disturbed by future site maintenance and construction activities (depths of even shallow footings, utilities and drainage structures in industrial areas are typically three to six feet); and

(B) The hazardous substances are relatively immobile (or have other characteristics) or have been otherwise contained so that subsurface lateral migration or surficial transport via dust or runoff to these nearby areas or facilities is highly unlikely; and

(iv) Note that a change in the reasonable maximum exposure to industrial site use primarily affects the direct contact exposure pathway. Thus, for example, for sites where the soil cleanup level is based primarily on the potential for the hazardous substance to leach and cause ground water contamination, it is the department's expectation that an industrial land use will not affect the soil cleanup level. Similarly, where the soil cleanup level is based primarily on surface water protection, ecological or other pathways other than direct human contact, land use is not expected to affect the soil cleanup level.

(d) Calculating industrial property soil cleanup levels. Soil cleanup levels established under this section shall be determined as described in subsections (2) through (5) of this section.

(e) Soil cleanup levels for nearby properties. Soil cleanup levels for areas beyond the industrial property boundary that do not qualify for industrial soil cleanup levels under this section (including implementation of institutional controls and a covenant restricting use of the property to industrial property uses) shall be established in accordance with WAC 173-340-740.

(f) Relationship between soil cleanup levels and other cleanup standards. Soil cleanup levels shall be established at concentrations which do not directly or indirectly cause violations of ground water, surface water, sediment or air cleanup standards established under this chapter or under applicable state and federal laws. A property that qualifies for an industrial soil cleanup level under this section does not necessarily qualify for other than a Method A or Method B cleanup level in other media. Each medium must be evaluated separately utilizing the criteria applicable to that medium.

(g) Other options. See WAC 173-340-740 (1)(c) for establishing cleanup levels for industrial land uses not qualifying under this section ~~and for commercial land uses.~~

~~(2)~~(3) Method A cleanup levels.

(a) Method A cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations in the following table:

PROPOSED MODEL TOXICS CONTROL ACT RULE REVISIONS

Table ~~3~~ 5
Method A Cleanup Levels - Industrial Soil[a]

Hazardous Substance	CAS Number	Cleanup Level	
Arsenic	7440-38-2	200.0 mg/kg[b]	
Benzene	71-43-2	~~0.5 mg/kg~~	0.0265 mg/kg[c]
Cadmium	7440-43-9	10.0 mg/kg[d]	
Chromium (Total)	7440-47-3	500.0 mg/kg[e]	
DDT	50-29-3	5.0 mg/kg[f]	
1,2 Dichloroethane	107-06-2	0.0186 mg/kg[g]	
Ethylbenzene	100-41-4	~~20.0 mg/kg~~[g]	8.9 mg/kg[h]
Ethylene dibromide	106-93-4	~~0.001 mg/kg~~[h]	0.002 mg/kg[i]
n-Hexane	110-54-3	35 mg/kg[j]	
Lead	7439-92-1	1000.~~0~~ mg/kg[k]	
Lindane	58-89-9	1.0 mg/kg[il]	
Methylene chloride	75-09-2	0.5 mg/kg[lm]	
Methyl tertiary-butyl ether	1634-04-4	0.15 mg/kg[n]	
Mercury (inorganic)	7439-97-6	1.0 mg/kg[o]	
Naphthalene	91-20-3	6.9 mg/kg[p]	
PAHs (carcinogenic)[q]		~~20.0 mg/kg~~[m]	
Benzo[a]anthracene	56-55-3	0.018 mg/kg	
Benzo[b]fluoranthene	205-99-2	0.018 mg/kg	
Benzo[k]fluoranthene	65-85-0	0.018 mg/kg	
Benzo[a]pyrene	50-32-8	0.0018 mg/kg	
Chrysene	218-01-9	0.18 mg/kg	
Dibenz[a,h]anthracene	53-70-3	0.0449 mg/kg	
Indeno[1,2,3-c,d]pyrene	193-39-5	0.18 mg/kg	
PCB Mixtures		10.0 mg/kg[rt]	
Tetrachloroethylene	127-18-4	0.5 mg/kg[su]	
Toluene	108-88-3	~~40.0 mg/kg~~[tv]	14 mg/kg[tf]
TPH (gasoline)		100.0 mg/kg[uq]	
TPH (diesel)		200.0 mg/kg[vs]	
TPH (mineral oil)		3,500 mg/kgw	
TPH (other and unknown)		200.0 mg/kg[xs]	
1,1,1 Trichloroethane	71-55-6	20.0 mg/kg[yz]	
Trichloroethylene	79-01-5	0.5 mg/kg[zz]	
Xylenes	1330-20-7	~~20.0 mg/kg~~[y]	140 mg/kg[aa]

[a] Caution on misusing method A tables. Method A tables have been developed for specific purposes. They are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or those sites with relatively few hazardous substances. The tables may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in these tables should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in these tables do not necessarily trigger requirements for cleanup actions under this chapter.

[b] Arsenic. Cleanup level based on concentration derived using the procedures in subsection (4)(a)(iii)(B) of this section.

[c] Benzene. Cleanup level based on protection of ground water.

[d] Cadmium. Cleanup level based on protection of ground water.

[e] Chromium. Cleanup level based on inhalation exposure.

[f] DDT. Cleanup level based on protection of ground water. This value may not be protective where terrestrial ecological impacts are a concern at a site. See WAC 173-340-709 for further information on how to determine which sites must address terrestrial ecological impacts.

[g] 1,2 Dichloroethane. Cleanup level based on protection of ground water.

[gh] Ethylbenzene. Cleanup level based on protection of ground water.

[hi] Ethylene dibromide. Cleanup level based on protection of ground water and modified based on analytical considerations.

[i] n-Hexane. Cleanup level based on protection of ground water.

[ik] Lead. Cleanup level based on direct contact. This value may not be protective where terrestrial ecological impacts are a concern at a site. See WAC 173-340-709 for further information on how to determine which sites must address terrestrial ecological impacts.

[jl] Lindane. Cleanup level based on cleanup level based on concentration derived using the procedures in subsection (4)(a)(iii)(B) of this section.

[km] Methylene chloride. Cleanup level based on protection of ground water.

[n] Methyl tertiary-butyl ether. Cleanup levels based on protection of ground water.

[o] Mercury. Cleanup level based on protection of ground water.

[p] Naphthalene. Cleanup level based on protection of ground water.

[mq] PAHs (carcinogenic). Cleanup level based on concentration derived using the procedures in subsection (4)(a)(iii)(B) of this section.

[qr] PCB Mixtures. Cleanup level based on concentration derived using the procedures in subsection (4)(a)(iii)(B) of this section.

[s] Tetrachloroethylene. Cleanup level based on protection of ground water.

[tu] Toluene. Cleanup level based on protection of ground water.

[tu] Total Petroleum Hydrocarbons (gasoline). Cleanup level based on protection of ground water.

[v] Total Petroleum Hydrocarbons (diesel). Cleanup level based on protection of ground water.

[w] Total Petroleum Hydrocarbons (mineral oil). Cleanup level based on protection of ground water.

[x] Total Petroleum Hydrocarbons (other or unknown). Cleanup level based on protection of ground water.

[y] 1,1,1 Trichloroethane. Cleanup level based on protection of ground water.

[z] Trichloroethylene. Cleanup level based on protection of ground water.

[aa] Xylenes. Cleanup level based on protection of ground water; and

(ii) Concentrations established under applicable state and federal laws;

(b) For sites with additional hazardous substances which are deemed indicator hazardous substances under WAC 173-340-708(2) for which there is no value in Table ~~3~~ 5 or applicable state and federal laws, cleanup levels for these additional hazardous substances shall be established at the natural background concentration or the practical quantification limit, subject to the limitations in this chapter.

(c) The department may establish ~~a~~Method A cleanup levels that are more stringent than those required by (a) of this subsection when, based on site-specific evaluations, the department determines that such levels are necessary to protect human health or environment, including consideration of the factors in WAC 173-340-740 (3)(b).

(d) Use of Method A cleanup levels is elective with the potentially liable person. A potentially liable person may always establish a cleanup level under Method B, Method C at appropriate sites, or a modified Method B or C, rather than use a Method A cleanup level.

~~(3)~~ (4) Method B cleanup levels. This section does not provide procedures for establishing ~~a~~Method B cleanup levels. Method C is the standard method for establishing soil cleanup levels at industrial sites and its use is conditioned upon the continued use of the site for industrial purposes.

~~(4)~~ (5) Standard Method C cleanup levels.

(a) Standard Method C cleanup levels for industrial soils shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws;

(ii) Ground water protection. Concentrations which will not cause contamination of ground water to concentrations which exceed ground water cleanup levels established under WAC 173-340-720 as determined using the following procedures:

(A) For individual hazardous substances or mixtures, concentrations that are equal to or less than one hundred (100) times the ground water cleanup level established in accordance with WAC 173-340-720 unless it can be demonstrated that higher soil concentrations are protective of ground water at the site;

(B)(I) For total petroleum hydrocarbons, the person undertaking the cleanup action may elect to make this demonstration on the basis of data on individual hazardous substances that comprise the total petroleum hydrocarbons;

(II) For total petroleum hydrocarbons, the person conducting the evaluation may elect to make the demonstration referred to under subsection (4)(b)(i) of this section on the basis of any of the following methods:

( ) Empirical demonstration. A soil concentration that is protective of ground water may be determined through an empirical demonstration that soil concentrations are not resulting in an exceedance of ground water cleanup levels. Where the person conducting the evaluation elects to make such an empirical demonstration, it shall be preferred over all other methods.

( ) Equilibrium partition solutions identified by the department. A soil concentration that is protective of ground water may be determined using a three-phase or four-phase equilibrium partition solution that has been identified by the department as generally appropriate for that purpose, including use of site-specific values measured at the site and/or default values identified by the department.

( ) A soil concentration that is protective of ground water may be determined using a computer model that has been identified by the department as generally appropriate for that purpose. Input parameters may be site-specific values measured at the site and/or default values or within acceptable ranges identified by the department.

( ) Leach tests. A soil concentration that is protective of ground water may be determined using the Synthetic Precipitation Leaching Procedure (EPA Method 1312) or any other method that complies with WAC 173-340-702 and 173-340-708.

( ) Other methods. A soil concentration that is protective of ground water may be determined using any of the methods described above with more site-specific information, or using any other appropriate method. Site-specific data or alternative methods used under this provision shall comply with WAC 173-340-702 and 173-340-708.

(iii) For those hazardous substances for which ~~sufficiently protective~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A)(I) Concentrations which are anticipated to result in no acute or chronic toxic effects on human health via direct contact with contaminated soil and are determined using the following equation and standard exposure assumptions:

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RFD} \times \text{ABW} \times \text{UCF2} \times \text{HQ}}{\text{SIR} \times \text{AB1} \times \text{FOC}}$$

Where:

RFD	= Reference Dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	= Average body weight over the period of exposure (70 kg)
UCF2	= Unit conversion factor (1,000,000 mg/kg)
SIR	= Soil ingestion rate (50 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
FOC	= Frequency of contact (0.4)
HQ	= Hazard quotient (1);

(II) For total petroleum hydrocarbon fractions, the following equation shall be used in lieu of the equation under (I):

$$\text{Soil cleanup level (mg/kg)} = \frac{\text{HI}}{E_I \times 3(F_i/\text{oRFD}_i) + E_D \times 3(F_i/\text{dRFD}_i)}$$

Where:

HI	= Hazard index (1)
E_I	= Exposure through ingestion: (SIR x AB1 x FOC)/(ABW x UCF2)
E_D	= Dermal exposure: (SA x AF x ABS_i)/(UCF3 x ABW)
F_i	= Percentage of total petroleum hydrocarbons contributed by Fraction i
oRFD_i	= Oral reference dose for Fraction i as specified in WAC 173-340-708(7) (mg/kg-day)
dRFD_i	= Dermal reference dose for Fraction i as specified in WAC 173-340-708(7) (mg/kg-day)
SIR	= Soil ingestion rate (50 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
FOC	= Frequency of contact (0.4)
ABW	= Average body weight during period of exposure (70 kg)
UCF2	= Unit conversion factor (1,000,000 mg/kg)
SA	= Surface area (3,400 cm^2)
AF	= Adherence factor (0.3 mg/cm^2-event)
ABS_i	= Absorption factor for Fraction i (unitless)
UCF3	= Unit Conversion factor (1,000,000 mg/kg)

(B) Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 100,000 via direct contact with contaminated soil and are determined using the following equation and standard exposure assumptions:

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RISK} \times \text{ABW} \times \text{LIFE} \times \text{UCF1}}{\text{CPF} \times \text{SIR} \times \text{AB1} \times \text{DUR} \times \text{FOC}}$$

Where:

RISK	= Acceptable cancer risk level (1 in 100,000)
ABW	= Average body weight over the period of exposure (70 kg)
LIFE	= Lifetime (75 years)
UCF1	= Units conversion factor (1,000,000 mg/kg)
CPF	= Carcinogenic Potency Factor as specified in WAC 173-340-708(8) (kg-day/mg)
SIR	= Soil ingestion rate (50 mg/day)
AB1	= Gastrointestinal absorption rate (1.0)
DUR	= Duration of exposure (20 years)
FOC	= Frequency of contact (0.4);

(b) The department may establish ~~m~~Method C cleanup levels that are more stringent than those required by (a) of this subsection when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision must comply with WAC 173-340-700, 702, 708, and 709.

(6) Modified Method C. A site-specific risk assessment may be performed to modify Method C cleanup levels, and/or to develop remediation levels, in the same manner as described under WAC 173-340-740(7).

~~(5)~~ (7) Multiple hazardous substances/multiple pathways of exposure.

(a) Soil cleanup levels for individual hazardous substances developed in accordance with ~~subsection (4) of~~ this section, including cleanup levels based on state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand.

~~(b) These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by~~

~~one exposure pathway, including cleanup levels based on applicable state and federal laws.~~

(b) Applicable laws. Where a cleanup level developed under this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.

~~(6)~~ (8) Point of compliance. The point of compliance shall be established in accordance with WAC 173-340-740~~(6)~~(9).

~~(7)~~ (9) Compliance monitoring. Compliance monitoring shall be performed in accordance with WAC 173-340-410 and 173-340-740~~(7)~~(10).

WAC 173-340-750 Cleanup standards to protect air quality. (1) Overview. [RESERVED]

~~(1)~~ (2) General considerations.

(a) Cleanup levels to protect air quality shall be based on estimates of the reasonable maximum exposure expected to occur under both current and future site use conditions. The department has determined that residential, commercial day care facilities, and schools are the ~~—~~site uses that will generally require the most protective ambient air cleanup levels and that exposure to hazardous substances under these conditions represents the reasonable maximum exposure. ~~In the event of a release or potential release of hazardous substances into the ambient air, treatment, removal, or containment measures shall be conducted to reduce the levels of hazardous substances in the ambient air to levels consistent with this use unless all of the following can be demonstrated:~~

~~(i) The site does not serve as a current residential area;~~

~~(ii) The site is not likely to become a residential area in the future based on a review of site zoning, statutory or regulatory restrictions, comprehensive plans, historic site use, adjacent land uses, and other relevant factors;~~

~~(iii) Appropriate institutional controls are implemented at the site to prohibit residential use; and~~

~~(iv) Air emissions from the site will not reduce the air quality in adjacent residential areas; or~~

~~(v) More stringent concentrations are necessary to protect human health and the environment.~~

(b) Ambient air cleanup or remediation levels for nonresidential site uses such as recreational, commercial, or agricultural uses shall be established ~~on a case-by-case basis~~based on a modified Method B/C as described in subsection (5) of this section. The overall limits on the hazard index and total excess cancer risk specified in subsections (3) through (~~6~~5) of this section shall apply to these sites. ~~Cleanup levels for these types of sites shall be at least as stringent as method C cleanup levels established under subsection (4) of this section.~~

(c) Ambient air cleanup levels shall be established at concentrations which do not directly or indirectly cause violations of ground water, surface water, or soil cleanup standards established under this chapter or applicable state and federal laws.

~~(2)~~ (3) Method A cleanup levels.

(a) Method A cleanup levels for ambient air shall be at least as stringent as concentrations established under applicable state and federal laws;

(b) The department may establish ~~m~~Method A cleanup levels that are more stringent than those required by (a) of this subsection when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment.

(c) Use of Method A cleanup levels is elective with the potentially liable person. A potentially liable person may always establish a cleanup level under Method B, Method C at appropriate sites, or modified Method B or C, rather than use a Method A cleanup level.

~~(3)~~ (4) Standard Method B cleanup levels.

(a) Standard Method B cleanup levels for ambient air shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws; and

(ii) For hazardous substances for which ~~sufficiently protective~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A) Concentrations which are estimated to result in no acute or chronic toxic effects on human health and are determined using the following equation and standard exposure assumptions:

$$\text{Ambient air cleanup level } (ug/m^3) = \frac{RFD \times ABW \times UCF \times HQ}{BR \times ABS}$$

Where:

RFD	= Reference Dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	= Body weight (16 kg)
UCF	= Units conversion factor (1,000 ug/mg)
BR	= Breathing rate (10 m^3/day)
ABS	= Absorption percentage (1.0)
HQ	=Hazard Quotient (1);

(B) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 1,000,000 and are determined using the following equation and standard exposure assumptions:

$$\text{Ambient air cleanup level } (ug/m^3) = \frac{RISK \times ABW \times LIFE \times UCF}{CPF \times BR \times ABS \times DUR}$$

Where:

RISK	= Acceptable cancer risk level (1 in 1,000,000)
ABW	= Body weight (70 kg)
LIFE	=Lifetime (75 years)
UCF	= Units conversion factor (1,000 ug/mg)
CPF	=Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
BR	= Breathing rate (20 m^3/day)
ABS	= Absorption percentage (1.0)
DUR	= Duration of exposure (30 years);

(b) The department may establish ~~m~~Method B cleanup levels that are more stringent than those required by (a) of this subsection, when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment.

~~(4)~~ (5) Standard Method C cleanup levels.

(a) Standard Method C cleanup levels may be approved by the department if the person undertaking the cleanup action can demonstrate that such levels are consistent with applicable state and federal laws, that best available control technology has been utilized, and that one or more of the conditions in WAC 173-340-707(1) exist.

(b) Standard Method C cleanup levels for ambient air shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws; and

(ii) For hazardous substances for which ~~sufficiently protective~~ health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A) Concentrations which are anticipated to result in no significant acute or chronic effects on human health and are estimated in accordance with WAC 173-340-750 (3)(a)(ii)(A) except that the average body weight shall be 70 kg and the estimated breathing rate shall be 20 m^3/day; and

(B) For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to 1 in 100,000 and are determined in accordance with WAC 173-340-750 (3)(a)(ii)(B).

(c) The department may establish ~~m~~Method C cleanup levels that are more stringent than those required by (b) of this subsection, when, based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment

(6) Modified Method B and C cleanup levels.

(a) Cleanup levels. A site-specific risk assessment may be conducted to establish modified Method B and C cleanup levels based on factors described under WAC 173-340-708(11)(b)(i), including absorption percentage.

(b) Remediation levels. A site-specific risk assessment described in paragraph (a) of this subsection may also be used to establish remediation levels based on factors described under WAC 173-340-708(11)(b)(ii), including factors identified under paragraph (a) and duration of exposure. A remediation level established as described in this paragraph may be used in developing cleanup action alternatives to be evaluated in a feasibility study under WAC 173-340-350(8)(d).

(c) Site-specific risk assessments shall be performed in a manner consistent with WAC 173-340-700, 173-340-702, and 173-340-708.

~~(5)~~ (7) Multiple hazardous substances/multiple pathways of exposure.

(a) Air cleanup levels for individual hazardous substances developed in accordance with ~~subsections (3) and (4)~~ of this section, including cleanup levels based on applicable state and federal laws, shall be

adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments shall be made in accordance with the procedures in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one and the total excess cancer risk shall not exceed one in one hundred thousand.

~~(b) These overall limits on the hazard index and total excess cancer risk shall also apply to sites where there is exposure to a single hazardous substance by one exposure pathway, including those cleanup levels based on applicable state and federal laws.~~

(b) Applicable laws. Where a cleanup level developed under this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in one hundred thousand (1×10^{-5}) or a hazard index of one (1), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in one hundred thousand (1×10^{-5}) and the hazard index does not exceed one (1) at the site.

~~(6)~~ (8) Points of compliance. Cleanup levels established under subsections (2), (3), (4), and (5) of this section shall be attained in the ambient air throughout the site. For sites determined to be industrial sites under the criteria in WAC 173-340-745, the department may approve a conditional point of compliance not to exceed the property boundary.

~~(7)~~ (9) Compliance monitoring.

(a) Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data which are representative of the site.

(b) Data analysis and evaluation procedures used to evaluate compliance with ambient air cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410.

(c) Averaging times specified in applicable state and federal laws shall be used to demonstrate compliance with those requirements.

(d) When cleanup levels are not based on applicable state and federal laws, the following averaging times shall be used:

(i) Compliance with ambient air cleanup levels for noncarcinogens shall be based on twenty-four-hour time weighted averages except where the cleanup level is based upon an inhalation reference dose which specifies an alternate averaging time;

(ii) Compliance with ambient air cleanup levels for carcinogens shall be based on annual average concentrations.

WAC 173-340-760 Sediment cleanup standards. Reserved.

PART VIII — GENERAL PROVISIONS

WAC 173-340-800 Property access. (1) Normal entry procedures. Whenever there is a reasonable basis to believe that a release or threatened release ~~of a hazardous substance~~ may exist, the department's authorized employees, agents or contractors may, after reasonable notice, enter upon any real property, public or private, to conduct investigations or remedial actions. The notice shall briefly describe the reason for requesting access. For the purpose of this subsection, unless earlier access is granted, reasonable notice shall mean:

(a) Written notice to the site owner and operator to the extent known to the department, sent through the United States Postal Service at least three days prior to entry; or

(b) Notice to the site owner and operator to the extent known to the department, in person or by telephone at least twenty-four hours prior to entry.

(2) Notification of property owner. The department ~~will~~ shall ask a resident, occupant, or other persons in custody of the site to identify the name and address of owners of the property. If an owner is identified who has not been previously notified, the department ~~will~~ shall make a prompt and reasonable effort to notify such owners of remedial actions planned or conducted.

(3) Orders and ~~consent~~ decrees. Whenever ~~investigations or~~ remedial actions are conducted under a ~~consent~~ decree or order, a potentially liable person shall not deny access to the department's authorized employees, agents, or contractors to enter and move freely about the property to oversee and verify investigations and remedial actions being performed.

(4) Ongoing operations. Persons gaining access under this section shall take all reasonable precautions to avoid disrupting the ongoing operations on a site.

Such persons shall comply with all state and federal safety and health requirements which the department determines to be applicable.

(5) Access to documents. The department's authorized employees, agents or contractors may, after reasonable notice, enter property for the purpose of inspecting documents relating to a release or threatened release at the facility. Persons maintaining such documents shall:

(a) Provide access during normal business hours and allow the department to copy these documents; or

(b) At the department's request, provide legible copies of the requested documents to the department.

(6) Emergency entry. Notice by the department's authorized employees, agents, or contractors is not required for entry onto property to investigate, mitigate, or abate an emergency posed by the release or threatened release ~~of a hazardous substance~~. The department will make efforts which are reasonable under the circumstances to promptly notify those owners and operators to the extent known to the department of the actions taken.

(7) Other authorities. Where consent has not been obtained for entry, the department shall secure access in a manner consistent with state and federal law, including compliance with any warrant requirements. Nothing in this chapter shall affect site access authority granted under other state laws and regulations.

(8) Access by potentially liable persons. The department shall make reasonable efforts to facilitate access to real property and documents for persons who are conducting remedial actions under either an order or decree.

(9) Information sharing. The department will provide the documents and factual information on releases or threatened releases obtained through this section to persons who request such in accordance with chapter 42.17 RCW and chapter 173-03 WAC. The department does not intend application of these authorities to limit its sharing of such factual information.

(10) Split samples. Whenever the department intends to perform sampling at a site, it shall indicate in its notification under subsection (1) of this section whether sampling may occur. The person receiving notice may take split samples, provided this does not interfere with the department's sampling.

WAC 173-340-810 Worker safety and health. (1) General provisions. Requirements under the Occupational Safety and Health Act of 1970 (29 U.S.C. Sec. 651 et seq.) and the Washington Industrial Safety and Health Act (chapter 49.17 RCW), and regulations promulgated pursuant thereto shall be applicable to remedial actions taken under this chapter. These requirements are subject to enforcement by the designated federal and state agencies. All governmental agencies and private employers are directly responsible for the safety and health of their own employees and compliance with those requirements. Actions taken by the department under this chapter do not constitute an exercise of statutory authority within the meaning of section (4)(b)(1) of the Occupational Safety and Health Act.

(2) Safety and health plan. Potentially liable persons responsible for undertaking remedial actions under WAC 173-340-520 through 173-340-540, shall submit a safety and health plan for the department's review and comment. The safety and health plan must be consistent with chapter 49.17 RCW and regulations promulgated pursuant thereto.

WAC 173-340-820 Sampling and analysis plans. (1) General. A sampling and analysis plan shall be prepared for all sampling activities which are part of investigation and remedial actions unless otherwise directed by the department and except for emergencies. The level of detail required in the sampling and analysis plan may vary with the scope and purpose of the sampling activity. Sampling and analysis plans prepared under an order or decree shall be submitted to the department for review and approval.

(2) Contents. The sampling and analysis plan shall specify procedures which ensure that sample collection, handling, and analysis will result in data of sufficient quality to plan and evaluate remedial actions at the site. Additionally, information necessary to insure proper planning and implementation of sampling activities shall be included. References to standard protocols or procedures manuals may be used provided the information referenced is readily available to the department. The sampling and analysis plan shall contain:

(a) A statement on the purpose and objectives of the data collection, including quality assurance and quality control requirements;

(b) Organization and responsibilities for the sampling and analysis activities;

(c) Requirements for sampling activities including:

(i) Project schedule;

(ii) Identification and justification of location and frequency of sampling;

(iii) Identification and justification of parameters to be sampled and analyzed;

(iv) Procedures for installation of sampling devices;

(v) Procedures for sample collection and handling, including procedures for personnel and equipment decontamination;

(vi) Procedures for the management of waste materials generated by sampling activities, including installation of monitoring devices, in a manner that is protective of human health and the environment;

(vii) Description and number of quality assurance and quality control samples, including blanks and spikes;

(viii) Protocols for sample labeling and chain of custody; and

(ix) Provisions for splitting samples, where appropriate.

(d) Procedures for analysis of samples and reporting of results, including:

(i) Detection or quantification limits;

(ii) Analytical techniques and procedures;

(iii) Quality assurance and quality control procedures; and

(iv) Data reporting procedures, and where appropriate, validation procedures.

(3) Available guidance. The department shall make available guidance for preparation of sampling and analysis plans.

WAC 173-340-830 Analytical procedures. (1) Purpose. This section specifies acceptable analytical methods and other testing requirements for sites where remedial action is being conducted under this chapter.

(2) General requirements.

(a) All hazardous substance analyses shall be conducted by a laboratory accredited under chapter 173-50 WAC, unless otherwise approved by the department.

(b) All analytical procedures used shall be done in accordance with a sampling and analysis plan prepared under WAC 173-340-820.

(c) Tests for which methods have not been specified in this section shall be performed using standard methods or procedures such as those specified by the American Society for Testing of Materials, when available, unless otherwise approved by the department.

(d) Samples shall be analyzed consistent with methods appropriate for the site, the media being analyzed, the hazardous substances being analyzed for, and the anticipated use of the data.

(e) The department may require or approve modifications to the standard analytical methods identified in subsection (4) of this section to provide lower quantitation limits, improved accuracy, greater precision, or to address the factors in (d) of this subsection.

(f) Limits of quantitation. Laboratories shall achieve the lowest practical quantitation limits consistent with the selected method and WAC 173-340-707.

(3) Multiple methods.

(a) Where there is more than one method specified in subsection (4) of this section with a practical quantitation limit less than the cleanup standard, any of the methods may be selected. In these situations, considerations in selecting a particular method may include confidence in the data, analytical costs, and considerations relating to quality assurance or analysis efficiencies.

(b) The department may require an analysis to be conducted by more than one method in order to provide higher data quality. For example, the department may require that different separation and detection techniques be used to verify the presence of a hazardous substance ("qualification") and determine the concentration of the hazardous substance ("quantitation").

(4) Analytical methods.

(a) The methods used for sample collection, sample preservation, transportation, allowable time before analysis, sample preparation, analysis, method detection limits, practical quantitation limits, quality control, quality assurance and other technical requirements and specifications shall comply with the following requirements, as applicable:

(i) Method 1. **Test Methods for Evaluating Solid Waste**, U.S. EPA, SW-846~~and any revisions or amendments thereto~~ third edition, third update (1997);

(ii) Method 2. **Methods for Chemical Analysis of Water and Wastes**, U.S. EPA, EPA-600/4-79-020

~~and any revisions or amendments thereto~~ March 1979 and March 1983 revision;

(iii) Method 3. **Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act,** 40 CFR Chapter 1 Part 136, and ~~Appendix A, B, and C, U.S. EPA and any revisions or amendments thereto~~ Appendices A, B, C and D, U.S. EPA, July 1, 1995;

(iv) Method 4. **Standard Methods for the Examination of Water and Wastewater,** American Public Health Association, American Water Works Association, and Water Pollution Control Federation ~~and any revisions or amendments thereto~~ 18th edition, 1992;

(v) Method 5. **Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound,** Puget Sound Estuary Program/Tetra Tech, ~~1986 and any revisions or amendments thereto~~ 1996 edition;

(vi) Method 6. **Quality Assurance Interim Guidelines for Water Quality Sampling and Analysis,** Groundwater Management Areas Program, Washington Department of Ecology, Water Quality Investigations Section, December 1986~~and any revisions or amendments thereto; or~~

(vii) Method 7. [ADD TPH METHODS HERE]

~~(vii)~~ (viii) Equivalent methods subject to approval by the department.

(b) The methods used for a particular hazardous substance at a site shall be selected in consideration of the factors in subsection (2) of this section.

(c) Ground water. Methods 1, 2, 3 and 4, as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-720.

(d) Surface water. Methods 1, 2, 3, 4 and 5 as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-730.

(e) Soil. Method 1, as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-740 and 173-340-745.

(f) Air. Appropriate methods for determining compliance with WAC 173-340-750 shall be selected on a case-by-case basis, in consideration of the factors in subsection (2) of this section.

WAC 173-340-840 General submittal requirements. Unless otherwise specified by the department, all reports, plans, specifications, and similar information submitted under this chapter shall meet the following requirements:

(1) Cover letter. Include a letter describing the submittal and specifying the desired department action or response.

(2) Number of copies. Three copies of the plan or report shall be submitted to the department's office responsible for the facility. The department may require additional copies to meet public participation and interagency coordination needs.

(3) Certification. ~~A~~ Except as otherwise provided for in Chapter 18.43.130 RCW, all engineering work submitted under this chapter shall be under the seal of a professional engineer registered with the state of Washington.

(4) Visuals. Maps, figures, photographs, and tables to clarify information or conclusions shall be legible. All maps, plan sheets, drawings, and cross-sections shall meet the following requirements:

(a) To facilitate filing and handling, be on paper no larger than 24 x 36 inches and no smaller than 8 1/2 x 11 inches. Photo-reduced copies of plan sheets may be submitted provided at least one full-sized copy of the photo-reduced sheets are included in the submittal.

(b) Identify and use appropriate and consistent scales to show all required details in sufficient clarity.

(c) Be numbered, titled, have a legend of all symbols used, and specify drafting or origination dates.

(d) Contain a north arrow.

(e) Use United States Geological Survey datum as a basis for all elevations.

(f) For planimetric views, show a survey grid based on monuments established in the field and referenced to state plane coordinates. This requirement does not apply to conceptual diagrams or sketches when the exact location of items shown is not needed to convey the necessary information.

(g) Where grades are to be changed, show original topography in addition to showing the changed site topography. This requirement does not apply to conceptual diagrams or sketches where before and after topography is not needed to convey the necessary information.

(h) For cross-sections, identify the location and be cross-referenced to the appropriate planimetric view. A reduced diagram of a cross-section location map shall be included on the sheets with the cross-sections.

(5) Sampling data. All sampling data shall be submitted consistent with procedures specified by the department. Unless otherwise specified by the department, all such sampling data shall be submitted in both printed form and an electronic form capable of

being transferred into the department's data management system.

(6) Appendix. An appendix providing the principal information relied upon in preparation of the submittal. This should include, for example: A complete citation of references; applicable raw data; a description of, or where readily available, reference to testing and sampling procedures used; relevant calculations; and any other information needed to facilitate review.

WAC 173-340-850 Recordkeeping requirements. (1) Any remedial actions at a facility must be documented with adequate records. Such records may include: Factual information or data; relevant decision documents; and any other relevant, site specific documents or information.

(2) Unless otherwise required by the department, records shall be retained for at least ten years from the date of completion of compliance monitoring.

(3) Records shall be retained by the person taking remedial action, unless the department requires that person to submit the records to the department.

(4) The department shall maintain its records in accordance with chapter 42.17 RCW.

WAC 173-340-860 Endangerment. In the event that the department determines that any activity being performed at a hazardous waste site is creating or has the potential to create a danger to human health or the environment, the department may direct such activities to cease for such period of time as it deems necessary to abate the danger.

WAC 173-340-870 Project coordinator. The potentially liable person shall designate a project coordinator for work performed under an order or decree. The project coordinator shall be the designated representative for the purposes of the order or decree. That person shall coordinate with the department and the public and shall facilitate compliance with requirements of the order or decree.

WAC 173-340-880 Emergency actions. Nothing in this chapter shall limit the authority of the department, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

WAC 173-340-890 Severability. If any provision of this chapter or its application to any person or circumstance is held invalid, the remainder of this chapter or the application of the provision to other persons or circumstances shall not be affected.

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

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ECOLOGY

September 27, 2000

In reply refer to: KEP-4

Ms. Tish Akana
Rules Coordinator
P.O. Box 47600
Olympia, Washington 98504-7600

The Bonneville Power Administration (Bonneville) appreciates the opportunity to comment on the Proposed Model Toxic Control Act (WAC 173-340) as published in the Washington State Register, Issue 00-16. Bonneville would like to acknowledge Washington Department of Ecology (Ecology) for the clarity and organization provided in this latest version of the proposed rule and congratulate Ecology for all their hard work.

2024 Bonneville has two remaining comments on the proposed Ecological Evaluation (173-340-7490, 7492 and 7491): Bonneville believes the rule should provide an exclusion from Terrestrial Ecological Evaluation for gravel-surfaced areas where the presence of wildlife is actively discouraged, Bonneville also recommends including mineral insulating oil in Table 749-2.

Exclusion for Gravel-surfaced areas where wildlife is actively discouraged.
Ecological evaluations should be unnecessary where there is no 'ecology'. If there is no vegetation, no subsurface biota due to highly compacted, gravel-covered soil and no water there are no exposure pathways. Furthermore, if wildlife is consistently and actively discouraged for safety reasons, potential future exposure is eliminated. Substations are an example of this type of property. Substation construction specifications make the ground too hard for small rodents to dig into, too inhospitable for vegetation, and inaccessible to larger animals (fencing). Furthermore, animals are discouraged from entering and living in substations because they can cause the electrical equipment to short circuit. Attracting wildlife to substations would create a hazardous situation and would endanger the reliability of the transmission system.

Bonneville has previously made these points with Ecology and has yet to receive an opinion on the subject. In the beginning of the ecological evaluation rulemaking process Bonneville sent Ecology a letter explaining specifically why substation construction specifications break the ecological exposure pathway (see attached letter dated October 3, 1997). At that time Bonneville asked for an exclusion for active substations. Ecology acknowledged receiving our letter, but the issue was not addressed. The next year Bonneville participated in Ecology's Ecological Risk Assessment Pilot Study (See attachment dated December 28, 1998). All 172 of Bonneville's Washington substations were run through the ecological screening process. The results of the pilot study were inconclusive because it was unclear if Ecology considered substation rock an ecological barrier. If substation rock and fencing are considered barriers, all substations were

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excluded from ecological evaluation, if not, only 36% were excluded because they had no potential for contamination. Only 5% were excluded because they were located within industrial areas. Bonneville passed the results of this pilot study and the resulting comments/questions on to Ecology. A year later Bonneville and four other Washington utilities again asked Ecology for an exclusion for active substations (see attached letter dated January 22, 1999). Bonneville believes this issue needs to be addressed in the final rule.

Under 173-340-7491(1)(b) a site can qualify for exclusion if "...buildings, paved roads, pavement, other physical barriers..." cover the contamination. Bonneville believes that substation rock and fencing qualifies as "other physical barrier" and would like an exclusion from ecological evaluation.

2025 **Add Mineral Insulating Oil to Table 749-2**

Tables 720, 740 and 745 all include mineral oil as a separate listing, but mineral insulating oil it is not listed in Table 749. This leaves us with two choices: inferring that mineral insulating oil is not a "priority contaminant of ecological concern" or placing mineral insulating oil under 'Diesel Range Organics'. Clearly mineral oil does not belong under 'Diesel Range Organics' because it does not contain the toxic compounds typically associated with diesel and is not as mobile in soil as diesel (EPRI 1996, EPRI 1998(a), EPRI 1998(b) and EPRI 1999). Because neither of these alternatives is realistic, we suggest that Ecology include mineral insulating oil in Table 749, with an unrestricted land use threshold level of 2,000 mg/kg and an industrial level of 4,000 mg/kg.

Again we congratulate you on a job well done. If you have questions or need further information please don't hesitate to call Debra Malin at 503-230-5701.

Thank you for your time and consideration.

Sincerely,

James R Meyer

James R. Meyer
Manager for Pollution Prevention and Abatement

Enclosures

REFERENCES

EPRI 1996. Insulating Oil Characteristics Volume 1: Characterization Results, Volume 2: Fate and Transport Evaluation. Electric Power Research Institute EPRI TR-106898-V1 and V2

EPRI 1998(a). Mineral Oil Transport and Fate Investigations at Franklin Substation. . Electric Power Research Institute TR-111238.

EPRI 1998(b). Technical Brief Chemical -Physical characteristics of Mineral Insulating Oils and Environmental Risk Analyses. Electric Power Research Institute TB-111083.

EPRI 1999. Mineral Insulating Oils Used in the Power Industry - Chemical Compositions and Dissolution Characteristics. Electric Power Research Institute TR-114129.

ENCLOSURE 1

Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

October 3, 1997

In reply refer to: EP-4

Mr. Nigel Blakely
Washington State Department of Ecology
Toxics Cleanup Program
P.O. Box 47600,
Olympia, Washington 98504-7600

Dear Mr. Blakely

Subject: Ecological Evaluation Proceedures (WAC 173-340-709)

Thank you for taking the time to assist the Bonneville Power Administration (BPA) with understanding the intent of the TPH Framework, and the Tier I off-ramps. A further review of the proposed regulations has raised BPA concern with the proposed ecological procedures. Applying the procedures as proposed to soils in operating electrical substations will be an overly burdensome requirement, and not be directly beneficial to plants or wildlife.

BPA owns and operates 162 substations in Washington State. Although the substations themselves are industrial in present and future use, many of them are surrounded by areas of rural or pristine environments, which could trigger ecological evaluation under the rule as proposed.

Active operating substations share several common factors which break the soil exposure pathway. These factors are universal in their design and construction specification, making qualification for Tier I on a site-by-site basis highly repetitive and without substative value to the assessment process.

BPA would like to suggest using the criteria specified below to categorically place active substations under a Tier 1 offramp in the proposed Ecological Evaluation Procedures (WAC 173-340-709). Substation design and construction specifications provide suitable protection, and preclude exposure to plants or wildlife from soils containing residual petroleum hydrocarbons.

The following substation specifications break the soil exposure pathway:

- Substation soils are compacted to 95%, making it unlikely that rodents or worms could dig and tunnel in compacted soils.
- Compacted substation soils are covered with 3" to 6" of compacted specification crushed rock to Washington - section 9-03.9(3); sizes 1-1/4 inch minus and 5/8 inch minus. This rock is too large for small birds and rodents to pick up or swallow, and too compact for small animals to tunnel or burrow in.

- Eight foot high fencing with barbed security wire fringe. Fence prevents large mammal access.
- Non-selective bareground control of weeds and grasses, to prevent arcing potential. Rodents, insects, worms, etc. have no attraction to substation soils where there is no available food supply, eliminating the possibility of food chain magnification.

BPA will continue to be open to suggestions on how the utility industry can provide support to protection of wildlife, while at the same time reducing cumbersome procedures and excess costs in conducting ecological risk assessments at active operating substations. Our participation in the Brownfields Pilot Site study, and completion of the Pilot Site Reports during October, will further comment on terrestrial screening levels, offramp analysis, and the TPH Framework Guidance document.

Thank you for the opportunity to comment on Washington's proposed ecological risk assessment rules.

Sincerely,

James E. Meyer
Manager, Pollution Prevention and Abatement
Environment, Fish & Wildlife

cc:
Kimberly Prestbo, Foster Wheeler Environmental Corp.
Ishwar Murarka, Electric Power Research Institute

ENCLOSURE 2

Malin, Debra - ECN

From: Malin, Debra - ECN
Sent: Monday, December 28, 1998 4:09 PM
To: 'Curtis Dahlgren WDOE'; 'Carol Krage'
Cc: 'Nigel Blakley'; 'Pete Kmet'; 'Carol Krage'; 'Steve Robb'; Meyer, James R. - EP
Subject: eco pilot

Curtis and Carol,
I apologize for taking so long to get back to you on this ecorisk assessment pilot project; seems as if everything is due at the end of the year.

Please let me know if you need anything else.
I hope you had a Merry Xmass and have been enjoying all the storms!

deb

ECORISK_.doc

Bonneville Power Administration's Comments and Response to Washington State Department of Ecology's Ecological Risk Assessment Pilot Study Questionnaire dated 11/30/98.

Site-Specific Questions:

Site: Albany 115KV Capacitor Yard - units 1 & 2. Voluntary cleanup completed 1994.

Q. Does the simplified evaluation determine if cleanup necessary?
A. No. It is unclear if the site is excluded. We would like Ecology's concurrence that substations pose no significant ecological risk –specifically that the exposure pathway is broken and that substations provide little habitat.

TIER I (Exclusion): Undetermined if exclusion applies.

- WAC 173-340-7491 (1) (a). No exclusion. Site had surface soil contamination.
- WAC 173-340-7491 (1) (b). It is unclear if Ecology considers the exposure pathway to be broken in substations. As previously noted (letter to Nigel Blakely dated 10/03/97) substations have very specific construction standards which we believe break all reasonable ecological exposure pathways. Additionally, substations provide little if any habitat for soil biota or wildlife:
  - Soils are compacted to 95% - a condition not conducive for soil microbes, insects or worms. Animals who feed on soil biota do not feed within substations because there is very little if any food and because substation soils are inaccessible.
  - Compacted soils are covered with 3" – 6" crushed rock (1.25" minus and 5/8" minus). This rock is too large for small birds or rodents to pick up or swallow and small animals find it difficult to burrow in.
  - Substation fencing prevents access by larger animals.
  - Vegetation is virtually nonexistent in substations. Non selective bare ground control of weeds and grasses is used to prevent arcing. Because there is no food, herbivores do not eat within substations.
  - Most utilities have substation pest control programs. This is because animals within substations can cause arcing. Small rodents and small birds are a particular problem because they like to nest among the warm and dry electrical equipment.
  - Summary: Utilities actively discourage animals from residing in substations, there is no food within substations to contribute to bioaccumulation, and access to substation soils by animals is improbable.

- WAC 173-340-7491 (1) (c). PCBs were present at the site and more than ¼ acre of undeveloped land is within 500 feet of "any area on the site". Suggest changing language to "within 500 feet of area of contamination".
- WAC 173-340-7491 (1) (d). PCB concentrations at the site were above background.

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TIER II (Simplified terrestrial evaluation) – Undetermined if excluded under this subsection.

- WAC 173-340-7492 (2) (a)(i). 350 square foot area of contamination off-ramp was exceeded. Areas of contamination in both unit 1 and unit 2 exceeded 800 square feet.
- WAC 173-340-7492 (2) (a)(ii). The site did not qualify for exclusion under Table 6.

  - There is more than 4 acres of undeveloped land within 500 feet of "any area of the site". Suggest changing to language to: "within 500 feet of the area of contamination".

  - Question 2 is problematic for federal facilities because they are not zoned. Land classification should be based on current and reasonably foreseeable land use.

  - Question 5 is also problematic. Ecology should define what constitutes presence or absence of a chemical. Suggest that presence be defined as being above screening levels.
- WAC 173-340-7492 (2) (b). Pathway analysis. Ecology has not yet concurred that the eco-exposure pathway is broken in substations.
- WAC 173-340-7492 (2) (c)(i). Surface soils were contaminated with PCB's at this site and PCB-contaminated equipment remains in use in other areas of this substation.

  Language in this section is unclear: "No hazardous substance listed in Table 7 is, *or will be,* present in the soil within 6 feet..." Because PCB-contaminated equipment will remain at this site (in another unit of the substation) there remains the potential for future releases. Substations with older equipment (in our case virtually all facilities) cannot eliminate potential for future release unless equipment is replaced. Replacement is not cost effective unless equipment is failing. Replacement for this purpose alone would directly and significantly effect electricity rates. Suggestion: Specify that '*will be*' pertains to what remains in the soil after remediation – not potential releases. Also, subsection 173-340-740(7) refers reader back to eco text (subsection 7490). Please specify the "indicated values".
- WAC 173-340-7492 (2) (c)(ii). Bioassays were not performed at this site. Cannot address subsection.
- WAC 173-340-7492 (3). Institutional controls are in place.
- Table 7 TPH (Diesel). It is unclear if the TPH (diesel) levels apply only to diesel or to all heavier TPH products. Please clarify.

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General Questions

Q. Does the 'problem formulation' step help in selecting a cleanup action alternative?
A. No. We believe that substation construction specifications break all reasonable terrestrial exposure pathways and that substations provide little habitat. This being the case, there is no need for the problem formulation step. See also the following question.

Q. Under what circumstances would you recommends using the screening level as a cleanup level rather than developing a site-specific cleanup level?
A. We believe substations should be excluded. If for some reason they are not, we would use the screening levels and place the resulting (additional) remediation costs in the rate case.
Cleanups inside of substations must be done expeditiously because they coincide with equipment replacement, construction schedules and outage schedules. There's no time for site-specific risk assessments.

Q. Does the terrestrial evaluation indicate that a previously chosen remedy was adequate or that another remedy would be more appropriate?
A. Not Applicable. The exposure pathway is broken by substation construction requirements. However, if the terrestrial evaluation was applied one would presumably come to the conclusion that substation soils pose minimal risk to wildlife because there is no exposure. While substations provide shelter for an occasional small rodent or bird, they do not provide food and thus do not contribute to the food chain. Utilities do not want animals in substations for electrical safety reasons.

Q. How does the cost of a terrestrial evaluation compare to an existing terrestrial approach under MTCA?
A. Don't know. We have not conducted a terrestrial evaluation.

Q What is the cost of conducting a terrestrial evaluation Vs a human health evaluation?
A. Don't know. We have not conducted a terrestrial evaluation.

Q. If you decided that a site-specific food web analysis was an appropriate approach for any of the case studies you review, were you able to decide from the rule language how to proceed?
A. Not applicable

Q. Does the proposed eco-evaluation process allow you to get to a result that could be used to develop a remedy for the site?
A. No. Substation construction and maintenance standards are the remedy.

Q. How well does this rule/process provide information you need to evaluate if a site poses a significant adverse effect to populations of ecological receptors?
A. See previous comments.

Q. Are there any specific technical problems that you foresee with the rule?
A. See above comments and the following comment regarding zoning/land use and barrier determination.

BPA substations are not zoned, therefore under the current proposed MTCA they cannot qualify as an industrial or commercial site unless they are surrounded by industrial property. Only 9 out of 172 Washington substations are located in areas surrounded by industrial development and by association could be considered industrial. The remaining substations are 'industrial islands', and under Ecology's expectations (173-340-745(2)(b)(i)) they will not meet the definition of industrial property. We suggest that the language in 173-340-7490(3)(d) include a determination of what is "industrial" for the purposes of this section. We further suggest that substations, whether they are 'islands' or not, are industrial because they have institutional controls required under 173-340-440(1): they are fenced, have use restrictions as long as the connecting transmission line remains intact, have strict electrical maintenance requirements which severely limit or eliminate risk to surrounding ecosystem.

Q. Do you have any suggestions on how the rule could be improved to make it easier to use? Do you have any suggestions for guidance or other types of supplementary assistance?
A. Suggestions are included in comments.

Q. How many sites you reviewed were eliminated based on exclusions in 7491?
A. Cannot definitively answer the question because there are problems with the language in (1) (a) (b) and (c) and lack of system-wide soil sampling data.

All of BPA's 172 substations located in the state of Washington were reviewed. Using substation equipment records, and the potential for contamination, the following estimate can be provided: 36% were excluded under (1) (a) because they have little potential for contamination at any depth. Either 0% or 100% were excluded under (1) (b) – depending on the interpretation of a physical barrier. Only 5% were potentially excluded under (1) (c) – most of our substations are located in remote areas.

7491(1)(a) There are two problems with this subsection's language: 1) Reference to the future should be clearly limited to the scope of the remediation, or eliminated altogether. This is an evaluation of *what is* not *what could be*. The existing language could be interpreted to apply to sites with the *potential* for release. In the case of substations, this is a significant problem, since equipment will remain on site. (Existing language: "Soil contaminated with hazard substances is *or will be* located...") 2) The existing language does not say how much contamination needs to be present to be outside the exclusion. The language does not provide a concentration trigger level or an area trigger level. E.g. Above what concentration is a constituent considered to be present and significant – (Below detection level? Below levels given in Table 7?). Section 7492 considers any contamination smaller than 350 square feet to be deminimus– suggest that the same deminimus level be adopted here. (Existing language: "Soil *contaminated with hazardous substances*....")

One hundred and two (59%) out of 172 BPA substations located in Washington *could* (have the potential to) contain PCB contaminated soils – independent of depth. This estimate is based on the probable (past or present) existence of PCB contaminated

equipment in large enough quantities to exceed 2 ppm if a release occurred. Sixty two (36%) of BPA's 172 Washington substations have little potential for PCB contaminated surface soil because they do not or have not contained PCB contaminated equipment in quantities above 10 gallons.

The potential for contamination was not evaluated at 9 substations because their location was assumed to exclude them from the eco-risk assessment process under 7491(1)(c). However, this assumption may not be valid (see below).

7491(1)(b) BPA believes that 172 out of 172 substations have physical barriers that prevent ecological exposure to substation soils (for the reasons given above). We would like concurrence from Ecology on this matter.

7491(1)(c) There are 3 problems with the language in this section: 1) the requirement for contiguous undeveloped land within *any area of the site* is problematic. This implies that measurements must be taken from the property boundary – not from the area of contamination. BPA frequently owns unfenced land surrounding our substations, and substations are part of linear transmission line right-of-ways. For clarity, we suggest that measurement take place from the area of contamination. 2) Most all (over 95%) of our substations are located in non-industrial settings, surrounded by undeveloped land because of electrical safety or siting requirements and are connected to undeveloped land under adjacent transmission lines. 3) The remaining 5% of BPA's Washington substations are surrounded by heavy industry but have more than ¼ acre of contiguous "undeveloped land" on the site or within 500 feet of any area of the site. The definition of "undeveloped land" is too narrow; it only excludes paved areas, not unpaved, highly compacted soils in industrial settings where soil biota and terrestrial habitat are virtually nonexistent. We suggest that the definition be broadened.

7491(2)(a)(i) Is problematic. All of BPA substations are adjacent to high voltage transmission lines – which, by definition are open spaces. Our right-of ways are managed so that low growing native and/or seminative vegetation is preserved or enhanced so that interference with native habitat is minimized. For this reason, we fear that transmission right-of-ways may be erroneously considered to be 'open spaces'. If this were the case, this subsection could trigger site-specific eco risk assessments at 95% of our substations (if substation maintenance and construction standards are not considered to break the ecological pathway). This is not acceptable and probably not Ecology's intention. We suggest that substations be excluded because they do not provide habitat and the exposure pathway is broken.

7491(2)(a)(ii) Is irrelevant, even if endangered species feed or live in substations, they have no access to substation soils. Suggest that substations be excluded because they do not provide habitat and the exposure pathway is broken by construction standards. Within substations, there is far greater risk from electrocution than from soil contact.

7491(2)(a)(iii) It is not uncommon for transmission right-of-ways to be covered by native vegetation. Because substations are connected to transmission right-of-ways this criteria is problematic. We suggest that substations be excluded because they do not provide habitat and construction and maintenance standards break the exposure pathway.

Q. How many of the sites you reviewed were eliminated based on the exclusions in 7492?

A. Depending upon interpretation, all or none.

Eight BPA sites which have undergone voluntary cleanups outside of Washington had enough site-specific data to be evaluated under this subsection: Troutdale, Bandon, Tillimook, Port Orford, Fairview, Albany, Conkelly and North Brookings.

- None were eliminated under 7492(2)(a)(i). All had contamination exceeding 350 square feet with PCB concentrations in excess of 2 ppm.
- Either all or none could be eliminated under 7492(2)(a)(ii). If Ecology concurs that substation construction and maintenance standards eliminate habitat and break the exposure pathway then all could be eliminated, if not, none. The surrounding areas in all 8 substations consisted of native vegetation and wildlife is present. Suggest changing the wording to read: "Land use at the site makes substantial wildlife exposure unlikely." (In other words, delete "and surrounding area").
- Either all or none could be eliminated under 7492(2)(b) – depending upon Ecology concurrence that substation construction and maintenance standards break the exposure pathway. Key issue is whether the lack of vegetation, compaction, rock cover, fencing, and overhead electrical equipment combine to make a "man-made physical barrier".

7492(2)(c)(i) All 8 sites had the same problem as the Albany Substation: there exists the potential for future contamination on other portions of the site because PCB contaminated equipment remains in service. Suggest that Ecology limit scope of the future to post remediation cleanup levels not to potential releases. The inclusion of potential releases is problematic because the future is unpredictable and because no consideration is given to spill response measures or quantity of potential releases. Existing language could trigger the requirement for an eco risk assessment at 64% of BPA substations. Problematic language: "No hazardous substances listed in Table 7 is *or will be* present in the soil...."

7492(2)(c)(ii) The difference between this subsection and the proceeding subsection is unclear. It appears that the intention is to require bioassays. This is problematic for substation soils. Cleanups inside of substations must be completed expeditiously because they coincide with equipment replacement, construction and outage schedules. For electrical safety reasons, there is no time for bioassays.

Q. How many of the sites you reviewed were eliminated based on the exclusions in 7492?

A. We have not conducted a site-specific terrestrial ecological evaluation.

ENCLOSURE 3

PUGET SOUND ENERGY

January 22, 1999

Mr. Jim Pendowski
Washington State Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Re: Comments to the December 16, 1998 MTCA Draft Rule Revisions

Dear Mr. Pendowski:

Enclosed are comments on the December 16, 1998 Model Toxics Control Act (MTCA) draft rule revision. These comments were prepared by Puget Sound Energy (PSE) in cooperation with the Bonneville Power Administration, Snohomish County PUD, Seattle City Light, and Tacoma PUD. As you may know, these utilities have been active participants in the MTCA rule revision process. We have carefully read the above referenced rule and have met to discuss how proposed revisions will impact utility operations and the ability to provide gas or electric service.

The enclosed comments cover several issues including proposed wording in the Method A tables; off-ramps for ecological risk evaluation; the use of different statistical approaches; the timing for application of new cleanup levels; and the use of Method A cPAH cleanup levels. As in previous comment letters, we indicate the paragraphs and sections of the revised rule that are referred to in each of our comments. In some instances, we also provide alternative rule language for Ecology's consideration. All of these comments are endorsed by the utilities mentioned above.

We are grateful to Ecology for being responsive to discussing some of the concerns that utilities have raised with the proposed rule revisions. We acknowledge and appreciate the fact that Ecology has incorporated many of our previous comments into the latest draft of the proposed rule. We understand that the rule revision process has been a difficult job and that Ecology's staff and others have worked hard to write rule revisions that satisfy everyone's concerns. We will continue to work with Ecology in this process and we will provide any information we have or perform any analysis we can that will be helpful in improving the final rule. Thanks again for all your efforts and thank you for your consideration of the enclosed comments.

Sincerely,

Barry Lombard
Manager- Remediation Programs

cc: Ms. Trish Akana

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Page 13 of 2

A. The Method A Table Footnote for Mineral Oil

The current wording for the Method A Tables in sections 740 and 745 include the following sentence in the footnote for Electrical Insulating Mineral Oil:

> *Sites using these cleanup levels must analyze soil samples and meet the cleanup level for PCBs, unless it can be demonstrated that the release originated from a transformer that was manufactured after 1980 or that the oil containing PCBs was never used in the equipment suspected as the source of the release.*

Section 720 has similar wording except that it references "*ground water samples*" instead of "*soil samples.*"

The use of the term "containing PCBs" has significance under TSCA and should be better defined in this rule. We recommend the wording below to provide clarification of the term "containing PCBs" and to provide reasonable tests for when testing for PCBs is required. We are also proposing a modification to this PCB test to include consideration of other historic sources of PCBs at the location of the release rather than just considering the current and historic status of an oil-filled device that may be the source of a release.

For Section 720 we suggest this change in the wording of the footnote:

> *Ground water from ~~S~~sites using these cleanup levels must also be analyzed ~~ground water samples~~ for PCBs, ~~unless~~ if it can be demonstrated that ~~the release originated from a transformer~~ equipment ~~that was manufactured after 1980 or that~~ the oil containing greater than 50 mg/kg PCBs was ~~never~~ used in the equipment ~~suspected as the source~~ at the location of the release or if the PCB content of the equipment used at the site of the release is unknown.*

For Section 740 we suggest this change in the wording of the footnote:

> *Soil from ~~S~~sites using these cleanup levels must also be analyzed ~~soil samples and meet the cleanup level~~ for PCBs, ~~unless~~ if it can be demonstrated that ~~the release originated from a transformer~~ equipment ~~that was manufactured after 1980 or that~~ the oil containing greater than 50 mg/kg PCBs was ~~never~~ used in the equipment ~~suspected as the source~~ at the location of the release or if the PCB content of the equipment used at the site of the release is unknown.*

For Section 745 we suggest this change in the wording of the footnote:

> *Soil from ~~S~~sites using these cleanup levels must also be analyzed ~~soil samples and meet the cleanup level~~ for PCBs, ~~unless~~ if it can be demonstrated that ~~the release originated from a transformer~~ equipment ~~that was manufactured after 1980 or that~~ the oil containing greater than 500 mg/kg PCBs was ~~never~~ used in the equipment ~~suspected as the source~~ at the location of the release or if the PCB content of the equipment used at the site of the release is unknown.*

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These threshold values are important in that they are sufficiently protective and cautionary. They also correlate to existing regulatory thresholds for PCBs under TSCA and functionally define the PCB content of an electrical device. Use of these thresholds could significantly reduce costs for unneeded testing and simplify the response to releases from oil-filled electrical transformers.

Concentrations of PCBs in soil resulting from releases of PCB contaminated electrical insulating mineral oil can be easily calculated using the PCB in oil concentration and the mineral oil in soil concentration. A spreadsheet and a graph illustrating this are attached to this document. Because of its infinite solubility in oil and very low solubility in water, the PCBs tend to remain in the oil at a uniform concentration when the mineral oil is in soil. This allows us to make reasonable assumptions to identify when there might be a concern that PCB cleanup levels could be exceeded in the event of a release of PCB-containing Electrical Mineral Insulating Oil to soil.

For Section 720, Ecology's own soil-to-ground water pathway calculations clearly demonstrate the very low solubility of PCBs. The published and proposed Method A soil cleanup levels for PCBs are not based on the soil to ground water pathway. If soil cleanup levels of 4,000 mg/kg Electrical Mineral Insulating Oil in soil is achieved and presuming the oil contained no more than 50 mg/kg PCBs, the resulting PCB concentration in the remaining soil would be sufficiently low to preclude the possibility of ground water contamination from the PCBs.

For Section 740, with a PCB cleanup level of 0.4 mg/kg in soil, a soil sample containing Electrical Insulating Mineral Oil at a concentration of 4,000 mg/kg could be contaminated with oil containing up to 100 mg/kg PCBs without exceeding the PCB cleanup level of 0.4 mg/kg PCBs in soil. The use of a 50 mg/kg threshold for PCBs in oil provides a two-fold factor of safety.

For Section 745, with a PCB cleanup level of 14 mg/kg in soil, a soil sample containing Electrical Insulating Mineral Oil at a concentration of 4,000 mg/kg could be contaminated with oil containing up to 3,500 mg/kg PCBs without exceeding the PCB cleanup level of 14 mg/kg PCBs in soil. The use of a 500 mg/kg threshold for PCBs in oil provides a seven-fold factor of safety.

The footnote as modified clearly points out that this special knowledge regarding the presence of PCBs in Electrical Insulating Mineral Oil must apply to all past uses of oil at the location of the release. This provision captures the possibility of a new release causing contamination at a location of a historic release that may have contained PCBs.

B. Eco-Risk Issue

The existing off-ramps for terrestrial ecological evaluation do not sufficiently address the conditions present at active electrical substations and switchyards. The construction and management of these facilities is intended to prevent as much as possible the presence of plants and wildlife within their fenced boundaries. All reasonable ecological exposure pathways at these facilities are broken because of the very specific construction standards. Because of the type of equipment involved and the exposed currents they carry, these facilities are actively managed to eliminate plants and wildlife which can pose fire and electrical outage hazards. These facilities do not provide any reasonable habitat or foraging opportunities for small mammals or birds, large animals are excluded by secure fencing and non-selective bare ground control is used to eliminate weeds and grasses. In summary, utilities actively discourage animals from residing in electrical substations and switchyards, there is no food in these facilities to contribute to bioaccumulation, and access to substation and switchyard soils by animals is very improbable.

We suggest the following exclusion be added to the Exclusions section WAC 173-349-7491. This suggested wording is almost identical to that of WAC 173-340-7491 (1)(b) with the difference that the existing section relies on features (buildings, pavement, etc.) to break the exposure pathway whereas the proposed wording below relies on design, operation and actual practice to break the exposure pathway. Both are subject to the demonstrations and limitations posed by institutional controls.

New Subpart

WAC 173-340-7491 (1)

(e) Soil contaminated with hazardous substances is confined to an area where active measures and controls are continually used to prevent the presence of plants and wildlife. To qualify for this exclusion, an institutional control shall be required by the department under WAC 173-340-440 and any planned future land use must be completed within a time frame acceptable to the Department.

We also suggest that WAC 173-340-7491(1)(b) be modified as follows:

(b) Soil contaminated with hazardous substances is, or will be covered by maintained buildings, roads, pavement, or other physical barriers.....

We believe that the Simplified Terrestrial Ecological Evaluation needs some clarification and suggest that the following subsection be added to section WAC 173-349-7492 to clearly identify the terrestrial ecological evaluation off-ramp for those facilities where hazardous material types or concentrations are such that they do not trigger ecological consideration at all.

New Subpart

WAC 173-340-7492 (2)(a)

(iii) Independent cleanup actions in which soil located in the upper 15 feet does not exceed, or will not upon completion of cleanup actions exceed the applicable concentrations for any of the hazardous substances listed in Table 7.

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C. Statistical Language

In conformance with the wishes of the PAC, Ecology has placed items formerly held as guidance issues into the rule. One of those items is the specific approach to be used in a statistical analysis to evaluate a site's compliance with cleanup levels. Recent experience at several sites has shown that the results obtained with this approach can be counter intuitive and, in-fact could encourage a less thorough cleanup in order to achieve compliance with cleanup levels. At issue is the treatment of non-detect values in statistical calculations.

We do not have a specific recommendation for a change in the statistical approach at this time. We do, however, recognize that once this former guidance is placed in the rule its impact on evaluating cleanup actions will be more rigid.

We suggest that the following wording be inserted in the various statistical sections of the rule to allow the use of other statistical approaches - essentially to build in some flexibility to the rule.

(iii) When between fifteen and fifty percent of the measurements are below the practical quantitation limit, Cohen's method shall be used to calculate a corrected mean and standard deviation for use in calculating an upper confidence limit on the true mean soil concentration. Alternative means approved by Ecology are also acceptable in calculating an upper confidence limit on the true mean soil concentration.

(iv) If more than fifty percent of the measurements are below the practical quantitation limit, ~~the largest value in the data set shall be used in place of~~ alternative means approved by Ecology are acceptable in calculating an upper confidence limit on the true mean soil concentration.

D. Adoption of New Cleanup Levels

We have re-examined the proposed wording in WAC 173-340-702(12) and have one concern regarding its interpretation. As this new section is presently worded, it could be implied that those who are cleaning up sites at this time would not be able to take advantage of new cleanup levels which will come into effect when the revised rule is adopted. The section specifically states that the appropriate cleanup level will be the one "in effect at the time the final cleanup action for that release began." Many cleanups can take years to complete (such as air sparging at a former UST site) and the owners of these sites should be able to take advantage of the new approaches available in evaluating the adequacy of their cleanup actions.

We believe that this is an oversight in the drafting of the wording and suggest that wording be added to the section to allow the use of either the current cleanup level or the cleanup level in effect at the time the final action for that release began. The text below provides suggested alternative wording.

WAC 173-340-702(12)(a) For cleanup actions conducted by the department, or under an order or decree, the department shall determine the cleanup level that applies to a release based on the rules in effect under this chapter at the time the department issues a final cleanup action plan for that release. In reviewing the adequacy of independent remedial actions, the department shall determine the cleanup level that applies to a release based on the rules in effect at the time the cleanup action for that release began. In either case, if a cleanup level in the current rule provides a higher cleanup level for the release, it may be used.

E. cPAH Cleanup Levels

The proposed rule includes a lowering of the Method A cleanup levels for cPAHs. the ground water cleanup level is lowered from 0.1 to 0.02 ug/L. The soil cleanup levels are lowered from 1.0 to 0.7 mg/Kg. We are concerned because these cleanup levels are set at concentrations that are commonly seen in urban environments.

The electric power utility industry uses treated wood utility poles extensively. We obviously have areas where these poles are stored. In recent years we have increasingly been testing for cPAHs at locations where poles have been stored. We have also tested many of our other sites for cPAHs as part of the process of preparing surplus property for sale. As a result, we are finding that cPAHs are ubiquitous in the environment in urban areas, particularly in roadside ditches and streams or wetlands that receive road runoff. Other independent studies have shown that it is not uncommon to find urban sediments with cPAH concentrations exceeding the existing and proposed Method A cleanup levels.

We suggest that Ecology take a close look at this concern and develop an approach for addressing background concentrations of cPAHs. You may be able to address the issue, at least in-part, in the notes on the Method A tables. An appropriate approach may be tied to profiling the relative ratios of cPAHs and possibly include other PAHs. If the PAHs found at a site match a background profile and not the profile of the type of cPAHs that could be released at a site then the PAHs present would not be contaminants of concern in a MTCA action.

Without a formal recognition that cPAHs are in fact ubiquitously present in urban areas, undue burden could be placed on those industries that prudently test for these compounds and then find themselves holding data that indicates the presence of hazardous materials that are not related to their past operations. In many instances, cleanup of such cPAHs would provide little or no long-term benefit to human health or the environment because the source of the cPAHs will not have been removed. For example, cleanup of a roadside ditch to MTCA Method A levels for cPAHs would only be a temporary fix because the ditch would become recontaminated from urban runoff. Another example would be the cleanup of an urban wetland. Cleanup of such a wetland to MTCA Method A levels for cPAHs would result in very little long-term benefit but could result in the long-term destruction of the wetland.

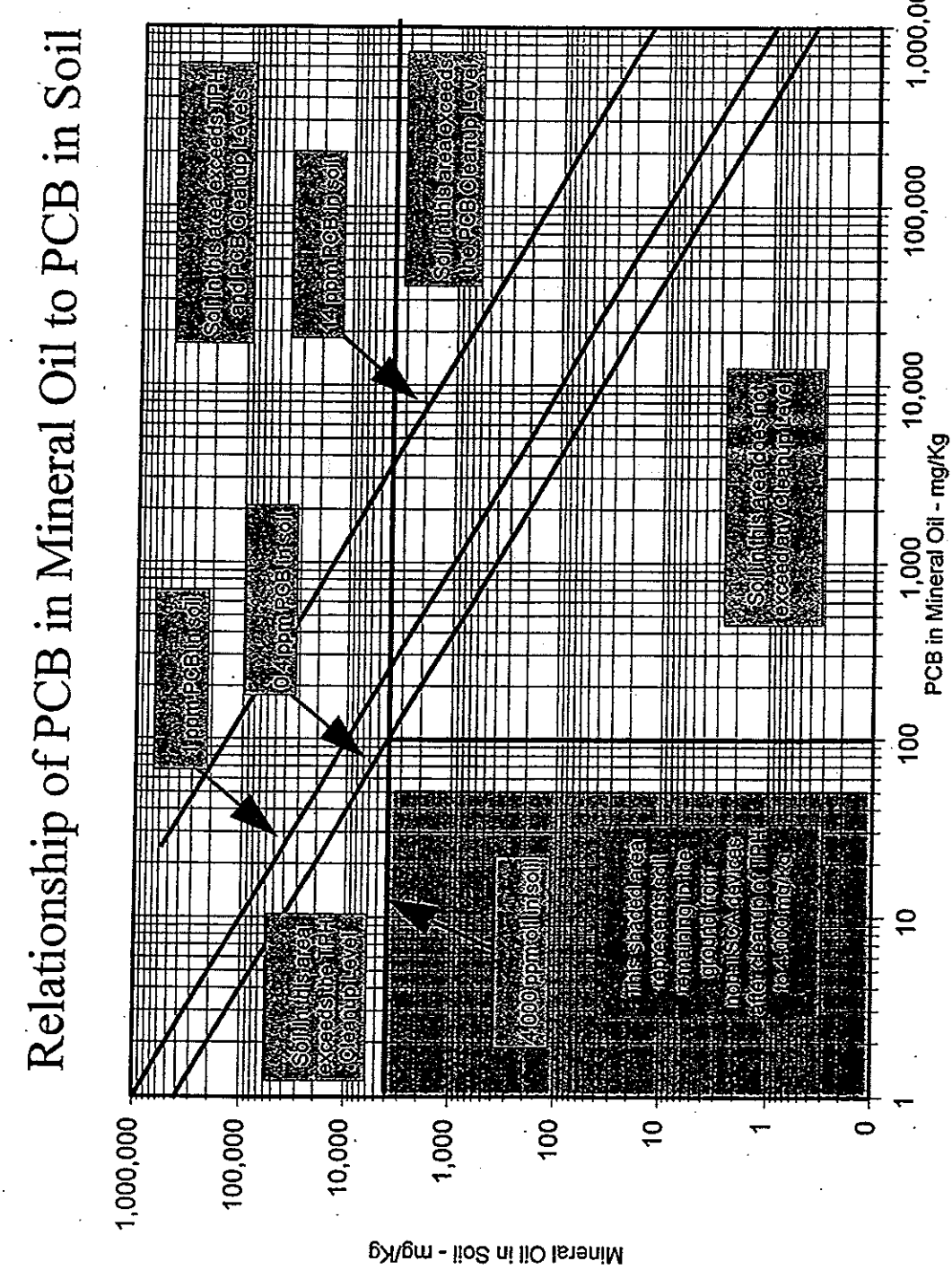
In addition to our electric power industry, other industries are also affected because of their use of PAHs in their infrastructure. These include the railroad industry, road authorities that deal with combustion by-products and road run-off, and other utilities that may use treated utility poles (the telephone and cable industries).

PCB in Soil related to PCB Oil in Soil

PCB in Soil = PCB in Oil * Oil in Soil

All units used are mg/kg therefor no other conversions are necessary.

PCB in Oil (mg/kg)	Oil Concentration in Soil (mg/kg) when:			
	PCB=1.0 mg/kg	PCB=0.4 mg/kg	PCB=14.0 mg/kg	PCB=0.1 mg/kg
1	1,000,000.0	400,000.0	NA	100,000.0
10	100,000.0	40,000.0	NA	10,000.0
25	40,000.0	16,000.0	560,000.0	[redacted]
50	20,000.0	8,000.0	280,000.0	2,000.0
100	10,000.0	[redacted]	140,000.0	1,000.0
125	8,000.0	3,200.0	112,000.0	800.0
250	[redacted]	1,600.0	56,000.0	400.0
500	2,000.0	800.0	28,000.0	200.0
1,000	1,000.0	400.0	14,000.0	100.0
3,500	285.7	114.3	[redacted]	28.6
5,000	200.0	80.0	2,800.0	20.0
10,000	100.0	40.0	1,400.0	10.0
100,000	10.0	4.0	140.0	1.0
1,000,000	1.0	0.4	14.0	0.1



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cc
S. Malin - KECN:
J. Sharpe - KEPR
S. Sander - KEPS
Official File – KEP (EQ-18-12)

DMalin:rl:5701 (w:/Ep/2000 Files/Eq/18-12/ Tish Akana.doc)

PORT OF RIDGEFIELD
P.O. Box 55
Ridgefield, WA 98642
(360) 887-3873 • FAX (360) 887-3403

R. Roy Randel
D. Joe Melroy
R. Bruce Wiseman
Commissioners

October 9, 2000

Ms. Trish Akana, Rules Coordinator
Toxics Cleanup Program
Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Re: Comments to Proposed Amendments to Washington Administrative Code 173-322

Dear Ms. Akana:

2026 The Port of Ridgefield has reviewed the proposed amendments to Washington Administrative Code 173-322 (WAC-173-322) and would like to take this opportunity to provide the Department of Ecology (Ecology) with comments. Our comments are most applicable to WAC-173-322-090 and the current and proposed language regarding the standard for "economically disadvantaged" status.

As written, WAC 173-322-090 effectively stipulates that the determination of "economically disadvantaged" be made at the county level. As such, the availability of remedial action grant funds are less for poor communities and/or government entities that are located in economically strong counties, than for poor communities and/or government entities within counties that meet the current definition of being "economically disadvantaged". The Port considers this an inherent flaw in the funding process as equally disadvantaged government entities do not have equal access to grant funds depending on the economic status of their respective counties.

The Port believes that the state's intent was to provide increased levels of remedial action grants available to those government entities that were most in need. It has been our experience, that the language of the current and proposed amendments to the regulations unintentionally hinders effort by small poor rural communities, and/or government entities in economically strong counties, to obtain funding levels needed to achieve the cleanup goals of Ecology.

The Port respectfully requests that Ecology consider modifying the proposed language of WAC 173-322-090 so that applications for large remedial action grants are reviewed based, not on the economic status of the county, but on the size of the responsible governmental entity and the economic impact the project has on that entity. In this evaluation process the size of the environmental problem and the governmental entity's

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Replaces fax of 10/9/00

ability to pay for the remedy would be used to determine the priority and level of state funding. Statewide this would provide small governmental entities with large environmental projects equal access to funds, and make more funds available to these parties.

For your information, the Port is currently working with Ecology on a large innovative cleanup project at our Lake River Industrial Site (LRIS). Mr. Dan Alexanian is Ecology's project manager for the LRIS. We would encourage you to contact Mr. Alexanian to discuss the "lessons learned" on this project.

The Port appreciates this opportunity to provide Ecology with our comments on the proposed amendments to WAC 173-322. Please feel free to call us with questions regarding this letter or if can provide you with additional information.

Sincerely,

Port of Ridgefield

Brent Grening
Executive Director

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Page 2 of 2

775-9491
LYNNWOOD

Davis Industries Inc.

783-5959
SEATTLE

DA-VI-SI * 191BZ
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LYNNWOOD, WASHINGTON 98036

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October 6, 2000

Ms. Trish Akana
Department of Ecology
Attn: Trish Akana
P.O. Box 47600
Olympia, WA 98504-7600

RE: Proposed Changes to the Model Toxics Control Act

Dear Ms. Akana:

I am the operations manager and general counsel of a petroleum marketer and distributor, which operates gasoline stations throughout Washington State. I have reviewed the proposed changes to the Model Toxics Control Act and I have several concerns, which I would like to bring to your attention.

2027 First, it appears that the new cleanup levels are unnecessary in that the current cleanup standards adequately protect human health and environment. The Department of Ecology has completely failed to review and assess the effectiveness of the several thousand cleanups, which have been conducted under the current standards. It seems to me that these sites would be excellent sources of information regarding the effectiveness of the current regulations and would offer both the Department of Ecology and the regulated community some data upon which to make these extremely expensive decisions.

2028 Similarly, the Department's distinction between "New Gasoline" and "Weathered Gasoline" either illustrates a lack of resolve within the Department of Ecology to support cleanup levels that are protective of human health and the environment or the Department's inability to document that the proposed cleanup levels are, indeed, necessary. "Weathered gasoline" is allowed to have a benzene level of .1mg/kg while "new gasoline" would be forced to cleanup to .03 mg/kg. If it is necessary to cleanup benzene soil levels to .03 mg/kg in order to be protective of human health and the environment why would some sites be allowed higher concentrations of benzene?

2029 Second, the new rules are not easier to understand nor less expensive to administer. It is my understanding that the MTCA revision task force was to look at ways to simplify the

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current standards and rules to make them easier to understand and less expensive to administer. They have completely failed in this task.

The proposed rules make much of distinctions and attempt to draw lines where lines should not be drawn. The proposed rules would allow sites previously cleaned-up to remain above thresholds that the department apparently now feels are not "clean." Even the distinction between "new gasoline" and "weathered gasoline" creates a level of distinction that is not currently embodied by the rules.

It is vitally important that the Department of Ecology move with the utmost care and deliberation before enacting new cleanup standards. The health and viability of several marketers and distributors will be directly linked to the decisions made by the Department. If the standards are unnecessary, as they appear to be, the regulated community will be forced to bear tremendous costs that they should not have to.

Sincerely,

Joseph L. Rockne
Operations Manager
General Counsel

City of Ridgefield

Phone 887-3557

230 Pioneer Avenue
P.O. Box 608
Ridgefield, WA 98642

October 12, 2000

Ms. Trish Akana, Rules Coordinator
Toxics Cleanup Program
Washington State Department of Ecology
PO Box 47600
Olympia, WA. 98504-7600

Re: Comments to Proposed Amendments to Washington Administrative Code 173-322

Dear Ms. Akana:

2030 The City of Ridgefield would like to take this opportunity to provide the Department of Ecology (Ecology) with comments regarding the proposed amendments to Washington Administrative Code 173-322 (WAC-173-322). Our comments are most applicable to WAC-173-322-090 and the current and proposed language regarding the standard for "economically disadvantaged" status.

As written, WAC 173-322-090 effectively stipulates that the determination of "economically disadvantaged" be made at the county level. As such, the availability of remedial action grant funds are less for poor communities and/or government entities that are located in economically strong counties, than for poor communities and/or government entities within counties that meet the current definition of being "economically disadvantaged". We consider this an inherent flaw in the funding process as equally disadvantaged government entities do not have equal access to grant funds depending on the economic status of their respective counties.

We believe the state's intent was to provide increased levels of remedial action grants available to those government entities that are most in need. The language of the current and proposed amendments to the regulations unintentionally hinders efforts by small poor rural communities, and/or government entities in economically strong counties, obtaining funding needed to achieve the cleanup goals of Ecology.

The City respectfully requests that Ecology consider modifying the proposed language of WAC 173-322-090 so that applications for large remedial action grants are reviewed based, not on the economic status of the county, but on the size of the responsible governmental entity and the economic impact the project would have on the entity. In this evaluation process the size of the environmental problem and the governmental entity's ability to pay for the remedy would be used to determine the priority and level of

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state funding. Statewide this would provide small governmental entities with large environmental projects equal access to funds, and make funds available to these parties.

The City of Ridgefield supports the efforts of the Port of Ridgefield and the Department of Ecology to clean the Lake River Industrial Site (LRIS). The Port has been working with you on a large innovative cleanup project. Mr. Dan Alexanian is Ecology's project manager for the LRIS. We encourage you to contact Mr. Alexanian to discuss the "lessons learned" on the project. If you have other questions please call Mr. Brent Grening, Executive Director of the Port of Ridgefield.

The City of Ridgefield appreciates this opportunity to provide Ecology with our comments on the proposed amendments to WAC 173-322.

Sincerely,

Gladys Doriot

Gladys Doriot
Mayor Pro Tem

Jh/GD
Pc. Brent Grening

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RICHARD F. WOLF
9076 HOLMAN ROAD N.W.
SEATTLE, WASHINGTON 98117
(206) 782-4930

October 19, 2000

Ms Trish Akana, Rules Coordinator
Washington State Department of Ecology
Toxics Cleanup Program
P.O. Box 40600
Olympia, WA 98504-7600

RE: MTCA Rule Changes

Dear Ms Akana:

2031. As a registered Site Assessor, I have been involved in the cleanup of hydrocarbon contamination at many underground storage tank (UST) sites in the State of Washington.

Most of these UST sites have had some release of petroleum products that have contaminated the soil around or under the USTs. In most cases the hydrocarbon contaminated soil has been excavated, treated and used as backfill at the site. The Method A cleanup level was achieved at these sites. However if Ecology changes the current benzene standard from .5 parts per million to .1 parts per million, or if the TPH-G standard changes form 100 ppm to 30 ppm, then some of these sites may not meet the new cleanup level. This could significantly impact financially the property owner or prior operator. This change could require drilling and testing sites that previously achieved cleanup standards.

Please do not change the Method A benzene standard from .5 parts per million to .1 parts per million or change TPH-G from 100 ppm to 30 ppm.

Very truly yours,

Richard Wolf

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Page 1 of 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

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Reply To
Attn Of: OEA-095

October 21, 2000

Trish Akana, Rules Coordinator
Washington Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, Washington 98504-6700

Re: Formal Comment
Proposed Amendments to WAC 173-340, Model Toxics Control Act

Dear Ms. Akana:

2032 It recently came to my attention that EPA's Superfund Technical Support Center (STSC), a part of the National Center for Environmental Assessment (NCEA), has retired the risk assessment issue paper for the provisional noncancer toxicity reference dose for benzene. This paper, which is attached for your information, was prepared in 1996.

The TPH Project Oversight Group, to which I am technical adviser, had recommended that the oral reference dose provided in the risk assessment issue paper be used by Ecology to calculate appropriate TPH cleanup numbers, including in Method A tables. This reference dose was also appropriate for any other calculations of cleanup numbers for benzene, in addition to its cancer slope factor, which has not changed.

Dr. Harlal Choudhury, director of STSC, recently made clear his opinion that the reference dose in the retired issue paper should now NOT be used and that, until toxicity values for the evaluation of noncancer effects of benzene have been finalized and placed on the IRIS database, he advises the use of the values found in the NCEA document entitled "Toxicological Review of Benzene (Noncancer Effects)," NCEA-S-0455, dated September 1998. (A copy of the Executive Summary is attached. The entire document may be read and/or downloaded at http://www.epa.gov/ncea/benztox.htm.) The project manager for this effort, David Bayliss of NCEA, advises that this document is in peer review and does not necessarily reflect the values that will eventually be adopted and incorporated into IRIS. Nevertheless, they represent the most current provisional toxicity values available from NCEA for evaluating the noncancer effects of benzene. Both a reference dose and a reference concentration (the latter for inhalation exposures) are available in the NCEA review document. These are 1E-3 mg/kg-day and 9E-3 mg/m3, respectively. (The extrapolated inhalation RfD, for use in risk assessment equations as a dose, would be 2.6E-3 mg/kg-day.) The previously recommended oral RfD was 3E-3 mg/kg-day. The

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change downward is due to a more meticulous application of uncertainty factors to the lowest observed adverse effect level in the primary critical study.

Until IRIS values become available, EPA Region 10 risk assessors will recommend the use of the provisional oral RfD and inhalation RfC for benzene put forth in the September 1998 NCEA peer review document cited above.

I recommend that Ecology incorporate the most current NCEA provisional toxicity values for establishing Method A cleanup levels for petroleum products in the amendments to MTCA. They also should be incorporated into CLARC tables and into appropriate departmental guidance or directives regarding the evaluation of the noncancer effects of petroleum products and of benzene alone under MTCA Methods B and C. At the same time, Ecology should be aware that these values potentially could be different from those eventually incorporated into the IRIS database in the future.

Yours truly,

Marcia Bailey

Marcia L. Bailey, D.Env.
Office of Environmental Assessment

Attachments

cc: Craig McCormack, w/ attachments
Steve Robb, w/o attachments
Pete Kmet, w/o attachments

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NCEA-S-0455

TOXICOLOGICAL REVIEW

OF

BENZENE

(NONCANCER EFFECTS)

(CAS No. 71-43-2)

In Support of Summary Information on the Integrated Risk Information System (IRIS)

September 1998

NOTICE

This document is a **preliminary draft**. It has not been formally released by the U.S. Environmental Protection Agency and should not at this stage be construed to represent Agency position on this chemical. It is being circulated for peer review on its technical accuracy and science policy implications.

U.S. Environmental Protection Agency
Washington DC

DISCLAIMER

This document is a preliminary draft for review purposes only and does not constitute U.S. Environmental Protection Agency policy. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Note: This document may undergo revisions in the future. The most up-to-date version will be made available electronically via the IRIS Home Page at http://www.epa..gov/iris.

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FOREWORD

The National Center for Environmental Assessment-Washington Division, Office of Research and Development, has prepared this document on the Toxicological Review of Benzene to serve as a source document for updating the noncancer health effects summary on benzene in the Integrated Risk Information System (IRIS).

In the development of this document, the scientific literature has been reviewed, key studies have been evaluated, and summary/conclusions have been prepared so that the noncancer health effects from exposure to benzene are qualitatively and quantitatively characterized and the derivation of the reference dose (RfD) and reference concentration (RfC) are adequately described. The evaluation and review of the noncancer effects of exposure to benzene have been conducted under the standing guidance of several relevant risk assessment guidelines dealing with reproductive, developmental, neurotoxicity, and immunotoxicity effects. This draft has undergone internal peer review and will undergo an expert external peer panel review in October 1998.

The emphasis of this document is a detailed discussion of the noncancer adverse health effects of benzene, including the no-observed-adverse-effect levels (NOAELs), the lowest-observed-adverse-effect levels (LOAELs), uncertainty factors (UFs), and any other considerations used to develop the RfDs and RfCs for benzene.

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LIST OF ACRONYMS AND ABBREVIATIONS

AChE	acetyl choline esterase
ANOVA	analysis of variance
ASA	acetylsalicylic acid
BFU-E	burst-forming unit-erythroid
CFU-C	colony-forming unit-culture
CFU-E	colony-forming unit-erythroid
CFU-HPP	high proliferative potential colony-forming unit
CFU-S	colony-forming unit-spleen
CI	confidence interval
Con A	concanavalin A
CYP2E1	cytochrome P450 2E1
DPP	differentiation and proliferation
ELISA	enzyme-linked immunosorbent assay
EMG	electromyographical
GD	gestation day
GM-CFU-C	granulocyte/macrophage colony-forming unit-culture
i.p.	intraperitoneally
IL-1	Interleukin-1
IL-1α	Interleuken-1alpha
IL-1β	Interleukin-1beta
Kd	kilodalton
LOAEL	lowest-observed-adverse-effect level
LPS	lipopolysaccharide
MCV	mean corpuscular volume
MF	modifying factor
NK	natural killer

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

NOAEL	no-observed-adverse-effect level
NQO1 NAD(P)H	quinone oxidoreductase
OR	odds ratio
PBPK	physiologically based pharmacokinetic
PCE	polychromatic erythrocytes
PCV	packed cell volume
PWM	pokeweed mitogen
RBC	red blood cells
RfD	reference dose
RfC	reference concentration
TWA	time-weighted average
UF	uncertainty factor
WBC	white blood cells
YAC	yeast artificial chromosome

EXECUTIVE SUMMARY

In 1992, the U.S. Environmental Protection Agency's (EPA's) Office of Air Mobile Sources, Office of Air and Radiation, requested that the National Center for Environmental Assessment (NCEA) (then known as the Office of Health and Environmental Assessment) provide an updated characterization of human health risk from exposure to benzene. Recently, EPA published the Carcinogenic Effects of Benzene: An Update (EPA/600/P-97/001F, April 1998). The scope of this report is limited to the noncancer health risk assessment of exposure to benzene under the Agency's standing guidance of several relevant risk assessment guidelines dealing with reproductive, developmental, neurotoxic, and other noncancer effects, including derivation of an oral reference dose (RfD) and inhalation reference concentration (RfC). This toxicological review of benzene is to serve as a scientific source document for hazard identification and dose-response assessment in updating the noncancer health effects summary on benzene in the Integrated Risk Information System (IRIS).

Benzene, also known as benzol, is widely used as an industrial solvent, as an intermediate in chemical synthesis, and as a gasoline additive, hence, the potential for human exposure is great. Inhalation exposure is the major route of exposure to benzene, although oral and dermal exposure routes are also important. The toxicokinetics (absorption, distribution, metabolism, and elimination) of benzene have been studied in humans and experimental animal species. Benzene is readily absorbed by both test animals and humans and is distributed throughout several body compartments. The parent compound is preferentially stored in fat, and the relative uptake appears to be dependent on the blood perfusion rates of tissues. The metabolism of benzene is required for expression of benzene toxicity. Evidence indicates that following inhalation exposure to benzene, the major route of elimination of unmetabolized benzene is via exhalation in humans. Absorbed benzene is metabolized to phenol and muconic acid, followed by urinary excretion of conjugated sulfates and glucuronides. Limited data exist on excretion of benzene following dermal exposure in humans. Physiologically based pharmacokinetic (PBPK) models have been developed and are being improved to better define interactions of benzene metabolism, toxicity, and dosimetry. However, the current models are not sufficiently refined to allow them to predict with certainty the relationship between metabolism and toxicity.

Benzene exposure results in adverse noncancer health effects by all routes of administration to test animal species. Hematotoxicity and immunotoxicity have been consistently reported to be the most sensitive indicators of noncancer toxicity both in limited studies in humans and experimental animals. The bone marrow is the target organ for the expression of benzene hematoxicity and immunotoxicity. Chronic exposure to benzene results in progressive deterioration of hematopoietic function. Whether the hematotoxic/immunotoxic effects of benzene and its carcinogenic effects are due to a common mechanism has not been established. Although leukocytopenia has been consistently shown to be a more sensitive indicator of benzene toxicity than anemia in experimental animals, lymphocytopenia has been shown to be an even more sensitive indicator of benzene toxicity. A decrease in absolute lymphocyte count was observed to be the most sensitive indicator of benzene exposure in Chinese factory workers.

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Benzene has also been shown to produce neurotoxic effects in test animals and humans after short-term exposure to relatively high concentrations; however; long-term neurotoxicity exposure studies are lacking. There is some evidence of reproductive and developmental effects due to benzene exposure from human epidemiological studies, but data are not conclusive to link low exposure concentrations to effects. No data from human studies were found to indicate that children are more sensitive to benzene toxicity than adults nor were there any gender differences found. The most frequently observed gender difference in test animals is a greater sensitivity of male mice with exposure to benzene, while in rats females appear to be more sensitive than males.

The human occupational inhalation study of Rothman et al. (1996) and the 28-day drinking water exposure study of Hsieh et al. (1988b) were considered to be the co-principal critical studies for derivation of RfC and RfD. Rothman et al. (1996) showed significant reductions in absolute lymphocyte counts in Chinese factory workers exposed to a median 8-hr TWA concentration of 7.6 ppm (24 mg/m^3). The findings from this study indicate that absolute lymphocyte count, WBC, RBC, hematocrit, and platelets were all significantly decreased, and mean corpuscular volume (MCV) was significantly increased in a group of 44 workers occupationally exposed to a median 8-hr TWA of 31 ppm (99 mg/m^3) in comparison to an age and sex matched control group. These effects are consistent with the well-known hematotoxic effects of benzene (Aksoy, 1989; Goldstein, 1988).

The co-principal study of Hsieh et al. (1988b) demonstrated significant (p <0.05) dose-dependent hematological effects (erythrocytopenia, leukocytopenia, lymphocytopenia, and increased MCV) at all exposure levels in (male Charles River) CD-1 mice. Hematological effects were accompanied by a biphasic response in several immunological tests, i.e., significantly increased responses at the low-exposure level (8 mg/kg-day) and significantly decreased responses at the mid- (40 mg/kg-day) and high-dose (180 mg/kg-day) levels. In one test, spleen cellularity was reported to be significantly decreased at all exposure levels, but in a separate test, only at the high-dose level.

Although the NTP (1986) study featured a 103-week chronic exposure regimen, the lowest dose tested (25 mg/kg-day) produced significant leukopenia and was higher than the lowest-observed-adverse-effect level (LOAEL) of 8 mg/kg-day identified in the Hsieh et al. (1988b) study.

To calculate an RfD at the oral equivalent dose of 1.2 mg/kg-day derived from the study of Rothman et al. (1996), the following uncertainty factors were selected. A factor of 10 was used for intraspecies differences in response (human variability) as a means of protecting potentially sensitive human subpopulations. A factor of 10 was applied for use of a LOAEL due to lack of a no-observed-adverse-effect level (NOAEL) in the Rothman et al. (1996) study. Two partial uncertainty factors of 3 were applied to account for extrapolation from subchronic exposure to chronic exposure and for database deficiencies to give a final uncertainty factor of 1000. Use of a partial uncertainty factor for exposure duration adjustment is necessary because the mean exposure duration in the study (6.4 years, range 0.7-16 years) is less than the Superfund interim guidance cutoff value of 7 years for designation as a chronic exposure (Means, 1989). Uncertainty regarding deficiencies in the database is small because of an adequate oral toxicity database and extensive supporting inhalation database. Although the database includes

developmental toxicity studies, a two-generation reproductive study was unavailable. No uncertainty factor was applied for route-to-route exposure because of benzene's well-documented target organ specificity irrespective of the route of administration. There is also little evidence of toxic effects in either the lungs or the gastrointestinal tract. No modifying factor is considered necessary. The calculation of the reference dose is as follows:

RfD = 1.2 mg/kg-day ÷ 1000 = 1E-3 mg/kg-day

To calculate an RfD using the LOAEL value of 8 mg/kg-day in male mice from the study of Hsieh et al. (1988b), the following uncertainty factors were selected. A factor of 10 was used for intraspecies differences in response (human variability) as a means of protecting potentially sensitive human subpopulations. A factor of 10 was applied for consideration of interspecies variation. A partial uncertainty factor of 3 was applied for extrapolation from subchronic (28 days) to chronic duration because the subchronic LOAEL from the study of Hsieh was lower than the LOAEL of 25 mg/kg-day determined in a chronic oral exposure study (NTP, 1986). A second partial uncertainty factor of 3 was applied for database deficiencies, due to the lack of a two-generation reproductive study. A factor of 10 was applied for use of a LOAEL due to lack of an appropriate NOAEL to give a final uncertainty factor of 10,000.

RfD = 8.0 mg/kg-day ÷ 10,000 = 8E-4 mg/kg-day

Although derivation of an RfD value based on the study of Rothman et al. (1996) requires route-to-route extrapolation, the level of uncertainty associated with this value is lower than the RfD calculated from the Hsieh et al. (1988b) study. Therefore, the RfD value of 1E-3 mg/kg-day is designated as the RfD.

The occupational study of Rothman et al. (1996) is also designated as the principal study for derivation of RfC. As described above, this cross-sectional study compared the hematological outcomes of 44 workers occupationally exposed to benzene and 44 unexposed workers that were age and gender matched from Shanghai, China. Absolute lymphocyte count, WBC, RBC, hematocrit, and platelets were all significantly decreased, and MCV was significantly increased in a group of 44 workers occupationally exposed to a median 8-hr TWA of 31 ppm (99 mg/m^3) in comparison with an age- and sex-matched control group. These effects are consistent with the known hematotoxic effects of benzene (Aksoy, 1989; Goldstein, 1988). Only the absolute lymphocyte count was reduced in the subgroup exposed to a median 8-hr TWA of 7.6 ppm (24 mg/m^3) benzene (p<0.03). The study of Rothman et al. (1996) is notable among epidemiology studies that were compared to matched controls. A dose-response relationship was established between the absolute lymphocyte count and benzene exposure as monitored by organic vapor passive dosimetry and renal benzene metabolites. The median 8-hr TWA of 7.6 ppm (24 mg/m^3) was the lowest exposure group examined, and it is therefore a LOAEL for benzene immunotoxicity in humans.

The principal study is also supported by a large database of inhalation and oral exposure experiments in a range of test animal species.

The co-principal study of Rothman et al. (1996) identified a median 8-hr TWA concentration of 7.6 ppm (24 mg/m^3) as a LOAEL for the immunological endpoint, decreased absolute lymphocyte counts. A LOAEL $_{(HEC)}$ was calculated by adjusting for the occupational ventilation rate and for the intermittent work week schedule for 24-hr exposure, 7 days per week. The calculation is as follows:

$$\text{LOAEL}_{(HEC)} = 24\ \text{mg/m}^3) \times (10\ \text{m}^3/20\ \text{m}^3) \times 5\ \text{days}/7\ \text{days} = 8.6\ \text{mg/m}^3$$

To calculate an RfC using the adjusted LOAEL $_{(HBC)}$ value of 8.6 mg/m^3, the following uncertainty factors were selected. A factor of 10 was used for intraspecies differences in response (human variability) as a means of protecting potentially sensitive human subpopulations. A factor of 10 was applied for use of a LOAEL due to lack of an appropriate NOAEL. Two partial uncertainty factors of 3 each were applied to account for extrapolation from subchronic exposure to chronic exposure and for database deficiencies, to give a final uncertainty factor of 1000. Use of a partial uncertainty factor for exposure duration adjustment is necessary because the mean exposure duration in the study (6.4 years, range 0.7-16) is less than the Superfund interim guidance cutoff value of 7 years for designation as a chronic exposure (Means, 1989). Uncertainty regarding deficiencies in the database is small because of an adequate oral toxicity database and an extensive supporting inhalation database. Although the database includes developmental toxicity studies, a two-generation reproductive study was unavailable. There is also little evidence of toxic effects in either the lungs or the gastrointestinal tract. No modifying factor is considered necessary.

$$\text{RfC} = 8.6\ \text{mg/m}^3\ /\ (1000) = 9\text{E-}3\ \text{mg/m}^3$$

The human chronic dose of ingested benzene considered to be without any appreciable risk (the RfD) is 1E-3 mg/kg-day. This is 1/1000 of the oral equivalent dose extrapolated from the LOAEL $_{(HBC)}$, using decreased absolute lymphocyte count observed in the lowest exposure group investigated in a subchronic human occupational study as the indicator of adverse effects (Rothman et al., 1996). The RfD is supported by an RfD value of 8E-4 mg/kg-day, which is 1/10,000 of the LOAEL dose, using hematological effects of erythrocytopenia, leukocytopenia, lymphocytopenia, and increased MCV in a subchronic test animal drinking water study as the indicator of adverse effects (Hsieh et al., 1988b).

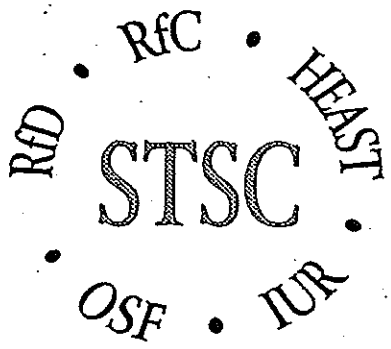
Quantitative estimates of human risk as a result of low-level chronic benzene inhalation exposure are based on subchronic human occupational inhalation exposure because no suitable chronic human data are available. Hematotoxicity and immunotoxicity in humans are the critical effects observed in humans.

The human chronic air concentration considered to be safe (the RfC) is 9E-3 mg/m^3. This is 1/1000 the LOAEL $_{(HEC)}$, using decreased absolute lymphocyte count observed in the lowest exposure group investigated in a subchronic human occupational study as the indicator of adverse effects (Rothman et al., 1996). The overall confidence in this RfC assessment is medium.

In summary, although a large number of human and experimental animal studies have been conducted, there have been few human studies with reliable estimates of exposure to benzene and

few long-term repeated dose experiments in test animals. The human studies are also complicated by exposure to other solvents. The long-term animal studies have employed exposure levels that were too high to establish reliable NOAEL values, as significant adverse effects were observed even in the lowest dose tested in all the long-term studies examined.

An area of scientific uncertainty in this assessment concerns the neurotoxic effects of benzene. In common with many other organic solvents, benzene has been shown to produce neurotoxic effects in experimental animals and humans after short-term exposures to relatively high concentrations. There is a lack of reliable information on dose-related neurotoxic effects under low-dose, chronic exposure conditions in either humans or experimental animal model systems.



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September 29, 2000

Marcia Bailey
US EPA - Region X

ASSISTANCE REQUESTED:	Requested toxicity information on Benzene.
ENCLOSED INFORMATION:	Attachment 1: **Risk Assessment Issue Paper for: Derivation of a Provisional Oral RfD for Benzene (CASRN 71-43-2)**
	Attachment 2: **Risk Assessment Issue Paper for: Derivation of a Provisional Chronic Inhalation RfC for Benzene (CASRN 71-43-2)**
BE ADVISED:	It is to be noted that the attached Risk Assessment Issue Papers have not been through the U.S. EPA's formal review process. Therefore, they do not represent a U.S. EPA verified assessment. If you have any questions regarding this information, please contact the STSC at (513) 569-7300.

Please note that the risk assessment issue papers for the oral reference dose and the inhalation reference concentration for Benzene are over three years old and are no longer considered current by STSC. Dr. Harlal Choudhury and STSC do not recommend these values to be used in risk assessment due to the new assessment being conducted by IRIS.

Attachments

Attachment 1

This paper is retired, Dr. Harlal Choudhury and STSC do not recommend it to be used in risk assessment.

(96-021/07-02-96)

Risk Assessment Issue Paper for:
Derivation of a Provisional Oral RfD for Benzene (CASRN 71-43-2)

INTRODUCTION

A chronic RfD for benzene is not available on IRIS (U.S. EPA, 1996) or HEAST (U.S. EPA, 1995a). Documents on the CARA list which discuss the toxicity of benzene (U.S. EPA, 1991, 1994) include an AWQCD (U.S. EPA, 1980, 1989a) and HEA (U.S. EPA, 1984, 1989b). None of these documents derived non-carcinogenic estimates of risk from benzene exposure. The one- and ten-day drinking water health advisories for a 10 kg child is 0.2 mg/l (U.S. EPA, 1995b). Longer-term health advisories for a child, health advisories for adults, and an RfD for benzene have not been derived by the Office of Water (U.S. EPA, 1995b). ATSDR has prepared a toxicological profile on benzene (ATSDR, 1995). This document did not derive acute, intermediate, or chronic oral MRLs for benzene. In addition, an RfC for benzene is not available on IRIS (U.S. EPA, 1996).

To identify research reports pertinent to the derivation of a provisional chronic RfD for benzene, EPA and ATSDR documents (as cited above) were reviewed; in addition, a computer search of the literature was conducted from the HSDB, RTECS, TSCATS, and TOXLINE (July 1990 to April 1993, oral strategy) databases. Update literature searches TOXLINE, MEDLINE, TSCATS, and DART were conducted in May 1996.

REVIEW OF PERTINENT LITERATURE

Data regarding the toxicity of ingested benzene in humans were limited to reports on single exposures (ATSDR, 1995). Several studies reported very serious effects, including death, but did not report dose levels. One study reported very serious neurological effects and death in humans from a single oral dose of approximately 125 mg/kg (Theines and Haley, 1972; as cited in ATSDR, 1991).

Chronic oral studies. Chronic oral studies have been conducted in F344 rats and B6C3F1 mice (NTP, 1986; Huff et al., 1989), and Sprague-Dawley and Wistar rats and Swiss and RF/J mice (Maltoni et al., 1983, 1985, 1989).

In the NTP (1986) study, F344 rats and B6C3F1 mice of both sexes were treated by gavage with benzene, 5 days/week for 103 weeks. Results of this study have also been reported by Huff et al. (1989). For rats, males (60/group) were administered doses of 0, 50, 100, or 200 mg/kg (0, 36, 71, or 143 mg/kg/day) and females (60/group) were administered doses of 0, 25, 50, or 100 mg/kg (0, 18, 36, or 71 mg/kg/day). Survival decreased with increasing dose in rats of both sexes, and was significantly decreased ($p<0.05$) at 200 mg/kg in

males and at 50 and 100 mg/kg in females. Body weight depression of ≥10% relative to controls was observed in male rats treated with 200 mg/kg/day and female rats treated with 100 mg/kg. Dose-related leucopenia was significant ($p<0.05$) in female rats treated with 25 mg/kg or higher for 3, 6, 9, and 12 months; leukocyte levels were comparable to controls after 15, 18, 21, and 24 months of treatment. In male rats, dose-related leucopenia was significant ($p<0.05$) at 50 mg/kg or higher for 3, 6, 9, 12, 15, and 18 months. A similar pattern of significant ($p<0.05$), dose-related decrease, followed by eventual return to control levels, was observed for lymphocyte levels in female rats treated with 25 mg/kg or higher and in male rats treated with 50 mg/kg or higher. Lymphoid depletion was observed in the thymus of 0/44, 4/42, 8/41, and 10/34 male rats treated with 0, 50, 100,and 200 mg/kg benzene, respectively. In the spleen, lymphoid depletion was observed in 0/49, 19/58, 8/47, and 23/47 male rats treated with 0, 50, 100, and 200 mg/kg benzene, respectively, and in 0/50, 11/50, 8/49, and 10/49 female rats treated with 0, 25, 50, and 100 mg/kg benzene, respectively. Increased ($p<0.05$) incidences of malignant tumors were observed at dose levels of 50 mg/kg or greater in male rats (Zymbal gland carcinomas, squamous cell papillomas and squamous cell carcinomas of the oral cavity, and squamous cell papillomas and squamous cell carcinomas of the skin) and at 25 mg/kg or greater in female rats (Zymbal gland carcinomas, squamous cell papillomas and squamous cell carcinomas of the oral cavity). This study identified a LOAEL of 25 mg/kg (18 mg/kg/day) for leukopenia and lymphocytopenia in female F344 rats treated by gavage for 103 weeks. A LOAEL of 50 mg/kg (36 mg/kg/day) was identified for leukopenia and lymphocytopenia in male F344 rats treated by gavage for 103 weeks. The observed LOAELs were at the lowest dose level tested. Thus, no NOAELs for hematological effects in rats were identified in this study.

In the NTP (1986) study, mice (60/sex/group) were treated by gavage with doses of 0, 25, 50, or 100 mg/kg benzene (0, 18, 36, or 71 mg/kg/day). Survival decreased with increasing dose in mice of both sexes and was significantly decreased ($p<0.05$) at 100 mg/kg. Body weight depression of ≥10% relative to controls was observed in mice of both sexes treated with 100 mg/kg. Significantly ($p<0.05$) decreased leukocyte counts were observed in males after 3, 6, 9, 12, 15, 18, and 21 months of treatment with 50 and/or 100 mg/kg, but males treated with 25 mg/kg had significantly decreased leukocyte counts only after 6 and 21 months of treatment. In female mice, leucopenia was observed only at 12 and 18 months, in both cases significant ($p<0.05$) at all treatment levels. Significantly ($p<0.05$) decreased lymphocyte counts were observed in males after 3, 6, 9, 12, 15, 18, and 21 months of treatment with 50 and/or 100 mg/kg, but males treated with 25 mg/kg had significantly ($p<0.05$) decreased lymphocyte counts only after 12 months of treatment. In female mice, significant ($p<0.05$) lymphocytopenia was observed at 25 mg/kg or higher at 12 and 18 months, and at 100 mg/kg at 3 months. Hematopoietic hyperplasia of the bone marrow was observed in 0/49, 11/48, 10/50, and 25/49 male mice treated with 0, 25, 50, or 100 mg/kg, respectively, and in 3/49, 14/45, 8/50, and 13/49 female mice treated with 0, 25, 50, or 100 mg/kg, respectively. Increased splenic hematopoiesis was observed in 5/49, 9/48, 19/49, and 24/47 male mice treated with 0, 25, 50, or 100 mg/kg, respectively, and in 9/49, 10/45, 6/50, and 14/49 female mice treated with 0, 25, 50, or 100 mg/kg, respectively. In the female mice, increased incidences of epithelial hyperplasia of the ovary occurred at all three doses and of senile atrophy of the ovary occurred at the lower two doses compared with controls. Increased ($p<0.05$) incidences of malignant tumors were observed at 25 mg/kg or higher in both sexes of mice (Zymbal gland squamous cell carcinomas, malignant lymphomas, alveolar/bronchiolar carcinomas, alveolar/bronchiolar carcinomas and adenomas (combined), Harderian gland adenomas, and squamous cell carcinomas of the preputial gland in males and Zymbal gland squamous cell carcinomas, malignant lymphomas, ovarian granulosa cell tumors, ovarian benign mixed tumors, carcinomas and

carcinosarcomas of the mammary gland, alveolar/bronchiolar carcinomas, and alveolar/bronchiolar adenomas in females). This study identified a LOAEL of 25 mg/kg (18 mg/kg/day) for leukopenia and lymphopenia in male and female B6C3F1 mice treated by gavage for 103 weeks. The observed LOAELs were at the lowest dose level tested. Thus, no NOAELs for hematological effects in mice were identified in this study.

Beginning in 1976, a series of carcinogenicity studies on oral treatment of rodents with benzene were performed at the Bologna Institute of Oncology, including 52-104 week studies on Sprague-Dawley and Wistar rats and Swiss and RF/J mice. The results of the studies from this laboratory were reported in numerous publications, including Maltoni et al. (1983, 1985, 1989). Limited information regarding non-carcinogenic effects were reported in the various publications since the major emphasis of the studies was the carcinogenic effects of benzene. No statistical information was included in the various publications, making interpretation of the data difficult.

Maltoni et al. (1985) treated Sprague-Dawley rats (13 weeks of age, 30-35/sex/group) by gavage with 0, 50, or 250 mg/kg benzene in oil, 4-5 days/week for 52 weeks, then observed until death; the expanded doses, assuming that the rats were treated an average of 4.5 times/week, were 0, 32, and 161 mg/kg/day, respectively. In addition, Sprague-Dawley rats (7 weeks of age, 40-50/sex/group) were treated by gavage with 0 or 500 mg/kg benzene in oil, 4-5 days/week for 104 weeks, then observed until death; the expanded doses, assuming that the rats were treated an average of 4.5 times/week, were 0 and 321 mg/kg/day, respectively (Maltoni et al., 1985). Maltoni et al. (1983) reported some preliminary information on these studies, including some non-carcinogenic endpoints. Mortality was higher in benzene treated groups and appeared to be dose-related; body weights were not affected. Maltoni et al. (1983) stated that mortality in the first portion of the study was due to direct (toxic) effects of treatment and in the later portion, was partially due to tumors. Mortality was similar to that of controls during treatment with 500 mg/kg for 92 weeks (Maltoni et al., 1983); body weight appeared to be somewhat depressed relative to controls. No further information regarding survival or body weight was provided in the later reports on these studies (Maltoni et al., 1985, 1989). In Sprague-Dawley rats exposed to 500 mg/kg for 84 or 92 weeks, decreased total RBC (only at 92 weeks), WBC, and lymphocytes were observed (Maltoni et al., 1983, 1985). Multiple-site carcinomas developed at 50, 250, and/or 500 mg/kg in rats in these studies. Zymbal gland, oral cavity, nasal cavity, and skin carcinomas, forestomach tumors, subcutaneous angiosarcoma, mammary gland tumors, hepatomas, non-myeloid leukemias, and other tumors were observed, with greater incidence and more types of malignancies observed at the higher treatment levels.

Additional gavage studies of benzene (at 500 mg/kg, 4-5 days/week) by Maltoni et al. (1989) in Wistar rats, Swiss mice, and RF/J mice focussed entirely on carcinogenic effects, which were similar to those reported in the above studies and occurred in all three strains/species. The report of these studies did not discuss non-carcinogenic effects.

Subchronic oral studies. Subchronic oral studies have been conducted in F344 rats and B6C3F1 mice of both sexes (NTP, 1986; Huff et al., 1989), female Wistar rats (Wolf et al., 1956); CD-1 male mice (Hsieh et al., 1988), C57BL/6 male mice (Fan, 1992), and B6C3F1 female mice (White et al., 1984).

NTP (1986) treated F344 rats and B6C3F1 mice (10/species/group/sex; 6-8 weeks of age) with 0, 25, 50, 100, 200, 400, or 600 mg/kg benzene, by gavage in corn oil, 5 days/week for 17 weeks; the expanded doses

were 0, 18, 36, 71, 143, 286, or 429 mg/kg/day. An additional 5 animals/species/group/sex were tested at the 0, 200 and 600 mg/kg dose levels and killed at 60 days of treatment. Hematological analyses were performed on all the animals killed at 60 days and on 5 animals/species/group/sex at the end of the study. Comprehensive histopathologic examinations were performed on all the animals killed at 60 days and on animals in the control and 600 mg/kg groups at the end of the study. In addition, necropsies were performed on all animals and the spleens of all animals were examined histopathologically. Results of this study have also been reported by Huff et al. (1989).

No compound-related deaths were observed for rats. Final body weight depression of ≥10% relative to controls was observed in male and female rats at dose levels of 200 mg/kg and greater. Significant ($p<0.05$) leukopenia and lymphocytopenia were observed in male and female rats after 60 days of treatment with 200 or 600 mg/kg (the only treatment groups tested on day 60). On day 120 of treatment, significant ($p<0.05$) leucopenia and lymphocytopenia were observed in female rats at 25 mg/kg and higher and significant ($p<0.05$) lymphocytopenia was observed in male rats at 400 mg/kg (blood counts were performed on only 1 male given 600 mg/kg for 120 days). Lymphoid depletion of B-cells in the spleen was observed in 100% of male and female rats exposed to 600 mg/kg for 60 or 120 days, and in 3/5 male and 4/5 female rats exposed to 200 mg/kg for 60 days. Increased extramedullary hematopoiesis in the spleen was observed in 4/5 male and 3/5 female rats treated with 600 mg/kg for 120 days. Incidences of lymphoid depletion of B cells and extramedullary hematopoiesis in the spleen were not reported for controls (or other groups); the implication was that these conditions were seen only in the groups for which incidences were given. This study identified a LOAEL of 25 mg/kg (18 mg/kg/day) in female rats and LOAEL of 200 mg/kg (143 mg/kg/day) in male rats for hematological effects following treatment by gavage for 17 weeks. The observed LOAEL for female rats was at the lowest dose level tested. Thus, the study does not define a NOAEL for hematological effects in rats.

NTP (1986) reported no compound-related deaths in the mice; final body weight depression of ≈7% was seen at ≥100 mg/kg. Tremors were observed intermittently in male and female mice treated with 400 or 600 mg/kg. No leukopenia or lymphocytopenia was observed in male or female mice after 60 days of treatment with 200 or 600 mg/kg. At 120 days, significant ($p<0.05$) leukopenia and lymphocytopenia were observed in male mice at dose levels of 50 mg/kg and greater, and in female mice at 400 (only lymphocytopenia) and 600 mg/kg. A NOAEL of 25 mg/kg (18 mg/kg/day) and a LOAEL of 50 mg/kg (36 mg/kg/day) for hematological effects were identified in male mice treated by gavage for 17 weeks. A NOAEL of 200 mg/kg (143 mg/kg/day) and a LOAEL of 400 mg/kg (286 mg/kg/day) for hematological effects were identified in female mice treated by gavage for 17 weeks.

White et al. (1984) exposed female B6C3F1 mice (12/group; 6-7 weeks of age) to benzene in drinking water (containing emulphor to increase solubility of benzene) at exposure levels of 0, 50, 1000, and 2000 mg/L (0, 12, 195, or 350 mg/kg/day, respectively) for 30 days. Body weight was significantly ($p<0.05$) decreased, relative to controls, at the high-exposure level. A dose-related ($p<0.01$) decrease in absolute and relative spleen weight was observed, significant at the high-exposure level ($p<0.01$). In one test, spleen cellularity was reported to be significantly ($p<0.05$) decreased at all exposure levels, and in a separate test, at only the mid- and high-exposure levels. Dose-related ($p<0.05$) leukopenia and lymphocytopenia were observed, significant ($p<0.05$) at the mid- and high-exposure level. A dose-related ($p<0.01$) decrease in eosinophils was observed, significant

($p<0.05$) at the high-exposure level. At the high-exposure level, significant ($p<0.05$) decreases in levels of erythrocytes and hemoglobin, and significant ($p<0.05$) increases in mean corpuscular volume and mean corpuscular hemoglobin were observed. No exposure-related effects were observed for levels of blood urea nitrogen, serum creatinine, serum glutamic oxaloacetic transaminase, or serum glutamic pyruvic transaminase, indicators of renal and hepatic damage. Dose-related ($p<0.05$) changes were observed in immunological tests on spleen cells and in assays of bone marrow: decreases were observed with respect to IgM antibody forming cells/spleen in response to sheep RBC, lymphocyte proliferation response to the T cell mitogen Con A and the B cell mitogen LPS, number of T lymphocytes, and femoral CFU-GM; an increase was observed in bone marrow cell DNA synthesis. These effects were not significant at 12 mg/kg/day, but were dose-related ($p<0.05$) and significant ($p<0.05$) at 195 and/or 350 mg/kg/day. Of all the immunological indices tested, only one endpoint (stimulation index for lymphocyte proliferation of spleen cells in response to medium containing 0.5 µg/ml of Con A) was significantly ($p<0.05$) decreased at 12 mg/kg/day. The number of B lymphocytes was not affected, but the investigators commented that the number of B lymphocytes in the controls was lower than for historical controls for their laboratory. This study identifies a marginal NOAEL of 12 mg/kg/day and a LOAEL of 195 mg/kg/day for hematological and immunological effects in mice exposed to benzene in drinking water for 30 days; the 12 mg/kg/day exposure level may approach the threshold of toxicity, as significance ($p<0.05$) was seen for two effects at this exposure level, and numerous hematological and immunological effects that were dose-related, but not significant at the 12 mg/kg level, were observed.

Hsieh et al. (1988) treated male Charles River CD-1 mice (5/group; 6-7 weeks of age) with benzene in the drinking water at exposure levels of 0, 40, 200, or 1000 mg/L (0, 8, 40, or 180 mg/kg/day, respectively) for 28 days. The treatment had no adverse effects with respect to mortality, clinical signs, body weight change, liver weight, or gross necropsy. A dose-related decrease in relative spleen weight was observed, significant ($p<0.05$) at the high-exposure level. In one test, spleen cellularity was reported to be significantly ($p<0.05$) decreased at all exposure levels, and in a separate test, only at the high-exposure level. Although relative thymus weights were decreased at all exposure levels, the values were not statistically significantly different from controls. Dose-related hematological effects (erythrocytopenia, leucopenia, lymphocytopenia, increased mean corpuscular volumes) were observed at all exposure levels, significant at $p<0.05$; hematocrit was significantly ($p<0.05$) decreased at the mid- and high-exposure levels. The authors indicated that the increased mean corpuscular volume, and decreased hematocrit and numbers of RBC were indicative of severe macrocytic anemia. Biphasic responses were observed in immunological tests [mitogen-stimulated (LPS, PWM, Con A, PHA) splenic lymphocyte proliferation, mixed splenic lymphocyte culture response to allogenic YAC-1 cells, cytotoxic splenic T-lymphocyte response to allogenic YAC-1 cells], with a significantly ($p<0.05$) increased response at the low-exposure level, and significantly ($p<0.05$) decreased responses at the mid- and/or high-exposure level. Using several methods to determine primary antibody response to sheep RBC, significantly ($p<0.05$) decreased responsiveness was observed at the mid- and/or high-exposure levels; this response was either significantly ($p<0.05$) increased or not different from controls in mice exposed to the low-exposure level. This study identifies a LOAEL of 8 mg/kg/day (the lowest treatment level tested) for hematological and immunological effects in male mice exposed to benzene in drinking water for 30 days. No NOAEL for hematological effects in mice were identified in this study.

Wolf et al. (1956) treated female Wistar rats (10/group) by gavage with benzene in olive oil, 5 days/week

for 6 months. The reported doses were 0, 1, 10, 50, or 100 mg/kg/day, but it was not clear whether these represented the dose on treatment days or the dose expanded from 5 to 7 days/week. The usual practice in the primary literature is to report the actual gavage doses given on treatment days. Assuming that the usual practice was followed for this study, the expanded doses would be 0, 0.7, 7.1, 35.7, and 71.4 mg/kg/day, respectively. Parameters measured included mortality, clinical signs, body and organ weights, hematology, blood biochemistry, bone marrow counts, and gross and microscopic pathology of lungs, heart, liver, kidneys, spleen, testes, adrenals and pancreas. Leucopenia (described as "very slight") was reported for 10 mg/kg; at higher dose levels erythrocytopenia and leucopenia were observed. No quantitative data or statistical analysis were reported. The authors reported that rats fed 1 mg/kg had "no evidence of ill effects" with respect to gross appearance, growth, periodic blood counts, blood urea nitrogen, average final body and organ weights, histopathological examination, and bone marrow counts. For higher treatment levels, only adverse effects were described, requiring the assumption that no adverse effects were observed with respect to the other tested parameters. This study identified a NOAEL of 1 mg/kg (0.7 mg/kg/day) and a LOAEL of 10 mg/kg (7.1 mg/kg/day) for hematological effects in female rats treated by gavage for 6 months.

In a subchronic study conducted by Fan (1992), groups of male C57BL/6 mice were exposed via drinking water to 0, 152, or 852 mg/L benzene for 7-28 days; using estimated daily water intakes, the authors calculated benzene dosages of 27 and 154 mg/kg-day. Five mice per group were killed after 7, 14, 21, or 28 days of exposure to benzene. An unspecified number of mice were exposed to 152 mg/L for 28 days and killed 7, 14, or 21 days after the last dosage. The focus of this study was to determine the toxicity of benzene on NK cells involved in non-specific host resistance, and interleukin-2 which is the primary growth factor of T cells, a growth factor for B cells and NK cells, and is involved in the regulation of granulocyte and eosinophil production that occurs in response to natural killer (NK) cell activity and interleukin-2 production. No overt signs of toxicity were observed in the benzene-exposed mice. Significant decreases in the number of spleen cells were observed in both groups of benzene-exposed mice. This effect was observed after 21 and 28 days of exposure in the 152 mg/kg-day group and after 14, 21, and 28 days in the 852 mg/kg-day group. After 21 days of exposure, a significant increase in splenic NK cell activity was observed in both benzene-exposed groups, however, after 28 days of exposure, the activity did not significantly differ from that observed in controls. Splenic interleukin-2 production was significantly depressed after 28 days of exposure to either benzene dosage. Spleen cell numbers and interleukin-2 production were also depressed in the mice exposed to 152 mg/kg-day benzene for 28 days and killed after 7 and 14 days (interleukin-2 levels only) after exposure termination. Thus, this study identified a LOAEL of 152 mg/kg-day (lowest dose tested) for effects on the immune system in male mice.

Developmental and reproductive toxicity studies. Developmental toxicity studies of orally administered benzene have been conducted in rats (Exxon Chemical Company, 1986) and mice (Nawrot and Staples, 1980; Seidenberg et al., 1986, as cited in ATSDR, 1995; BASF, 1975).

Exxon Chemical Company (1986) treated bred female Sprague-Dawley rats (20-22/group) by gavage with 0, 50, 250, 500, or 1000 mg/kg/day on gestation days 6-15. No dose-related mortality was observed. Significant ($p \leq 0.05$) findings in the treated dams as compared with controls were decreased food consumption at 250, 500 and 1000 mg/kg, decreased body weights and body weight gains at 500 or 1000 mg/kg/day, and

increased incidence of alopecia at 1000 mg/kg. Developmental toxicity was limited to decreased ($p \leq 0.05$) fetal body weights in the 500 and 1000 mg/kg/day groups. Fetuses were examined only for external malformations, not for skeletal and visceral malformations. This study identified a NOAEL of 50 mg/kg/day and LOAEL of 250 mg/kg/day for maternal toxicity and tentative NOAEL of 250 mg/kg/day and LOAEL of 500 mg/kg/day for developmental toxicity in Sprague-Dawley rats.

Nawrot and Staples (1980) treated bred CD-1 mice (23-105/group) by gavage with benzene in cottonseed oil at dose levels of 0, 0.3, 0.5, or 1 ml/kg/dose, 3 times daily, on gestation days 6-15. Using a specific gravity of 0.8765 g/ml (ATSDR, 1995) and multiplying by 3 doses/day results in doses of 0, 789, 1315, and 2630 mg/kg/day, respectively. Additional groups of mice were similarly treated with 0 or 1 ml/kg/dose (0 or 2630 mg/kg/day) on gestation days 12-15. Mortality rates in dams treated with 0, 789, 1315, and 2630 mg/kg/day were 2/105, 0/27, 6/48, and 7/23, respectively. Significant ($p<0.05$) findings in the dams included the increased mortality at the mid- and high doses, increased liver weights at the mid- and high doses, increased relative liver weights at all three doses, and a reduction in maternal weight gain only at the low dose. A dose-related decrease in apparent pregnancy rate at sacrifice was observed, significantly different ($p<0.05$) from controls at all dose levels; at the mid and high doses, this effect resulted from early resorption of entire litters ($p<0.05$). The decrease in apparent pregnancy rate at the low dose was attributed to an unusually high pregnancy rate in vehicle controls. Fetal body weights were decreased in all dose groups treated on days 6-15. In dams exposed on gestation days 12-15, no deaths occurred; significant ($p<0.05$) results included increased absolute maternal liver weight, decreased maternal weight gain and fetal body weight and increased number of resorptions. No increases relative to controls in external, visceral or skeletal defects were seen in any of the treatment groups. This study identified a LOAEL of 789 mg/kg/day for developmental toxicity and possible maternal toxicity resulting from treatment on gestation days 6-15, and a LOAEL of 2630 mg/kg/day for maternal and developmental toxicity resulting from treatment on gestation days 12-15. The LOAELs were at the lowest (or only) treatment level used and no NOAELs were identified in this study.

In a developmental toxicity screening study, Seidenberg et al. (1986, as cited in ATSDR, 1995) treated bred mice by gavage with benzene in oil at dose levels of 0 or 1300 mg/kg/day on gestation days 8-12. Fetal body weights were decreased; no other effects were reported. This study identifies a LOAEL of 1300 mg/kg/day for developmental toxicity in mice.

In a mouse developmental toxicity study, groups of 19-23 pregnant NMRI mice were administered via gavage 0, 563, or 1688 mg/kg-day benzene in olive oil on gestational days 6-15 (BASF, 1975; English summary of study). On gestational day 18, the mice were killed and the fetuses were examined. Decreased maternal body weight gain, unrest, tremor, and apathy were observed in the benzene-exposed dams. The onset of maternal toxicity appeared to be dose-related; observed from day 11-12 in the 563 mg/kg-day group and days 8-12 in the 1688 mg/kg-day group. Increased mortality (23% as compared with 14% in the control group) and decreased fetal body weights were observed in the fetuses of the dams treated with 1688 mg/kg-day benzene. An increase in malformations (6.86% of the fetuses versus 2.97% of fetuses in the control group) also was observed in the 1688 mg/kg-day group; the authors noted that 9 of the 12 fetuses with malformations were from the same litter. No evidence of fetal toxicity was observed in the 563 mg/kg-day group. Thus, this study identified a LOAEL of 563 mg/kg-day for maternal toxicity in mice and a NOAEL of 563 mg/kg-day and FEL of 1688 mg/kg-day for

developmental toxicity.

Additional developmental toxicity studies of benzene have been conducted in animals using inhalation exposure. These studies identify hematopoietic effects in the animal fetus (Keller and Snyder, 1986, 1988) as a sensitive developmental toxicity endpoint for inhalation exposure to benzene.

Data on the potential of benzene to induce reproductive toxicity following oral exposure is limited to the report of increased incidences of hyperplasia and senile atrophy of the ovary in female mice administered ≥18 mg/kg-day benzene for 2 years (NTP, 1986). Following inhalation exposure, histological alterations in the testes and ovarian cysts have been observed in mice exposed to relatively high concentrations of benzene (Ward et al., 1985). Data on the effect of benzene on reproductive performance is limited to a one-generation inhalation reproductive toxicity study in which female mice were exposed to benzene prior to mating and during gestation (Bio/dynamics, 1980; Kuna et al., 1992).

In the one-generation reproductive toxicity study, groups of 26 female Sprague-Dawley rats were exposed to vapor concentrations of 0, 1, 10, 30, or 300 ppm benzene (0, 3, 32, 96, or 958 mg/m^3) for 6 hours/day, 5 days/week during premating (10 weeks) and mating periods, then 6 hours/day, 7 days/week on gestational days 1-20 and lactational days 5-21 (Bio/dynamics, 1980; Kuna et al., 1992). No deaths, abnormal clinical signs, or alterations in body weight gain were observed in the dams. Additionally, benzene did not affect the pregnancy rate or the gestation length. The number of pups per litter, sex ratio, and viability were not affected by prenatal exposure to benzene. Male and female pups from the 300 ppm group tended to have lower body weights than controls, however, the differences in body weight was only significant in the female pups on lactational day 21. Alterations in liver and kidney weights also were observed in the female pups: a significant decrease in absolute liver weight in the 300 ppm group and increases in relative kidney weights in the 10, 30, and 300 ppm groups. No alterations in organ weights were observed in the male pups. This study identifies a NOAEL of 300 ppm for maternal toxicity and reproductive toxicity, and a NOAEL and LOAEL of 30 and 300 ppm, respectively, for developmental toxicity (decreased body weight gain).

DERIVATION OF PROVISIONAL CHRONIC RfD

The critical effects of orally administered benzene were determined to be hematotoxicity and immunotoxicity, probably related to the adverse effects of benzene on hematopoiesis (Wolf et al., 1956; White et al., 1984; NTP, 1986; Hsieh et al., 1988; Huff et al., 1989). This was not unexpected, because the extensive database on inhalation toxicity of benzene identifies hematological, hematopoietic and immunological toxicity as the critical effect, supported by human and animal data. The Health Risk Technical Support Center has derived a provisional RfC based on a free-standing NOEL of 0.045 ppm for hematological effects in occupationally exposed humans (Collins et al., 1991). Although no LOAEL was identified in this study, other occupational exposure studies reported hematological and/or hematopoietic effects at higher concentrations (Aksoy et al., 1971; Fishbeck et al., 1978), as did inhalation studies in experimental animals. Immunological effects have been reported in short-term inhalation studies of benzene in animals.

The NTP (1986) chronic and subchronic toxicity studies on rats and mice were not used as the basis for

the RfD because the lowest dose tested, 18 mg/kg/day, was a LOAEL for hematological effects, and is higher than LOAELs for similar effects observed in other studies of subchronic duration. Wolf et al. (1956) reported very slight leukopenia in rats treated by gavage for 6 months with 10 mg/kg (7.1 mg/kg/day) and leukopenia and erythrocytopenia at higher dose levels; no effects were observed at 1 mg/kg (0.7 mg/kg/day). Hsieh et al. (1988) reported hematological and immunological effects in male CD-1 mice exposed to 8 mg/kg/day benzene in the drinking water. A marginal NOAEL of 12 mg/kg/day was identified for hematological and immunological effects in female B6C3F1 mice exposed to benzene in the drinking water (White et al., 1984); the 12 mg/kg/day exposure level may approach the threshold of toxicity, as discussed previously.

The Hsieh et al. (1988) study was selected as the principal study because it demonstrated significant ($p<0.05$) hematological and immunological toxicity in mice exposed to relatively low doses of benzene. This study found a biphasic response to immunological challenges (e.g., mitogens, sheep RBCs) in male mice exposed to benzene in the drinking water for 28 days. At the lowest dose tested (8 mg/kg-day), there was a significant increase in the response; at the two higher doses (40 and 180 mg/kg-day), significant decreases in response were observed. Erythryoctyopenia, leukocytopenia, and lymphocytopenia were also observed at doses of 8 mg/kg-day or higher. The 6-month study by Wolf et al. (1956) was selected as a co-principal study because it provides supporting information for the critical effect and threshold for toxicity. The LOAEL for hematological effects was 7.1 mg/kg/day, with a NOAEL of 0.7 mg/kg/day. No adverse effects were observed for non-hematological endpoints, including blood biochemistry, bone marrow counts, and gross and microscopic pathology of major tissues and organs. The Wolf et al. (1956) study was not chosen as the principal study because the results were presented only as a summary; actual data and statistical analysis were not reported. Results from the other subchronic studies (White et al., 1984; NTP, 1986) and the chronic (NTP, 1986) study support the critical effects (hematological, immunological) identified in the principal and co-principal studies.

A provisional RfD of **3E-3 mg/kg/day** was determined based on the LOAEL of 8 mg/kg/day from the study by Hsieh et al. (1988). An uncertainty factor of 3000 was applied because some uncertainty exists in all 5 areas (variation within and between species, use of a LOAEL, extrapolation to chronic duration, and deficiencies in the database). Uncertainty regarding extrapolation to chronic duration is mitigated by the 6-month duration of the co-principal study and by the supporting chronic oral study (NTP, 1986); some uncertainty remains because the dosages in the chronic study were higher than the LOAELs in the key subchronic studies and did not overlap with the threshold for toxicity based on Hsieh et al. (1988). Uncertainty regarding deficiencies in the database is small because of the reasonably adequate oral database, which includes developmental toxicity studies, and the extensive supporting inhalation database, but some uncertainty remains due to the lack of a two-generation reproductive study.

Confidence in the principal study is medium to low. The critical effect (hematological and immunological) was investigated through the use of a battery of tests and a range of dose levels, appropriate statistical analyses were performed, a dose-effect relationship was established, and the LOAEL is consistent with the LOAEL and NOAEL from a 6 month study (Wolf et al., 1956) measuring hematological effects and other endpoints of toxicity. Confidence in the principal study is limited by the small group sizes (5 animals/dose), testing of only one sex, short duration, and limited range of endpoints examined. Confidence in the database is

medium because the critical effect is supported by numerous studies on benzene by the oral and inhalation routes and for various durations, including chronic; confidence in the database is not higher because of the lack of a two-generation reproductive study. Reflecting the medium to low confidence in the key study and medium confidence in the database, confidence in this provisional RfD is medium.

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Attachment 2

This paper is retired, Dr. Harlal Choudhury and STSC do not recommend it to be used in risk assessment.

(96-021/07-02-96)

Risk Assessment Issue Paper for:
Derivation of a Provisional Chronic Inhalation RfC
for Benzene (CASRN 71-43-2)

INTRODUCTION

An RfC for benzene is not available on IRIS (U.S. EPA, 1996) or HEAST (U.S. EPA, 1995a). An RfC for benzene was discussed at the May and July, 1989 RfD/RfC Work Group meetings, and the RfC is considered under review (U.S. EPA, 1995b). Documents listed on the CARA database (U.S. EPA, 1991, 1994a) include a AWQCD (U.S. EPA, 1980) and HEA and update HEA (U.S. EPA, 1984, 1989). ATSDR has prepared a toxicological profile on benzene, intermediate and chronic inhalation MRLs were not derived in this document (ATSDR, 1995). ACGIH lists a TLV-TWA of 10 ppm; however, a change to a TLV-TWA of 0.3 ppm has been proposed (ACGIH, 1995).

In preparation of this issue paper, computer literature searches of TOXLINE (January 1986 to February 1992), RTECS, HSDB and TSCATS databases were conducted for benzene in February 1992. Update literature searches of TOXLINE, MEDLINE, TSCATS, and DART were conducted in May, 1996. The above listed documents and literature searches were used to identify relevant studies.

REVIEW OF PERTINENT LITERATURE

There is an extensive database on the toxicity of inhaled benzene in humans and animals. Secondary sources, as well as literature searches, were used to identify studies that defined the thresholds of toxicity. Specifically, studies which evaluated the subchronic, chronic, developmental, and reproductive toxicity of inhaled benzene. When numerous studies were available, studies which found toxic effects at low concentrations of benzene were selected.

Epidemiology Studies

Several epidemiology studies of the long-term toxicity of benzene are available; four are reported herein, covering a wide range of exposure levels and effects.

Aksoy et al. (1971) examined hematological parameters in 217 apparently healthy male workers (mean age 24.7 years) exposed to 30-218 ppm benzene (96-696 mg/m^3) for 3 months to 17 years, and in 100 male hospital workers and medical students (mean age 26.6 years). Peripheral blood samples were obtained for

measurement of RBC, WBC, PCV, platelets, and differential counts. In 11 benzene-exposed workers known to have hematological abnormalities, bone marrow samples were obtained for determination of cellularity and myeloid and erythroid series. Twenty-four percent of the exposed workers had hematological abnormalities, including leukopenia (9.7%), thrombocytopenia (1.84%), leukopenia associated with thrombocytopenia (4.6%), pancytopenia (2.76%), acquired pseudo-Pelger-Huet anomaly (0.46%), lymphocytosis (0.46%), giant platelets (0.46%), eosinophilia (2.3%), basophilia (0.46%), and eosinophilia associated with basophilia (0.46%). Low hemoglobin levels, PCV, and MCV, indicative of mild or moderate hypochromic or normochromic anemia, were observed in 33% of the benzene-exposed workers. In bone marrow tests, 9/11 workers had hematopoietic abnormalities, including hypercellularity (in 1 worker), hypocellularity (4), and maturation arrest (8) and vacuolization (4) in the erythroid and myeloid series. This study identifies a LOAEL of 30 ppm (96 mg/m^3) for hematopoietic effects in humans.

Kipen et al. (1989a,b) examined about 18,000 peripheral blood counts from hematologic surveillance records on 459 workers employed in the rubber industry between 1940 and 1975. Mean concentrations of benzene decreased from 137 to 66 ppm between 1940 and 1948, with a mean 8-hour TWA of 75 ppm (239.6 mg/m^3). During the time period of 1940 to 1948, significant depressions in erythrocyte, hemoglobin, and leukocyte levels were observed in the workers. As the benzene levels steadily decreased, the erythrocyte and leukocyte levels steadily increased. Between 1948 and 1975 when the workers were exposed to mean 8-hour TWA concentrations of 15-20 ppm (48-64 mg/m^3), no significant relationships between benzene levels and erythrocyte, hemoglobin or leukocyte levels were established.

Collins et al. (1991) examined hematological parameters (peripheral blood RBC, WBC, hemoglobin, platelets, and MCV) in workers (n=200) exposed to benzene over a 10-year period. Within this 10-year period the mean length of exposure was 7.3 years. The workers were exposed to an 8-hour TWA of 0.01-1.40 ppm benzene. The mean TWA exposure was 0.045 ppm (J. Collins, 1992, personal communication). A group (n=268) of non-benzene exposed workers in the same plant were used as controls. There were statistically significant differences on demographic (age, race, sex) and personal habit (currently smokers, regular exercise) variables between the benzene-exposed workers and the control group. Multiple regression analyses were applied using the confounding factors and current exposure as independent variables. No significant correlations between cumulative exposure and hematological parameters were identified. Thus, this study identifies a free-standing NOEL of 0.045 ppm (0.14 mg/m^3) for hematological effects in humans.

Fishbeck et al. (1978) examined hematological parameters (RBC, WBC, hematocrit, hemoglobin, mean corpuscular volume, platelets, differential blood counts, clot retention determinations, sedimentation rate, and blood indices) in 10 employees exposed to high benzene concentrations [8-hour TWA of >25 ppm (>80 mg/m^3)] for 2.5-22.9 years, with an average of 9.6 years of exposure. Concentrations of benzene in the work area were especially high in 1963, with the 8-hour TWA ranging from 37-132 ppm (118-422 mg/m^3); after 1963, conditions were altered to assure that concentrations of benzene remained below 25 ppm (80 mg/m^3) (the acceptable limit at that time). Examination of the 10 employees in 1963 revealed enlarged RBC's, high MCV (10/10), slightly low hemoglobin levels (9/10), and transient anemia; bone marrow was examined at this time and no abnormalities were found. After 1963, hematological values for these employees improved (in 1977, 5/10 workers had increased MCV values) and by 1978 none of the employees had developed serious health problems.

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The authors concluded that exposure of workers to high levels of benzene produced transient hematological effects, which did not influence the long-term overall health of the workers.

Animal Studies

Male C57BL/J mice (sample size not reported; initial age 8 weeks) were exposed via inhalation to vapor concentrations of 0 or 10 ppm benzene (0 or 32 mg/m^3) for 6 hours/day, 5 days/week for up to 178 days (Baarson et al., 1984). After 32, 66, and 178 days of exposure, peripheral blood samples were obtained from all mice for determination of levels of RBC, lymphocytes, and neutrophils, and 5 mice/exposure level were sacrificed for measurement of erythroid progenitor cells [colony forming units - erythroid (CFU-E), burst forming units (BFU-E), nucleated red cells, and total cellularity] in bone marrow and spleen. There was a significant ($p<0.05$) decrease in levels of RBC (at 66 and 178 days) and lymphocytes (at all sampling times) in peripheral blood of benzene-exposed mice. CFU-E and BFU-E in bone marrow were significantly ($p<0.01$) decreased at all sacrifice times and at 66 days, respectively; after 178 days of treatment, bone marrow CFU-E was 5% of controls. Splenic CFU-E (10% of controls), nucleated red cells (15%), and total nucleated cellularity (84%) were significantly ($p<0.05$) decreased in mice sacrificed at 178 days. This study identifies a LOAEL of 10 ppm (32 mg/m^3) for depressed hematopoiesis in mice.

Male CD-1 mice (11-12/exposure level/exposure duration; 8-12 weeks of age) were exposed for 6 hours/day, 5 days/week to vapor concentrations of 0 or 9.6 ppm (0 or 31 mg/m^3, respectively) benzene for 10 weeks or to 0 or 302 ppm (0 or 966 mg/m^3) benzene for 26 weeks (Green et al., 1981a,b). On the day of the last exposure, samples (pooled from groups of 3-4 mice) were obtained from the peripheral blood, bone marrow and the spleen to evaluate hematological and hematopoietic cells. In mice exposed to 9.6 ppm (31 mg/m^3), no adverse effects were observed with respect to mortality, body weights, or cells in the peripheral blood or bone marrow. Splenic weight, total nucleated cells per spleen, and nucleated red blood cells per spleen were significantly ($p<0.05$) increased in mice exposed to 9.6 ppm (31 mg/m^3). Mice exposed to 302 ppm (966 mg/m^3) had the following significant ($p<0.05$) changes: increased mortality rate; decreased numbers of lymphocytes and RBC in peripheral blood; decreased numbers of lymphocytes, granulocytes, multipotential hematopoietic stem cells, and committed granulocyte/macrophage progenitor cells in bone marrow; decreased splenic weight, and numbers of lymphocytes, multipotential hematopoietic stem cells and committed granulocyte/macrophage progenitor cells in the spleen; increased incidence of atypical cell morphology in peripheral blood, bone marrow, and spleen. This study identifies a LOAEL of 9.6 ppm (31 mg/m^3) for slight hematopoietic effects in mice exposed to benzene for 10 weeks, more severe hematopoietic effects were observed at 304 mg/m^3.

Sprague-Dawley rats (50/sex/group; 12 weeks of age) and CD-1 mice (150/sex/group; 9 weeks of age) were exposed to nominal vapor concentrations of 0, 1, 10, 30, or 300 ppm benzene (99.9% purity) (0, 3, 32, 96, or 959 mg/m^3), 6 hours/day, 5 days/week, for 13 weeks (Ward et al., 1985). Clinical observations and body weight data were normal in both species. High-exposure level rats had leukopenia and significantly ($p<0.05$) decreased femoral marrow cellularity. High-exposure level mice had leukopenia, anemia, thrombocytopenia, and significant increases in MCV, MCH, glycerol lysis time, and incidence and severity of morphological changes in RBC. Relative testes weights were significantly decreased in high-dose male mice. High-dose mice had

histological abnormalities in the thymus (atrophy), bone marrow (myeloid hyperplasia), lymph nodes (lymphoid depletion of mesenteric and mandibular lymph nodes; plasma cell infiltration into mandibular lymph node), spleen (increased incidence of extramedullary hematopoiesis; periarteriolar lymphoid sheath depletion), ovaries (bilateral ovarian cysts), and testes (bilateral atrophy/degeneration; decreases in spermatozoa in the epididymal ducts; increased numbers of abnormal sperm types); similar lesions were observed in the testes and ovaries of mice exposed to concentrations lower than 300 ppm (959 mg/m^3), but the authors did not consider these effects to be biologically significant. The incidence and severity of most benzene effects were greater in male mice than in female mice. This study identifies a NOAEL of 30 ppm (96 mg/m^3) and a LOAEL of 300 ppm (959 mg/m^3) for these effects in rats and mice.

Using blood samples collected from the Ward et al. (1985) study, White and Munsen (1983) examined the effect of benzene on levels of serum immunoglobulins in groups of male and female rats and mice (6-10/sex/group/species). A dose-related suppression of IgG levels were observed in male rats exposed to benzene for 14 days; as compared with controls, IgG levels were significantly lower in the 300 ppm group. No other alterations in IgG, IgM, or IgA were observed in the male or female rats. In the mice, several alterations in immunoglobulin levels were observed. The overall trend was an early suppression of IgM, IgA, and IgG levels followed by a trend toward increased immunoglobulin levels after 28 days of exposure to benzene in male mice and 56 days of exposure in female mice. The statistically significant alterations in immunoglobulin levels in the male mice consisted of decreases in IgM levels in the 1 ppm group at 56 days, increases in IgM levels in the 300 ppm group at 56 days; increases in IgG_1 levels in the 1, 10, and 30 ppm groups at 14 days of exposure and in the 30 ppm group at 91 days; increases in IgG_{2B} levels in the 1 and 10 ppm groups at 14 days and in the 30 ppm group at 91 days and decreases in IgG_{2B} levels in the 1 ppm group at 91 days. In the female mice, the statistically significant alterations in immunoglobulin levels included decreases in IgM levels in the 1, 10, 30, and 300 ppm groups at 56 days; decreases in IgA levels in the 30 and 300 ppm groups at 7 days and in the 1 ppm group at 14 days and increases in IgA levels in the 1 and 30 ppm groups at 91 days; increases in IgG_1 levels in the 10 ppm group at 7 days and in the 300 ppm group at 56 days and decreases in IgG_1 levels in the 300 ppm group at 28 days and in the 1, 30, and 300 ppm groups at 91 days; decreases in IgG_{2A} levels in the 30 and 300 ppm groups at 7 days and 30 ppm group at 28 days and increases in IgG_{2A} levels in the 10 ppm group at 14 and 28 days; increases in IgG_{2B} levels in the 10 ppm group at 7 days and decreases in IgG_{2B} levels in the 300 ppm group at 28 days; and increases in total IgG levels in the 10 ppm group at 14 days and 10 and 300 ppm group at 56 days and decreases in total IgG levels in 300 ppm group at 28 days. The toxicological significance of these alterations in immunoglobulin levels is not known. The authors note that the magnitude of the alterations (most alterations 20-50% different from control levels) were not remarkable and may have been due to hemodilution or hemoconcentration. They suggest that the immunoglobulin alterations may have been related to benzene-induced immunotoxicity or the increased immunoglobulin levels may have been secondary to benzene-induced increased susceptibility to infections.

Male C57BL/6 mice were exposed to 0 or 300 ppm benzene (0 or 960 mg/m^3), 6 hours/day, 5 days/week for 9 weeks (Baarson and Snyder, 1991). Blood was withdrawn from the tail vein for differential white blood cell counts and peripheral nucleated red cell counts. Following sacrifice, femurs and the spleen were aseptically removed and placed in sterile culture dishes. Single cell suspensions were made, and the numbers of colony forming unit erythroid (CFU-E) cells and burst forming unit erythroid (BFU-E) cells were counted in control vs.

exposed animals. From 1 day after beginning of exposure to benzene until the end of the treatment period, peripheral red blood cell counts were decreased. In addition, the numbers of BFU-E and CFU-E colonies were depressed to less than half the control values, in all exposed animals at days 5 and 60 of exposure. These effects represent an adverse effect on the organism, due to the potential for anemia. In this study, the combined treatment of benzene and ethanol was studied in a second group of animals, and was the thrust of the new information from this group. The exposure levels are far greater in this study than in previous work; a LOAEL of 960 mg/m^3 was established for hematotoxic effects.

Similar results were seen in a study where female C57BL/6xDBA/2 F1 hybrid mice were exposed to 0 or 300 ppm benzene (0 or 960 mg/m^3), 6 hours/day, 5 days/week for 6-7 weeks (Vacha et al., 1990). Indices of hematopoiesis were measured in peripheral blood (RBC and WBC count, Hb, Hct, reticulocyte, and leukocyte count), in addition to ^{59}Fe accumulation in the erythropoietic organs (spleen and bone marrow) and in the peripheral RBC's. The distribution of developmental classes of erythroblasts was also determined. This study found that animals became anemic after 6-7 weeks of benzene exposure. The number of erythroblasts in the bone marrow was not different, however exposure to benzene shifted the population to a less mature class of cells. The number of colonies derived from BFU-E and CFU-E were decreased to 70% and 34% of controls, respectively. A LOAEL of 960 mg/m^3 was established for hematotoxic effects.

BDF1 mice were exposed to 0, 100, 300, or 900 ppm benzene (0, 320, 960, 2880 mg/m^3) for up to 4 weeks (Seidel et al., 1990). The numbers of hematopoietic progenitor cells, early and late progenitors (BFU-E, CFU-E), and granuloid progenitors (CFU-C) were determined. A group was generated to establish the effect of ethanol (drinking water) on these effects. This study demonstrated that the number of CFU-E per femur was decreased in a concentration-dependent manner by benzene. This effect was evident at 300 and 900 ppm (960 and 2880 mg/m^3, respectively) concentrations, however the effect of the 100 ppm (320 mg/m^3) exposure group was uncertain, as the study focused on the effect of ethanol on benzene toxicity. The LOAEL/NOAEL was thus difficult to determine.

Male Sprague-Dawley rats (40/group) were exposed to vapor concentrations of 0 or 100 ppm benzene (0 or 319 mg/m^3), 6 hours/day/ 5 days/week, for life (American Petroleum Institute, 1983). Blood samples were obtained at 2-4 week intervals throughout the treatment period. The treatment had no adverse effects with respect to mortality rates or body weight gain. Peripheral erythrocyte and lymphocyte counts were depressed at nearly every sampling time in treated rats, but the extent of decrease was not statistically significant at $p<0.05$. Significantly increased incidence of splenic hyperplasia ($p<0.005$) and hemosiderin pigments ($p<0.001$) were observed in benzene-exposed rats. The incidences of normally rare tumors in treated rats were liver (4/40), Zymbal gland (2/40), and chronic myelogenous leukemia (1/40); the authors considered these tumors to be related to the benzene exposure. This study identifies a LOAEL of 100 ppm (319 mg/m^3) for slight hematological effects in rats.

Male AKR/J (50/group) and C57BL/6J mice (40/group) were exposed to vapor concentrations of 0, 100 (319 mg/m^3; AKR mice only), or 300 ppm (958 mg/m^3; C57BL/J mice only) benzene, 6 hours/day, 5 days/week for life (Snyder et al., 1980). The following parameters were used to assess toxicity: clinical signs (observed daily), body weights (measured biweekly), hematology (RBC, WBC, WBC differentials, absolute neutrophil and

lymphocyte; measured biweekly in 10 control and 10 treated mice from each strain), and gross and microscopic necropsy (lung, liver, spleen, kidney, and bone marrow). The treatment had no adverse effects with respect to life span, body weight, or incidence of lymphoma in AKR mice. Treated AKR mice had significant (± 2 standard errors) degrees of lymphocytopenia, neutrophilia, erythropenia, and bone marrow hypoplasia ($p<0.05$). Treated C57BL mice had significant (± 2 standard errors) degrees of lymphocytopenia, neutrophilia, erythropenia, morphological changes in peripheral blood cells, and bone marrow and splenic hyperplasia ($p<0.05$). The incidence of hematopoietic neoplasms was significantly ($p<0.05$) increased in C57BL mice, including 6 cases of thymic lymphoma. This study identifies a LOAEL of 100 ppm (319 mg/m^3) for hematopoietic effects in mice.

Pregnant Swiss Webster mice (5/exposure level/progeny age group; initial age 8-12 weeks) were exposed via inhalation to nominal vapor concentrations of 0, 5, 10, or 20 ppm benzene (0, 16, 32, or 64 mg/m^3) for 6 hours/day on gestation days 6-15 (Keller and Snyder, 1988). On gestation day 16 (fetuses), 2 days after birth (neonates), and 6 weeks after birth (adults), progeny (1-2 males and 1-2 females/litter) were sacrificed to determine the amounts and types of hemoglobin produced, and hemopoietic cells in the peripheral blood and hematopoietic organs. No evidence of maternal or non-hematopoietic developmental toxicity was observed in treated mice, and no adverse hematopoietic effects were observed in fetuses. The treatment had no adverse effects in any progeny with respect to peripheral blood levels of RBC, MCH, blasts, dividing granulocytes, lymphocytes, or ratio of hemoglobin A major to hemoglobin A minor. There was a concentration-related decrease in peripheral blood levels of early nucleated red cells in neonates, significant ($p<0.05$) at all exposure levels. High-exposure level neonates had significantly ($p<0.05$) increased numbers of nondividing granulocytes and decreased numbers of late nucleated red cells in peripheral blood. In high-exposure level neonates, hepatic levels of blasts, dividing granulocytes, non-dividing granulocytes, and lymphocytes were significantly ($p<0.05$) increased and late nucleated red cells were significantly ($p<0.05$) decreased; hepatic levels of blasts were also significantly ($p<0.05$) increased at the low-exposure level in neonates. In adults, there was a concentration-related decrease in early nucleated red cells in bone marrow, significant ($p<0.05$) at the high-exposure level. High-exposure level adults also had significant ($p<0.05$) increases in splenic levels of blasts, dividing granulocytes, and nondividing granulocytes; splenic levels of non-dividing granulocytes were also increased in low-exposure level adults. This study identifies a LOAEL of 5 ppm (16 mg/m^3) for developmental hematopoietic effects in mice.

Pregnant Swiss-Webster mice (5/exposure level/progeny age group; initial age 8-12 weeks) were exposed via inhalation to nominal vapor concentrations of 0, 5, 10, or 20 ppm benzene (0, 16, 32, or 64 mg/m^3) for 6 hours/day on gestation days 6-15 (Keller and Snyder, 1986). On gestation day 16 (fetuses), 2 days after birth (neonates), and 6 weeks after birth (adults), progeny (1-2 males and 1-2 females/litter) were sacrificed for measurement of hematopoietic progenitor cells [colony forming units - erythroid (CFU-E), burst forming units - erythroid (BFU-E), and granulocytic colony forming cells (GC-CFU-C)] from the liver (fetuses and neonates), and bone marrow and spleen (adults). In addition, 10-week old progeny from litters in the control and mid-exposure group were exposed for 2 weeks to 10 ppm (32 mg/m^3) benzene, then sacrificed for measurement of hematopoietic progenitor cells from the bone marrow and spleen. There was no evidence of maternal or non-hematopoietic developmental toxicity in benzene-exposed mice. There was a significant ($p<0.05$) increase in the numbers of erythroid burst forming units from livers of male and female fetuses exposed to the low- and mid-exposure level, respectively. The following significant ($p<0.05$) changes were observed with respect to CFU-E:

in fetuses, there were increases in liver CFU-E at the low- and mid-exposure levels and decreases at the high-exposure level; in male neonates, there were increases and decreases in liver CFU-E at the mid-exposure level, and increases at the high-exposure level; in adult mice there were decreases in bone marrow CFU-E and increases in spleen CFU-E in males exposed to 10 ppm (32 mg/m^3) in utero. Liver GM-CFU-C in neonates was significantly ($p<0.05$) decreased at the mid-exposure level (males only) and increased at the high-exposure level. Mice exposed to 10 ppm (32 mg/m^3) benzene in utero and for 2 weeks as adults had significantly ($p<0.05$) decreased bone marrow CFU-E (males only) and splenic GM-CFU-C; mice exposed to air in utero and 10 ppm (32 mg/m^3) benzene for 2 weeks as adults had no changes in bone marrow or splenic CFU-E, but had a significant ($p<0.05$) decrease in splenic GM-CFU-C (females only). The authors concluded that benzene treatment in utero induced hematopoietic alterations in fetuses, persisting until at least 10 weeks after birth. This study identifies a LOAEL of 5 ppm (16 mg/m^3) for developmental hematopoietic effects in mice.

Bred Sprague-Dawley rats (17-20/group; initial body weights 210-223 g) were exposed via inhalation to nominal vapor concentrations of 0, 10, 50, or 500 ppm benzene (0, 32, 160, and 1600 mg/m^3) for 7 hours/day, on gestation days 6-15, followed by sacrifice on gestation day 20 for determination of developmental abnormalities (Kuna and Kapp, 1981). The treatment had no adverse effects on dams with respect to mortality rate, hematology, or gross necropsy. Body weight gain over gestation days 5-15 was significantly ($p<0.05$) decreased in mid- and high-exposure level dams. Fetal body weight was significantly ($p<0.05$) decreased at the mid- and high-exposure levels and fetal crown-rump length was decreased at the high-exposure level. The number of litters with skeletal and visceral variants was significantly ($p<0.05$) increased at the mid- and high-exposure levels. The skeletal and visceral abnormalities observed included execephaly, angulated ribs, dilated lateral and third ventricles of the brain, forefeet ossification out of sequence, generalized lagging ossification, and decreased numbers of caudals, and metacarpals, metatarsals, and phalanges/foot; the authors considered these abnormalities to be related to the benzene treatment. This study identifies a NOAEL of 10 ppm (32 mg/m^3) and a LOAEL of 50 ppm (160 mg/m^3) for maternal toxicity and developmental effects in rats.

Bred Sprague-Dawley rats (26-31/group) were exposed to nominal vapor concentrations of 0, 10, or 40 ppm benzene (0, 32, or 128 mg/m^3) for 6 hours/day on gestation days 6-15 (Litton Bionetics, 1978). The treatment had no adverse effects on mortality rate, body weight gain, or food consumption in dams. Pregnancy ratio, fetal weight, live litter size, and incidence of variants and malformations were similar in control and treatment groups. Benzene-exposed rats had significantly ($p<0.05$) decreased ratio of live fetuses/implantation site. The number of resorption sites was increased in benzene-exposed rats, but the difference was only significant ($p<0.05$) in the low-exposure group. This study identifies a LOAEL of 10 ppm (32 mg/m^3) for developmental effects in rats.

Coate et al. (1984) exposed pregnant Sprague-Dawley rats (40/group) to 1, 10, 40, or 100 ppm benzene (3.2, 32, 128, or 320 mg/m^3), 6 hr/day, days 6-15 of gestation. No maternal toxicity or teratogenic effects were noted. There was no deviation from controls in the number of resorptions. There was reduced fetal weight at 100 ppm ($p<0.05$) thus, a LOAEL of 100 ppm (320 mg/m^3) can be identified along with a NOAEL of 40 ppm (128 mg/m^3).

Ungvary and Tatrai (1985) exposed pregnant CFLP mice (15/group) and New Zealand rabbits

(11-15/group) to 0, 160 or 320 ppm benzene (0, 500 or 1000 mg/m^3), 24 hr/day, during days 6-15 (mice) or 7-20 (rabbits) of gestation. There were no teratogenic effects in either species. In rabbits, exposure to 320 ppm (1000 mg/m^3) was associated with reduced fetal weight ($p<0.05$) in the presence of reduced maternal body weight gain. The NOAEL and LOAEL for this effect was 160 ppm (500 mg/m^3) and 320 ppm (1000 mg/m^3), respectively. Mice exposed to concentrations ≥ 160 ppm (500 mg/m^3) had reduced fetal weight, as well as skeletal deformities (maternal weight data not provided). The LOAEL for this effect was 160 ppm (500 mg/m^3).

Stücker et al. (1994) examined the induction of spontaneous abortions following paternal exposure to benzene. In this study, 823 married men aged <45 years employed at two chemical factories and their wives were asked to complete questionnaires regarding sociodemographics and pregnancies. Based on job titles, the workers were divided into three groups: no exposure to benzene, low benzene exposure (1-5 ppm), and moderate benzene exposure (≥5 ppm). Of the 1739 pregnancies, 171 ended in a spontaneous abortion (defined as a pregnancy that ended before 28 weeks of gestation, excluding induced abortions). The frequency of spontaneous abortion in the wives of non-exposed workers was not significantly different than the rate in workers exposed to benzene at any time before conceptions or in workers exposed to benzene 3 months immediately before conception. Adjusting for classic risk factors (e.g., mother's age, pregnancy order) did not alter the association between benzene exposure and the rate of spontaneous abortions. Comparisons between the occurrence of spontaneous abortions in the non-exposed group and the low benzene and moderate benzene groups also were not statistically significant.

In a one-generation reproductive toxicity study, groups of 26 female Sprague-Dawley rats were exposed to vapor concentrations of 0, 1, 10, 30, or 300 ppm benzene (0, 3, 32, 96, or 958 mg/m^3) for 6 hours/day, 5 days/week during premating (10 weeks) and mating periods, then 6 hours/day, 7 days/week on gestational days 1-20 and lactational days 5-21 (Bio/dynamics, 1980; Kuna et al., 1992). No deaths, abnormal clinical signs, or alterations in body weight gain were observed in the dams. Additionally, benzene did not affect the pregnancy rate or the gestation length. The number of pups per litter, sex ratio, and viability were not affected by prenatal exposure to benzene. Male and female pups from the 300 ppm group tended to have lower body weights than controls, however, the differences in body weight was only significant in the female pups on lactational day 21. Alterations in liver and kidney weights also were observed in the female pups: a significant decrease in absolute liver weight in the 300 ppm group and increases in relative kidney weights in the 10, 30, and 300 ppm groups. No alterations in organ weights were observed in the male pups. This study identifies a NOAEL of 300 ppm for maternal toxicity and reproductive toxicity, and a NOAEL and LOAEL of 30 and 300 ppm, respectively, for developmental toxicity (decreased body weight gain).

DERIVATION OF PROVISIONAL CHRONIC INHALATION RfC

Exposure of humans to benzene vapor in the work place resulted in hematological and/or hematopoietic effects at concentrations of 30-218 ppm (Askoy et al., 1971; Fishbeck et al., 1978; Kipen et al., 1989a,b). At lower concentrations (0.01-1.4 ppm), no adverse hematological effects were observed in the peripheral blood (Collins et al., 1991). However, the epidemiology studies did not examine the potential of benzene to induce

hematopoietic alterations in the bone marrow or spleen.

In animals, the most sensitive endpoint for shorter-term exposure to benzene vapors is effects on the hematopoietic progenitor cells. The lowest LOAELs identified for this effect are 5 and 10 ppm (16 and 32 mg/m^3) in mice exposed to benzene *in utero* or subchronically, respectively (Keller and Snyder, 1986, 1988; Green et al., 1981a,b; Baarson et al., 1984). NOAELs for damage to hematopoietic progenitor cells have not been established. Several lifetime inhalation exposure studies have been conducted, however, the lowest concentration tested was 100 ppm. The lifetime studies provide evidence that mice are more sensitive to the long-term effects of benzene than are rats (Snyder et al., 1980; American Petroleum Institute, 1983). Reproductive effects (testicular lesions and ovarian cysts) were observed in mice exposed to 300 ppm for 13 weeks, but not in mice exposed to 30 ppm (Ward et al., 1985), or in female rats exposed to 300 ppm for 17 weeks during premating, mating, gestation, and lactation (Bio/dynamics, 1980). No male reproductive performance studies were located in the available literature; thus, no NOAEL can be established for reproductive effects due to benzene exposure.

The limitations in the human database preclude derivation of an RfC using human data. Several studies reported hematological and/or hematopoietic effects in workers exposed to benzene (Askoy et al., 1971; Fishbeck et al., 1978; Kipen et al., 1989a,b). However these data are inadequate to establish dose-response relationships because the workers were exposed to a wide range of benzene concentrations or were previously exposed to very high benzene concentrations. The Collins et al. (1991) study identified a NOEL of 0.045 ppm for hematological effects. Because dose-response relationships can not be established for humans, it is not known how far this NOEL is below the threshold concentration. Thus, it is recommended that the animal database be used to derive an RfC for benzene. $LOAEL_{HEC}$s were calculated for the Keller and Snyder (1986, 1988), Green et al. (1981a,b), and Baarson et al. (1984) studies using the following equation (U.S. EPA, 1994b):

$$LOAEL_{HEC} = LOAEL_{ADJ} \times [(H_{b/g})_A / (H_{b/g})_H]$$

Where: $LOAEL_{ADJ}$ is the duration adjusted LOAEL and $[(H_{b/g})_A / (H_{b/g})_H]$ is the ratio of the blood:gas (air) partition coefficient of benzene for mice to the blood:gas (air) partition coefficient of benzene for humans. Because the ratio of the mouse to human blood:gas partition coefficients (12.1 for mice and 8.19 for humans; Gargas et al., 1989) is greater than 1, the default ratio of 1 is used.

a. Keller and Snyder (1986, 1988), LOAEL of 5 ppm (16 mg/m^3):

LOAEL of 16 mg/m^3 is not adjusted for the 6 hours/day intermittent exposure because this is a developmental toxicity study

$LOAEL_{HEC} = 16\ mg/m^3 \times 1$
$LOAEL_{HEC} = 16\ mg/m^3$

b. Baarson et al. (1984), LOAEL of 10 ppm (32 mg/m^3)

$LOAEL_{ADJ}$ = 32 mg/m^3 x 6 hours/24 hours x 5 days/7 days
$LOAEL_{ADJ}$ = 5.7 mg/m^3

$LOAEL_{HEC}$ = 5.7 mg/m^3 x 1
$LOAEL_{HEC}$ = 5.7 mg/m^3

c. Green et al. (1981a,b), LOAEL of 9.6 ppm (31 mg/m^3)

$LOAEL_{ADJ}$ = 31 mg/m^3 x 6 hours/24 hours x 5 days/7 days
$LOAEL_{ADJ}$ = 5.5 mg/m^3

$LOAEL_{HEC}$ = 5.5 mg/m^3 x 1
$LOAEL_{HEC}$ = 5.5 mg/m^3

Thus, $LOAEL_{HEC}$s for the Baarson et al. (1984) and Green et al. (1981a,b) studies are lower than the $LOAEL_{HEC}$ from the Keller and Snyder et al. (1986, 1988) studies. Because the exposure duration was longer in the Baarson et al. (1984) study than for the Green et al. (1981a,b) study (25 weeks versus 10 weeks), the Baarson et al. (1984) study was selected as the principal study. An uncertainty factor of 1000 was applied to the $LOAEL_{HEC}$ of 5.7 mg/m^3 to derive a provisional RfC of 6E-3 mg/m^3. The uncertainty factor includes 3 for interspecies extrapolation using dosimetric adjustments, 10 for intraspecies variability, 10 for use of a subchronic study, and 3 to extrapolate from a minimal LOAEL.

Confidence in the principal study (Baarson et al., 1984) is medium because a small number of animals of one sex were used. Confidence in the database also is medium. A large number of studies corroborated the hematopoietic effects observed in the Baarson et al. (1984) study, however, a NOAEL for these effects has not been identified. In addition, testicular lesions were reported by Ward et al. (1985), but male reproductive performance tests and/or a multigeneration reproduction study were not identified. Reflecting the medium confidence in the principal study and database, confidence in the provisional RfC is medium.

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Benzene Chronic RfC Principal/Supporting Studies - Inhalation Exposure

Study	Species/ Route	Conc. (ppm/ mg/m^3)	Duration	Critical Effect	NOAEL (mg/m^3)	LOAEL (mg/m^3)	NOAEL[adj] LOAEL[adj] (mg/m^3)	HEC (mg/m^3)
Co-critical Studies:								
Baarson et al. 1984 (chronic)	C57BL/J mice	0/0 10/32	6 h/d 5 d/wk 178 d	Decr. ability of mouse marrow progenitor cells to form colonies	None	32	5.7 L	5.7 L
Green et al. (1981a,b) (acute and chronic)	CD-1 mice	0/0 9.6/31	6 h/d 5 d/wk 10 wk	Hematolo-gical	31	None	5.5 N	5.5 NO/0 302/96626 wkNone966 173 L173 L
Supporting Studies:								
Aksoy et al. 1971	Human	0/0 30/96 218/696	3 m to 17 yr	Hematolo-gical	None	96	34 L	
Collins et al. 1991	Human	0/0 0.045/0.14	7 yr	None	0.14 (free-standing)	None	0.05 N	

Study	Species/ Route	Conc. (ppm/ mg/m^3)	Duration	Critical Effect	NOAEL (mg/m^3)	LOAEL (mg/m^3)	NOAEL[adj] LOAEL[adj] (mg/m^3)	HEC (mg/m^3)
Ward et al. 1985 (subchronic)	CD-1 mice	0/0 1/3 10/32 30/96 300/959	6 h/d 5 d/wk 13 wk	Hematological effects (decr. RBC, WBC, platelets, Hb, M/E ratios, and Hct.; Histological effects (91 d postexp): testicular atrophy, abn. sperm, decr. spermatozoa, etc.	96	959	17 N 171 L	17 N 171 L
	Rats			Decr. lymphocyte count, incr. neutrophils; Histological effects: decr. femoral marrow cellularity (at 7 d exposure)	96	959	17 N 171 L	17 N 171 L
Baarson and Snyder 1991 (subchronic)	C57BL/6 male mice	0/0 300/960	6 h/d 5 d/wk 9 wk	Decreased RBC count; decr. ability of mouse marrow progenitor cells to form colonies	None	960	171L 171 L	

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Study	Species/ Route	Conc. (ppm/ mg/m^3)	Duration	Critical Effect	NOAEL (mg/m^3)	LOAEL (mg/m^3)	NOAEL[adj] LOAEL[adj] (mg/m^3)	HEC (mg/m^3)
Vacha et al. 1990 (subchronic)	C57BL/6x DBA/2 F1 hybrid female mice	0/0 300/960	6 h/d 5 d/wk 6-7 wk	Decreased RBC count; decr. ability of mouse marrow progenitor cells to form colonies	None	960	171 L	171 L
Seidel et al. 1990 (subchronic)	BDF1 mice	0/0 100/320 300/960 900/2880	6 h/d 5 d/wk 4 wk	Decreased ability of mouse marrow progenitor cells to form colonies	Unclear	960	171 L	171 L
Kuna and Kapp 1981 (develop-mental)	Sprague-Dawley rats	0/0 10/32 50/160 500/1600	7 hr/d GD 6-15	Decr. fetal body weight	32	160	32 N 160 L	32 N 160 L
Coate et al. 1984 (develop-mental)	Sprague-Dawley rats	1/3.2 10/32 40/128 100/320	6 hr/d GD 6-15	Decr. fetal body weight	128	320	128 N 320 L	128 L 320 L

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Study	Species/ Route	Conc. (ppm/ mg/m³)	Duration	Critical Effect	NOAEL (mg/m³)	LOAEL (mg/m³)	NOAEL[adj] LOAEL[adj] (mg/m³)	HEC (mg/m³)
Unovary and Tatrai 1985 (develop-mental)	CFLP mice	0/0 160/500 320/1000	24 hr/d GD 6-15	Decr. fetal body weight	None	500	500 L	500 L
	New Zealand white rabbits		GD 7-20	Decr. fetal body weight	500	1000	500 N 1000 L	500 N 1000 L

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18 October 2000

Washington State Department of Ecology
Toxics Cleanup Program
Attn: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, Washington 98504-7600

Subject: Comments Regarding Proposed Regulation Modifications to the Model Toxics Control Act - Chapter 173-340-WAC

Kennedy/Jenks Consultants is pleased to submit its comments regarding the August 2000 proposed changes to the Washington State Model Toxics Control Act (MTCA). These comments are provided as requested by Ecology in its public announcements soliciting comments on the proposed changes to the MTCA. General and specific comments are provided below.

GENERAL COMMENTS

2033

1. We understand that it is Ecology's intent to rewrite the regulation so that it is easier to understand and provides for faster cleanups. One of Ecology's goals is to streamline the regulation in an effort to allow users to understand the cleanup process. As a consulting firm that uses the regulations to assist its clients, we find the latest revision to be complex and difficult to understand. It will be difficult for us to convey the process and meaning of the regulation to our clients given the complexities that have been added and cross referencing of various sections within the regulation. One of Ecology's major goals was to make the rule result in faster and less costly cleanups. The proposed rule is complex, will require PLPs to do more costly testing and analyses, and all of this will take more time. Ecology should review the regulation and modify it as appropriate for ease of understanding and to result in faster, less costly cleanups.

2034

2. Regulation or guidance language needs to be provided to define what actions are necessary to provide for substantial compliance with MTCA for conducting independent remedial actions and in support of cost recovery actions under the Regulation. It is uncertain what specifically needs to be addressed in order to substantially comply with the regulation as written. For example, 173-340-515(3)(c) refers to several sections of the regulation and states that sufficient information must be included to serve the same purpose. The current MTCA section on independent actions does not reference specific sections of the regulation as needing to be considered in conducting an independent action. Previously, we are aware that Ecology has approved independent actions where the only information submitted was data to support confirmation that cleanup levels were achieved. These data did not include such data referred to in

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other sections of MTCA, such as collecting investigation data typical of RI/FS studies, and remedy selection evaluations (including evaluation of permanence and other detailed evaluation criteria, etc.). Ecology's criteria for approving independent actions should be as it is today.

Similarly, clarification is needed for what is required for substantial compliance under private rights of action. Do specific evaluations (not title and format), such as identifying the most permanent alternative and evaluating all other alternatives against the most permanent alternative, need to be performed to accomplish a private right of action?

2035 3. The revised regulation does not provide any information regarding the ability for a PLP to use Method A and/or Method B cleanup levels together on a particular site. Currently in Ecology Guidance (CLARC II Tables, page 5), Ecology allows for use of Method A default values when Method B cleanup levels are being evaluated for a particular site. It would be helpful to state Ecology's current policy in the Regulation.

2036 4. The Policy Advisory Committee (PAC) Report did not anticipate evaluation of the dermal or other exposure pathways except in those cases where site-specific risk assessment provided for a "significantly" higher cleanup level. The proposed regulation considers dermal exposure when calculating Method B and C cleanup levels for petroleum contamination in <u>all</u> cases. In addition, the vapor pathway must be considered when soil cleanup levels for the protection of groundwater are calculated using anything other than default formula values. This was not the intent of the PAC.

2037 In addition, guidance needs to be provided on what is "significant." One potential approach for Ecology to consider is to require assessment of other exposure pathways when cleanup levels increase by over <u>an order of magnitude</u> due to modified exposure parameters. This approach appears appropriate in that risk assessment procedures are conservative by nature and EPA practice is to consider risk assessment calculations no more accurate than an order of magnitude. The State of Oregon has recently adopted this approach in evaluation of "hot spots" under its revised cleanup regulations.

2038 5. One of our primary concerns with the ecological evaluation is that, as written, many sites will require a Tier 3 evaluation (due to low screening levels in Tier 2), and that cleanup could be driven by ecological concerns. In turn, habitat could actually be destroyed through implementation of a cleanup action. Under these scenarios, it is questionable whether or not there is a net environmental benefit.

2039 6. The impact of the regulations to sites where pesticides/herbicides are legally applied is uncertain and not defined in the proposed regulations. The Dangerous Waste Regulations exempt legally applied materials. What is the responsibility for contamination under MTCA in locations where these chemicals were appropriately applied?

SPECIFIC COMMENTS

2040 1. **WAC 173-340-350(8)(b)** requires the PLP to seek Ecology's approval for alternatives that will be evaluated in the Feasibility Study. This is not consistent with current regulations and adds a burdensome extra step to the Feasibility Study process. If this is truly a requirement of Ecology, then a section should be added that requires all feasibility studies performed under an administrative order with Ecology to undergo a preliminary review before the document can be finalized. The purpose of the preliminary review would be to gain Ecology's approval of the alternatives to be evaluated before the Feasibility Study is finalized. In this way, PLPs will not waste time and money writing a Feasibility Study that may require complete re-writing following Ecology review.

2041 2. **WAC 173-340-350(8)(c)(i)(F)** states that the feasibility study shall include alternatives with the point of compliance throughout the site for each environmental medium containing hazardous substances and may include, as appropriate, alternatives for conditional points of compliance. This language implies that various alternatives, which include a point of compliance throughout the site, must be evaluated in the Feasibility Study. In certain cases, where contamination is widespread, it may be obviously apparent that achievement of cleanup levels throughout the site is not practical and that establishment of remediation levels would be appropriate. It would appear to be inefficient to evaluate a variety of alternatives with the point of compliance throughout the site during the feasibility study if sufficient information can be provided that shows that any alternative with a point of compliance throughout the site is impractical. Language to allow this demonstration should be provided in the Regulation language.

2042 3. **WAC 173-340-440(6)** states that the cleanup action shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a cleanup action alternative that utilizes a more permanent cleanup action for all or a portion of the site. We believe it is Ecology's intent to have PLPs look at alternatives that not only include permanent solutions but also containment. Therefore, the use of the term "a more permanent cleanup action" is inappropriate, since containment may not be construed as a permanent solution. Also, the term "technically possible" is inappropriate in that almost anything is technically possible if enough money is spent. The term "practical" should be substituted for "technically possible."

2043 4. **WAC 173-340-355(4)** does not include a disproportionate cost test as a method to establish remediation levels. If it can be demonstrated that the cost of cleanup to a cleanup level is so disproportionate to the benefit achieved, then this should be a method to establish a remediation level. This should be added to the methods of establishing a remediation level.

2044 5. **WAC 173-340-357(3)(f)** provides for a specific risk assessment process at commercial gas stations. Should commercial gas stations be defined in the Regulation? In addition, many other commercial sites fit the potential exposure profile that would be

encountered at a commercial gas station (e.g., an auto repair shop and other service businesses for retail purposes). It would appear to be appropriate for Ecology to expand the definition under this subsection to include other activities where this exposure scenario is anticipated.

2045 6. **WAC 173-340-390** indicates that Ecology may develop model remedies from time to time. We suggest that Ecology establish the criteria by which model remedies will be evaluated in this draft regulation change. We also suggest that stakeholders be allowed to make suggestions for model remedies and be involved in Ecology's process for selection of model remedies. Finally, we suggest that Ecology include any known Model Remedies that could be considered for use.

2046 7. **WAC 173-340-410(1)(c)** identifies the need for confirmational monitoring following completion of a remedial action. This section should include the specific requirements for confirmational monitoring or cite an appropriate guidance document that identifies Ecology's expectations in this area.

2047 8. **WAC 173-340-440(5)** states that institutional controls shall be evaluated based on quantitative, scientific analysis where appropriate. It is difficult to quantify the benefits of institutional controls, and typically they are used to address lesser risks. The costs of attempting to quantify the benefits of institutional controls outweigh the benefits of such an analysis.

2048 9. **WAC 173-340-440(11)** requires financial assurances from PLPs sufficient to cover all costs associated with operation, maintenance, and cleanup action. There will be some cases where financial assurances may not be necessary, and Ecology should provide flexibility in evaluating where financial assurances are appropriate (such as relatively high operation and maintenance costs), other than a demonstration of financial hardship.

2049 10. **WAC 173-340-700(5)** - As discussed in *Model Toxics Control Act Cleanup Level and Risk Calculations* (CLARC II Tables, page 5), this section should identify when and how mixing of MTCA Method A, B, and C cleanup levels will be allowed.

2050 11. **WAC 173-340-700(6)(d)** indicates that cleanup levels shall not be established at concentrations lower than the PQL. Is Ecology still using Implementation Memo No. 3 to identify method PQLs? We suggest that Ecology establish a database that summarizes the acceptable PQLs for the different analytes and different media (i.e., soil, water, and air).

2051 12. **WAC 173-340-706(1)(b)** states that Method C soil cleanup levels may only be established for industrial properties. It is unclear why Method C has been established for surface water, groundwater, and air but not for soil at unrestricted land use sites. There will be many cases where Method A or B cleanup levels for soil are below technically possible concentrations and, thus, an entire site may require remediation (especially in areas where areawide contamination exists within urban areas). If

Ecology anticipates that PLPs can establish remediation levels for unrestricted land use soil cleanup levels, the need to conduct a site-specific risk assessment to establish the protectiveness of remediation levels is of concern, especially if Ecology requires assessment of dermal and ingestion exposure pathways under their risk assessment procedures.

2052 13. **WAC 173-340-709(4)** should also identify methods for establishing natural background concentrations in groundwater. This approach should include well locations and the approximate number of wells necessary to identify background conditions. Use of soil sampling procedures is not practical for groundwater.

2053 14. **WAC 173-340-720(1)(d)(v)** indicates that if groundwater is flowing into a "nearby" non-potable surface water body, surface water standards should be used to evaluate the need for cleanup. Under this section, how is "nearby" defined?" In addition, this section allows the use of surface water standards in WAC 173-340-730 for non-potable groundwater flowing into a surface water body. Ecology uses Harbor Island in Seattle as an example where non-potable surface water discharges to Puget Sound. The surface water standards include several criteria, including Method B surface water cleanup levels, surface water quality standards (WAC 173-201A), and the National Toxics Rule. In many cases, these surface water criteria are lower than EPA maximum contaminant levels (MCLs) or Method B groundwater cleanup levels. Just a few examples would be for 1,1-dichloroethlylene, carcinogenic PAH compounds, arsenic, copper, lead, and zinc. It seems unreasonable to require non-potable groundwater from beneath an industrial zoned site that flows to non-potable surface water to have more stringent standards than we expect for the potable water we consume on a daily basis, especially if the groundwater input to surface water does not cause a violation of water quality standards. We agree with the intent of the regulation (to develop cleanup standards that are protective of the intended use of the water) and suggest that the language in the revised Regulation be modified to meet this intent.

2054 15. **WAC 173-340-720(2)** this section indicates that groundwater shall be considered a drinking water source unless certain criteria can be demonstrated. The implication is that if these criteria were met, the water would be considered a non-potable water source. However, this section does not specifically say this is the case. We suggest that additional language be added to specify the classification of groundwater meeting these criteria.

2055 16. **WAC 173-340-720(2)(c)(iii)** section indicates "The likelihood of inter-connection between the contaminated ground water and the ground water that is a current or potential future source of drinking water due to well construction practices in the area of the state where the site is located." It is unclear what role regional well construction practices have on identifying the likelihood of inter-connection. We suggest that Ecology identify more defined procedures based on hydrogeologic principles for evaluating the potential for inter-aquifer communication. These procedures are necessary to develop consistency in application of this section.

2056 17. **WAC 173-340-720(8)(c)** requires the PLP to demonstrate that it is not practicable to meet cleanup levels throughout the site within in a reasonable time frame when establishing a conditional point of compliance. This change is more restrictive than the current MTCA and could preclude the use of a conditional point of compliance at some sites. We suggest that this language be removed from this MTCA revision and that the PLP be allowed the option of meeting cleanup levels throughout the site or at a conditional point of compliance if it is impractical to meet cleanup levels throughout the site. The restrictions placed on a conditional point of compliance would not change and are adequate to deter most PLPs from using a conditional point of compliance.

2057 18. **WAC 173-340-720(8)(d)(ii)** states that if contamination has not reached surface water, then the conditional point of compliance cannot extend beyond the current extent of groundwater contamination. This is not practical. If it can be shown that contamination will move somewhat but will never reach surface water, then forcing expensive hydraulic control will accomplish nothing. This provision should be removed and PLPs should be forced to demonstrate that remedial actions will be protective of public health and the environment.

2058 19. **WAC 173-340-740(6)(f)** indicates that cleanup actions selected that involve containment may require a site-specific human health risk assessment that demonstrates that the cleanup action is protective. As with Specific Comment No. 12 above, this section does not discuss the procedures for performing a risk assessment and whether the risk assessment will consider the presence of a containment system in evaluating residual risk. This issue is especially important in considering cleanup actions such as containment based on remediation levels developed through a disproportionate cost test analysis, rather than a site-specific risk assessment. As previously indicated, if Ecology intends to allow elimination of the dermal and ingestion exposure scenarios if a cap is properly designed and maintained, then this issue is of less concern. However, if a risk assessment that considers these exposure routes is intended, this would imply that the only method for establishing a remediation level would be through a site-specific risk assessment. The most telling example of how this could be of concern is where a remediation level developed under the disproportionate cost analysis was found not to be protective (using standard default risk assessment procedures that consider ingestion and dermal contact). This would essentially disallow use of the disproportionate cost analysis to develop remediation levels.

2059 20. **WAC 173-340-747(5)(f)(ii)** discusses limitations on infiltration rates for sites west and east of the Cascades. The infiltration estimates of 70% of the average annual precipitation west of the Cascades and 30% of the average annual precipitation east of the Cascades is excessive and not reflective of site-specific conditions which may limit infiltration. Definition of this parameter should be based on best professional judgment based on site-specific conditions, which could predict the expected infiltration rate.

2060 21. **WAC 173-340-747(10)/Table 747-2** - Ecology provides residual saturation levels that may be used as empirical evidence to demonstrate that groundwater will not be

impacted by hydrocarbons. These values are overly conservative for most soil conditions. Instead, the screening levels should be based on soil types (silts/clays, sand, gravel) in accordance with documentation provided in the American Petroleum Institute (API) publication No. 1628.

2061 22. **WAC 173-340-7490(4)** indicates that the point of compliance is established at 15 feet below grade. This is justified by Ecology as "a reasonable estimate of the depth of soil that could be excavated and disturbed at the soil surface as a result of development activities." We disagree that 15 feet below grade represents a reasonable estimate of the depth of soil disturbance resulting in exposure to ecological receptors. Under the majority of development activities, soil from 15 feet below grade will not be brought to the surface and left, thereby exposing ecological receptors. If an excavation is created, the spoils are typically used for backfill. This is an economically driven fact of construction. We suggest development of a more scientifically based point of compliance based on real construction practices and the habits of potentially exposed ecological receptors (i.e., the biologically active zone).

2062 23. **WAC 173-340-7491(1)** - We recommend that all industrial zoned properties are conditionally exempt from ecological exposure analyses/cleanup requirements identified in sections WAC 173-340-7490 through 7493. These are areas that the government has designated for industrial use, not for propagation of ecological organisms. Other sections within MTCA and other state and federal regulations provide adequate protection for ecologically sensitive areas (i.e., water bodies, wetlands, etc.). Imposing these regulations on industrial properties puts an excessive burden on the industry without providing significant ecological benefit.

To demonstrate the potential impacts of this section, Ecology could consider areas such as a grass strip of land (1.5 acres of contiguous property) between two runways at an airport as qualifying for a terrestrial evaluation. While this area may have plants growing on it or earthworms in the soil, it should not warrant ecologically driven cleanup under MTCA regulations.

2063 24. **WAC 340-750** - Under this section, indoor air quality cleanup levels for contaminated soils at industrial sites should be based upon OSHA/WISHA standards and not on risk assessment exposure models provided the chemical is used in the industrial process and appropriate worker right-to-know actions are implemented.

2064 25. **WAC 173-340-750(1)(a)(iv)** states that air standards apply and must be addressed at "other sites as determined by the Department." How does the Department intend to select which sites must be evaluated for potential air quality impacts?

2065 26. **WAC 173-340-830** references appropriate test methods, including dates of current documents. It seems the approach used in the current rule, which references updated revisions or amendments that may be issued in the future as applying, should be retained in the revised rule.

2066 27. **Table 749-2** In many instances, these values are lower than MTCA Method A or B soil cleanup levels to protect human health. This means that ecological exposure could drive cleanup at sites not otherwise required to address minor soil impacts. For example, the proposed Method A soil cleanup level for diesel range hydrocarbons at a residential site is 2,000 mg/kg. However, the soil cleanup level for diesel to protect ecological receptors (even at an industrial zoned site) is 200 mg/kg. We suggest that Table 749-2 values be re-evaluated so that ecological effects do not drive a soil cleanup action based solely on theoretical impacts to ecological receptors.

2067 28. **Table 749-2** - The priority contaminants of ecological concern (Table 749-2 under the simplified terrestrial ecological evaluation procedure) present screening levels for various metals and organics. Under the 3-tiered approach being proposed by Ecology for evaluating terrestrial ecological impacts, it appears that many sites will require evaluation using Tier 2, and thus will require screening in accordance with the Table 749-2 values. For several contaminants which are ubiquitous in the environment and/or elevated due to their typical presence in urban areas, many sites will not be able to achieve the screening levels and will be required to conduct a Tier 3 evaluation. (Due to difficulty in meeting initial screening criteria under the "exposure" and "pathway" analyses under WAC 173-340-7492, few sites will be excluded through these mechanisms.) Chemicals of particular concern that we have seen in much greater concentrations (including residential areas in urban settings) include copper, magnesium, manganese, lead, and zinc. At many sites, particularly in the vicinity of highways and heavily traveled roads, zinc and lead concentrations are well in excess of even the industrial or commercial site screening levels indicated in Table 749-2. It seems ironic that many of the stormwater control alternatives that are being implemented to address roadway runoff include construction of detention basins or swales, which in turn attract wildlife and are seeded with plants to facilitate filtering of contaminants in runoff. Other screening levels of concern in Table 749-2 include TPH concentrations, which essentially are the same as current Method A cleanup levels under MTCA. It would seem that the screening levels discount much of the work of the POG, which has worked hard with Ecology to develop reasonable cleanup levels for TPH contamination to protect human health. As it appears that many sites will require evaluation using Tier 2, many sites may require continued evaluation through Tier 3 due to petroleum contamination. Is significant information available to assess ecological effects associated with TPH concentrations greater than the screening levels in Table 749-2.

2068 29. **Table 749-2 and WAC 173-340-7492(2)(c)(i)** – The proposed rule states that if no value is listed, then the requirements of (c)(ii) must be met, which includes requirements to perform bioassays. Where there is a value for "unrestricted land use," that same value should be able to be used for "industrial or commercial site." Thus, the unrestricted land use value should be able to be used as a screening level with higher values being acceptable if demonstrated through bioassay testing.

Several chemicals with no value listed for any land use scenario include ubiquitous chemicals in urban environments such as bis(2-ethylhexyl)phthalate, acenaphthene, silver, manganese, magnesium, and antimony. Under the proposed rule, PLPs would have no choice except to conduct bioassays, which will be burdensome and time-consuming.

2069 30. **Table 749-3** - Many of the same issues associated with the comments regarding Table 749-2 above apply to the information contained in Table 749-3 regarding ecological indicator concentrations for protection of terrestrial plants and animals. While we understand that these levels do not represent actual cleanup levels, the values presented are problematic and will require many sites to conduct extensive ecological evaluation where onsite concentrations exceed these values. As previously indicated, we question what data are available that may lead to selection of a defensible cleanup level under the Tier 3 evaluation process.

2070 31. **Table 830-1** provides information regarding required testing for petroleum releases. It would be helpful for Ecology to reference the specific analytical methods required to analyze for various fuel additives (i.e., EDB, EDC, various fuel oxygenates, and octane boosters). The proposed testing scheme required for all petroleum releases is significantly different than current practice on TPH release sites, and we question the value of requiring all sites to go through the designated testing regime. The Regulation should provide flexibility in defining which tests are required based on historical information that is available on each particular site.

We appreciate the opportunity to provide these comments to Ecology and are willing to discuss our comments with you at your convenience. Should you have any questions regarding the information contained herein, please feel free to call us at (253) 874-0555.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

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October 27, 2000

BOEING

Trish Akana, Rules Coordinator
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Dear Trish:

Subject: MTCA Rules (WAC 173-340)
Comments on 8/00 WDOE draft of proposed revisions

Please find enclosed comments submitted on behalf of The Boeing Company and on my own behalf as a member of the MTCA Policy Advisory Committee.

Sincerely,

Taryn McCain

Taryn McCain
Counsel

Enclosure

753790

#77

To: Trish Akana, Curtis Dahlgren
From: Taryn McCain- Boeing (contact information at bottom)
Date: 10/25/00

Subject: MTCA rules (WAC 173-340)
Comments on 8/00 WDOE draft of proposed revisions

General Comments: While we have commented extensively on earlier drafts of the proposed revisions to the MTCA rules, a large portion of this set of comments does not simply repeat earlier concerns. Due to the extensiveness of the changes, and the complexity of the proposal, the following includes a number of suggested improvements to improve the cohesiveness of the product.

Nevertheless, many concerns raised earlier persist. The primary concerns addressed herein focus upon three main issues- soil vapor pathways, deriving soil concentrations for groundwater protection, and remediation levels. The first two, which were initiated by the department, appear themselves to be responsible for a significant increase in the complexity of the rule. I have no doubt that compliance, especially with proposed WAC 173-340-747, will be much more expensive than previously. Virtually no one will be able to even scope the cost of a potential cleanup without the help of a consultant. It is also questionable whether the perceived scientific advances will be worth the incremental cost. The third issue is raised to encourage further thought on whether the rules as drafted provide for practical implementation of remedies. That, after all, should be at least one of the major goals of the MTCA program.

Section-specific comments:

2071 WAC 173-340-200 Definitions.

"Containment"

Comment: This should explicitly include "engineered controls," which is newly defined.

Suggested Language: Change "or structure" to "structure or engineered control".

2072 "Engineered Controls"

Comment: The definition is stated in the conjunctive- "treatment and containment." Treatment is not a requirement, therefore this should be stated in the alternative.

Suggested Language: Change "treatment and containment" to "treatment and/or containment".

2073 "Natural Attenuation"

Comment: The definition states in the last sentence- "Natural attenuation is not an active remedial measure." The reason or need for this

statement is unclear, and it leaves an impression that a remedy including natural attenuation is a "no action" alternative. As pointed out by the U.S. EPA, monitored natural attenuation is not a "no action" alternative. See EPA's OSWER directive at http://www.epa.gov/swerust1/directiv/d9200417.pdf . Rather, it may be an appropriate approach under certain conditions, as recognized in proposed WAC 173-340-370(7). See also, comments below regarding WAC 173-340-360(2)(e)(iii).

Suggested Language: Delete the last sentence- "Natural attenuation is not an active remedial measure."

2074 "Point of Compliance"

Comment: Proposed WAC 173-340-200- definition of "point of compliance" indicates that the term includes "conditional point of compliance" but limits conditional POCs to groundwater under WAC 173-340-720(8), and to soil when based on ecological considerations under WAC 173-340-7490(4)(a). Nothing is mentioned about surface water (which appears to be semantics since mixing zones may be approved under 730(6)(a)). No reference is made to WAC 173-340-740(6)(f), which provides for an exception to standard points of compliance. Proposed WAC 173-340-750 eliminates the conditional POCs for air at industrial sites, without any evident rationale. Nothing is mentioned about sediments, even though they can be as problemmatic as soil (requiring containment).The last sentence of the definition should be modified, as it is overly narrow. The language should not preclude other conditional points of compliance.

Suggested Language: Change the last sentence to read " A conditional point of compliance for particular media is only available as provided in WAC 173-340-720 through WAC 173-340-760."

2075 "Soil"

Comment: Project managers occasionally read the end of the definition, which states that "soil" includes "materials of anthropogenic sources such as slag, sludge, etc." as requiring that landfill wastes be characterized to a 15 foot depth in order to satisfy the 15 foot point of compliance for soils under WAC 173-340-740(6)(d). Similar issues arise with the 15 foot point of compliance for soils under the new terrestrial ecological standards at WAC 173-340-7490(4)(b). This result is ridiculous. The depth of the soil point of compliance is based on a desire to prevent exposures that might occur if the land is developed without restriction. Yet, every landfill will be subject to conditions to preserve the integrity of the cap and prevent exposures. This strained interpretation could be avoided by rewording the definition. Further, there should be a clear distinction (as there is in the solid waste and hazardous waste rules) between waste materials and contaminated media like soil.

Suggested Language: Revise the existing sentence to add qualifying language at the end. The definition would read "including materials of anthropogenic sources such as slag, sludge, etc. which have been used as soil." Also consider adding another sentence " Materials of anthropogenic sources

that have been disposed, such as in a landfill, are not considered themselves to be soil hereunder."

2076 WAC 173-340-300(2)(b) – Site discovery and reporting/ release report

Comment: The proposed additional language is very misleading since it describes in very broad terms various "situations that generally should be reported." If one compared the proposed rule language to the descriptions of similar situations in WDOE's MTCA Policy 101, it is obvious that the rule language is much broader than the language is in the policy. For instance, where the proposed rule recommends reporting "contamination in a water supply well", Policy 101 says "contamination in a water supply well in excess of a maximum contaminant level." The difference is crucial, since the proposed rule language offers no perspective whatsoever on what should be considered a threat to human health or the environment. If one were to read the proposed rule language literally, then any detectable concentration of any hazardous substance would be reportable, which it clearly is not.

Suggested Language: Delete the list of situations. Instead, insert: "The department shall identify in guidance typical situations that should be reported hereunder."

2077 WAC 173-340-350(8)(c)(i)(A) & (B)-Procedures for conducting a FS

Comment: The requirements of (A) and the second sentence of (B) appear redundant. Aren't they saying the same thing? The second sentence of (B) almost seems to require more than one alternative for each receptor, since it is located in a subsection addressing the number and type of alternatives. If that is the intent, why is it necessary? It would seem to triple the number of required alternatives. If that is not the intent, then the second sentence of (B) should be moved to (A) or eliminated.

Suggested Language: The second sentence of (B) should be moved to (A) or eliminated.

2078 WAC 173-340-355(2) Remediation Levels; relationship to cleanup levels and cleanup standards.

Comment: The proposed language states in part that: "A cleanup action that uses remediation levels must meet each of the minimum requirements specified in WAC 173-340-360, including the requirement that all cleanup actions must comply with cleanup standards. Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance." This underlined language is very problemmatic, as explained below.

Stating that cleanup levels must be met at the point of compliance has two practical components. It describes what must be met (cleanup levels) and where (points of compliance). Note that the standard point of compliance for the various media is often stated to be "throughout the site" [See, WAC 173-340-720(8)(b), 740(6)(c) & (d), 750(6)]. Thus, without further qualification, the underlined statement would require meeting cleanup levels throughout the site.

However, a requirement of meeting cleanup levels throughout the site is simply not technically and/or economically practicable for many remedies, e.g., due to difficulties with source control or source removal, the confluence of numerous widespread sources, the complexity of the media, and/or the existence of widespread low-level contamination. The section's own language recognizes this situation where it states, at WAC 173-340-355(1), that "remediation levels are used ... at sites where achieving cleanup levels at the point of compliance is not practicable."(emphasis added).

As stated in proposed WAC 173-340-355(1):

> **"A cleanup action selected for a site will often involve a combination of cleanup action components, such as treatment of some soil contamination and containment of the remainder. Remediation levels are used to identify the concentrations (or other methods of identification) of hazardous substances at which different cleanup action components will be used. (See the definition of remediation level in WAC 173-340-200 [which says that "other methods of identification include physical appearance or location"].) Remediation levels are used at sites where a combination of cleanup action components are used to achieve cleanup levels at the point of compliance... and at sites where achieving cleanup levels at the point of compliance is not practicable...." [emphasis added]**

Clearly, remediation levels are intended in part to provide for identification of locations where a cleanup action will use methods other than meeting cleanup levels throughout the site to assure that the cleanup is protective.

Under the current MTCA rules, there are two other mechanisms that function similarly: (1) conditional POCs identified explicitly in the rules, and (2) "implicit" conditional POCs for containment remedies, provided for by rules allowing a determination that containment can meet cleanup standards (even though it literally cannot meet cleanup levels at standard points of compliance). Both of these mechanisms address where cleanup levels must be met, and where other methods of assuring protectiveness are conditionally permitted. In essence, they define areas within which cleanup levels may be exceeded under specific conditions. From a practical standpoint, remediation levels are similar, in that they may serve the role of identifying specific conditions and locations for permitting an exceedance.

Currently, two sections from the current rule language also provide for identifying specific conditions and locations for permitting an exceedance. These sections are as follows:

> **WAC 173-340-360(8) allows containment (without limitation to any particular media) subject to limitations including long-term monitoring and institutional controls.**
>
> **WAC 173-340-700(2)(c) indicates that cleanup actions involving containment of hazardous substances "may be determined to comply with cleanup standards" if they comply with WAC 173-340-360(8) and the compliance monitoring program is designed to ensure the long term integrity of the containment. Again, there is no mention of limitation to any particular media.**

Unfortunately, the proposed rules make some very confusing changes. With respect to implicit conditional POCs for containment, the huge change is that only soils remain eligible after deletion and revision of language which was previously media-neutral:

> **In the new rules, WAC 173-340-360(8) is deleted and replaced by different provisions in proposed WAC 173-340-355. WAC 173-340-355(2) and (3)(b) then note WAC 173-340-740(6)(f) allows for a determination that containment of soils comply with cleanup standards. Proposed revisions to WAC 173-340-700(2)(c) narrow its scope, indicating that cleanup actions involving containment of soils "may be determined to comply with cleanup standards."**

At the same time, the proposed revisions include language that recognizes the difficulties of meeting cleanup levels at standard POCs for certain sites. For instance:

> **Proposed revisions to WAC 173-340-360(2)(c)(ii) discuss containment of DNAPL and contaminated groundwater for nonpermanent groundwater cleanup actions.**
>
> **Proposed WAC 173-340-370 includes among its "expectations" that there may be a "need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable." [Note that this language is media-neutral, and could apply as easily to sediments as soils.]**

Outlined below are various scenarios that proposed WAC 173-340-355 make very problemmatic. As is evident therefrom, the language requiring that "cleanup levels are met at the applicable points of compliance" essentially renders meaningless the portion of the provision that states "remediation levels are used ... at sites where achieving cleanup levels at the point of

compliance is not practicable." That is, the first phrase makes it imperative that a conditional POC or other provision such as WAC 173-340-740(6)(f) [for soil containment] exist before remediation levels may ever serve the role of identifying specific conditions and locations for permitting an exceedance of cleanup levels. Here are examples of this result:

1. Containment of contaminated sediments. The proposed rules do not provide for any conditional POC. Therefore, the impact of proposed WAC 173-340-355 appears to be that cleanup levels need to be met throughout the site, at least to some depth (this is unclear due to the deferral to WAC 173-204, which does not use the same terminology). This is a problemmatic result because sediments have the same problems as soils, but are more complex due to ongoing deposition and water-borne movement. Hot spot cleanup and/or capping, and allowance for natural attenuation over time are very typical cleanup scenarios. Some flexibility is available due to dilution, attenuation and ongoing deposition providing new sediments to the biologically active zone over time (providing a natural cap). Full cleanups of are not necessarily practicable, even over time. While sediments are mostly left to cleanup under WAC 173-204, such cleanups are supposed to also comply with MTCA. Therefore, without conditional POCs, if WAC 173-340-355 requires that cleanup levels need to be met throughout the site (at least to some depth), then the proposal may leave no practicable cleanup alternative.
2. Industrial air. The proposed rules delete the previously available conditional POC for industrial sites. Therefore, the impact of proposed WAC 173-340-355 appears to be that cleanup levels need to be met throughout the site. This is a problemmatic result. There may be situations in which, for instance, soil contamination is contained (e.g., sheetpile around DNAPL) and related emissions to the air do not meet ambient air standards in the immediate area but do meet those standards elsewhere on the property. Therefore, without conditional POCs, if WAC 173-340-355 requires that cleanup levels need to be met throughout the site, then the proposal may leave no practicable cleanup alternative. [What is the reason for proposing to delete language allowing the department to approve a conditional POC at the property boundary for air at industrial sites under WAC 173-340-750? Obviously, access can be controlled at many industrial sites, and worker exposures are highly regulated. There does not appear to be any justification.]
3. Ecological risk to soils. The proposed rules at WAC 173-340-7490(4)(a) provide for a conditional point of compliance to be set at the biologically active zone (approximately a 6 foot depth). Therefore, the impact of proposed WAC 173-340-355 appears to be that cleanup levels need to be met throughout the site at least to a depth of 6 feet. This is a problemmatic result. It completely ignores the possibility that soil containment may be the only suitable remedy, such as at a landfill. This would vitiate the provisions in WAC 173-340-740 (6)(f) [for soil containment protective of human exposures], and have the effect of requiring a 6 foot cap of clean soil at a landfill. This is a ridiculous result.

While the department may choose to resolve the problems identified in these examples by "fixing" problems with the conditional POCs involved, that would simply be avoiding the issue raised. Again, the language requiring that "cleanup levels are met at the applicable points of compliance" essentially renders meaningless the portion of the provision that states "remediation levels are used ... at sites where achieving cleanup levels at the point of compliance is not practicable."

Suggested language: Revise the language in proposed WAC 173-340-355(1) which states: "A cleanup action that uses remediation levels must meet each of the minimum requirements specified in WAC 173-340-360, including the requirement that all cleanup actions must comply with cleanup standards. Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance."

Delete: "Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance."

Replace it with: "Compliance with cleanup standards is determined as described in WAC 173-340-700."

2079

WAC 173-340-360 Selection of cleanup actions

Subsection 360(2)(e) Minimum Requirements; Institutional Controls

Comment: This provision is subject to misinterpretation, which would make it overly stringent. The problem arises from language stating: "cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site." It is easy to read into the language an assumption that a remedy relying on institutional controls and monitoring is itself incapable of providing a permanent cleanup action. This is not necessarily the case. For instance, there are sometimes marginal exceedances of cleanup levels which are naturally attenuating at sites with no ongoing source. Within a reasonable remediation timeframe, the cleanup levels will be achieved and a permanent remedy will be achieved. This remedy is no less permanent than one that requires substantially greater expenditures. This type of cleanup approach can also satisfy department expectations identified in proposed WAC 173-340-370(7). [Note that this issue is entirely apart from the other issue raised by industry, i.e., that using "technically possible" is the wrong standard, since the mandate is to use permanent remedies to the maximum extent "practicable." This second point is reiterated, though not addressed in the language suggested below.]

Suggested language: Revise the language that states: "cleanup actions shall not rely primarily on institutional controls and monitoring where it is

technically possible to implement a more permanent cleanup action for all or a portion of the site." New language could read: "nonpermanent cleanup actions which rely primarily on institutional controls and monitoring shall not be selected where it is technically possible to implement a more permanent cleanup action."

2080 Subsection 360(4)(d)- Area background

Comment: This section should be revised to reflect the effect of the new provision for a conditional point of compliance for area-wide groundwater contamination, provided under proposed WAC 173-340-720(8)(d)(iii), which allows for permanent remedies rather than interim remedies. The suggested revision is intended to identify that it is the delay that makes the remedy interim, rather than the area-wide nature of the problem.

Suggested language: Revise the introductory clause to the last sentence to read: "A remedial action for which a portion of the cleanup is delayed" instead of "In these cases the remedial action".

2081 WAC 173-340-420(2) Periodic Review

Comment: The portion of the proposed language that states "or issues a no further action opinion as resources permit;" is confusing. It is unclear whether "as resources permit" refers to the conduct of a periodic review or the issuance of the NFA. Presumably the former?

Suggested language: Delete "or issues a no further action opinion as resources permit;" in the introductory sentence. Add a sentence at the end of the subsection stating: "As resources permit, the department shall also conduct periodic review of any no further action opinion previously issued by the department which involved one of the conditions identified in (a) through (c) above."

2082 WAC 173-340-430(7) Interim Actions; Submittal requirements.

Comment: New language is added stating: "Reports for independent remedial actions shall be submitted as required by WAC 173-340-515." This is confusing, because it is general and follows language stating that "a report shall be prepared before conducting an interim action." This latter requirement has never been applicable to interim actions, which are reported under the rules after they are complete. See current WAC 173-340-300(4)(a) and proposed WAC 173-340-515(4)(a).

Suggested language: Either delete the language, or revise it to say something like : "Notwithstanding the above, reports for independent remedial actions

shall be submitted within ninety days of the completion of the action as required by WAC 173-340-515(4)(a)."

2083 WAC 173-340-440(6) Institutional controls; primary reliance.

Comment and Suggested Language: See comments to proposed WAC 173-340-360(2)(e) above.

2084 WAC 173-340-515(3)(c) Independent remedial actions; Standards; documents

Comment: The proposed new language under WAC 173-340-515(3)(c) appears to require a much higher level of detail than currently required, leaving the impression that the procedural steps reported in the various documents identified in proposed WAC 173-340-515(3)(c) are also requirements imposed on an independent cleanup. This does not appear to be Ecology's intent, since the primary statement of standards in WAC 173-340-515(3)(a) is that independent cleanups meet the "substantive" requirements of the chapter.

In particular, the cross references in WAC 173-340-515(3)(a) refer to workplans, studies, and submittal requirements, raising questions about what it really means when the provision goes on to say that required documentation need not have the same "title or format ... as long as sufficient information is included to serve the same purpose." Just what is intended by this statement?

This provision is very confusing given the streamlined and result-oriented approach of the current rules. The provision at 515(3)(c) stands in stark contrast with the current rule at WAC 173-340-300(4)(b) and proposed WAC 173-340-515(4)(b), both of which indicate what must be reported regarding an independent cleanup. Proposed WAC 173-340-515(4)(b)states: " The report shall include the information in WAC 173-340-300(2) if not already reported, and the results of all site investigations, cleanup actions and compliance monitoring planned or underway. The department may require additional reports on the work conducted." This simple reporting requirement, and the details elicited through the voluntary cleanup program, are fairly streamlined and result-oriented. The proposed provision at 515(3)(c) departs significantly from this approach, including and excluding other portions of the rules in almost an ad hoc fashion, and raising questions about what is important.

Consider an example of a cleanup in response to a spill. A perfectly acceptable approach might be to take samples to identify the extent of the spill, dig it up and haul it away. In that context, what does it mean to say that the documents submitted on the cleanup need to include sufficient information to serve the same purpose as Section 350? Does it mean that information needed to be developed about physical soil properties, or that any other cleanup alternatives needed to be evaluated? What does it mean to say that the documents submitted on the cleanup need to include sufficient information to

serve the same purpose as Section 380, which provides for the department to issue a cleanup action plan, providing for public participation? What does it mean to say that the documents submitted on the cleanup need to include sufficient information to serve the same purpose as Section 810 (requiring a worker safety and health plan), or Section 820 (requiring a sampling and analysis plan) if the work was done in a safe manner with proper quality assurance by trained professionals? What does it mean to say that required documentation need not have the same "title or format ... as long as sufficient information is included to serve the same purpose" and yet require "substantive" compliance with section 840 (which prescribes the format for submittals!)? None of this really makes any sense, and appears very unwise for inclusion in rule language. The matter of how Ecology will review submittals for substantive compliance should be addressed in guidance rather than this very confusing attempt at inclusion in the rules.

Suggested language: Delete proposed WAC 173-340-515(3)(c) and address in guidance how the department will evaluate submittals under the standards set forth in 515(3)(a).

2085 WAC 173-340-600 Public participation; routine cleanup and interim action

Comment: Proposed language at WAC 173-340-600(16)(b)(ii) states that public notice shall include "proposed permit exemptions." Note that similar language is proposed at WAC 173-340-710(9)(d)(ii) and (iii). This language inaccurately describes the nature of permit exemptions provided by statute under RCW 70.105D.090. That is, the permit exemptions arise automatically by operation of law, and thus do not need "proposal" or "approval" by Ecology. Indeed, the statute reserves to Ecology the ability to nullify the exemption only if it determines that the exemption would result in loss of approval from a federal agency necessary for the state to administer a federal law.

The statute, however, does reserve to Ecology the ability to determine the substantive requirements that must be complied with, subject to public comment. Thus, the language in this section should refer to the substantive requirements that are proposed for applicability to cleanup actions exempt from permitting under RCW 70.105D.090.

Suggested language: Delete "proposed permit exemptions and institutional controls" and replace it with "any institutional controls and any substantive requirements that are proposed for applicability to cleanup actions exempt from permitting under RCW 70.105D.090."

2086 WAC 173-340-700(5)(a) & (8)(a) Overview of cleanup standards; terrestrial ecological receptors

Comment: In proposed subsections 700(5)(a) and 700(8)(a), it states "If the Method A cleanup level is not protective of terrestrial ecological receptors, then a Method B or Method C soil cleanup level, as appropriate for the site, must be established." This language is very likely to have unintended consequences, since the concentrations and points of compliance for Method A are largely based on human health protection.

To illustrate the problem, consider a site where soil is contaminated with lead at levels that comply with the Method A soil value (250ppm). The simplified terrestrial ecological evaluation procedures at proposed section WAC 173-340-7492(1)(d) indicate that soil concentrations in Table 749-2 may be used as cleanup levels. Table 749-2 indicates that lead values greater than 220ppm may not be protective of terrestrial ecological receptors. Proposed section WAC 173-340-7492(2)(b) would then allow use of a physical barrier and institutional controls to satisfy ecological protection requirements. This would suggest that it should be appropriate to deal with lead under Method A for human exposures, and use controls allowed under WAC 173-340-7492(2)(b) to address potential terrestrial ecological exposures. Instead, the language proposed for subsection 700(5)(a) would require that cleanup levels be based on Method B or C rather than on Method A. This is a ridiculous result, since Method A was protective for other purposes and the ecological evaluation procedures identified a method for managing eco risks. Similar results and analyses apply to other chemicals for which lower eco-risk numbers in Table 749-2 are lower than Method A numbers, such as PCBs at industrial properties, chromium III, diesel, etc.

As another example, the proposed conditional point of compliance for protection of terrestrial ecological receptors is 6 feet, which the department considers to be the "biologically active zone" under WAC 173-340-7490(4)(a). Under that provision, nothing more may be necessary than an institutional control preventing deeper excavation. Again, what would then be the reason to require that cleanup levels be based on Method B or C, rather than on Method A, if the only exceedance of the ecological standard is deeper than 6 feet?

The basic problem appears to arise because Method A and proposed WAC 173-340-7490 to 7493 provide very different methods for deriving cleanup levels and points of compliance. Further, Ecology has not accounted for the fact that the terrestrial ecological evaluation procedures include a number of "offramps" intended to avoid complex analysis when it isn't necessary. This poor "fit" shouldn't force complexity into the process. Rather, Ecology should simply state that Method A numbers must be used in tandem with terrestrial ecological analyses.

Suggested language: At both WAC 173-340-700(5)(a) & (8)(a):

Delete: "If the Method A cleanup level is not protective of terrestrial ecological receptors, then a Method B or Method C soil cleanup level, as appropriate for the site, must be established."

Replace it with: "If the Method A cleanup level is not protective of terrestrial ecological receptors, then cleanup levels and points of compliance for such receptors shall be identified as required by WAC 173-340-7490 to 7493."

2087 **WAC 173-340-704(1)(c)(ii)**

Comment: See comments on WAC 173-340-700(5)(a) & (8)(a) above

Suggested language: Revise the language that reads "or it can be demonstrated" to delete the "or", and add at the end of the sentence "or that the cleanup levels and points of compliance for terrestrial ecological receptors are separately identified as required by WAC 173-340-7490 to 7493."

2088 **WAC 173-340-710(9)(d)(ii) & (iii)**

Comment: See comments on WAC 173-340-600.

Suggested language:
In (ii), delete "permits proposed for exemption and the". No replacement language needed.
In (iii), delete "permits proposed for exemption and seek comment on these exemptions." Replace with "substantive requirements that are proposed for applicability to cleanup actions exempt from permitting under RCW 70.105D.090, and seek comment on the proposal."

2089 **WAC 173-340-740(3)(b)(iii)(C) & 740(3)(c)(iv)(A) Soil cleanup standards; soil vapors**

Comment: In both these sections, Ecology has proposed to add: "The soil to vapor pathway shall be evaluated whenever one of the methods specified in WAC 173-340-747(5) through (9) is used to derive a soil concentration that is protective of groundwater and that concentration is significantly higher than a concentration derived under the method specified in WAC 173-340-747(4)."

The language contained here states that analysis of the soil to vapor pathway is triggered by using a method other than the fixed three-phase partitioning model under proposed WAC 173-340-747 if significantly higher concentrations are derived thereby. This is troubling from two aspects. The Policy Advisory Committee specifically addressed evaluation of other pathways in agreed language at WAC 173-340-708(10)(c), which depended upon the use of modifications under 708(10)(b) of default values for exposure parameters. This bears no resemblance to that agreement.

Further, in the latest revision of proposed WAC 173-340-747, the fixed three-phase partitioning model is no longer identified as a default method. Yet, this

has the practical effect of doing just that. In fact, it exacerbates the issue since section 747(6) acknowledges that the three phase model may be inappropriate, and no exemption from this language is provided for inorganics which might most appropriately use leaching tests and which have little vapor potential. In those instances, why is anything tied to the three phase model? Indeed, given the highly conservative assumptions used in proposed section 747 (see comments below), this proposal for adding pathways seems extremely onerous.

Suggested language: The proposed language should be deleted in both provisions.

2090 WAC 173-340-740(6)(c) Soil cleanup levels; vapor point of compliance

Comment: The proposed language sets a point of compliance throughout the site from the ground surface to the uppermost groundwater table for soil levels based on vapor. How can this possibly be scientifically based? Is there no difference between the ground level hazard from contaminants at 55 feet than at 5 feet? How about areas of the state where groundwater is quite deep, say 300 feet? How can there be no bound? Surely models exist that give the department the ability to consider at least conditional points of compliance.

Suggested language: Replace proposal with language based on science and practicality.

2091 WAC 173-340-745(5)(b)(iii)(C) & (5)(c)(iv) Industrial soil; vapors

Comments and suggested language: See comments to section 740 above.

2092 WAC 173-340-747

Comments and Suggestions: The following includes comments from a consultant hired by Boeing to prepare a technical analysis of WAC 173-340-747.

We understand Ecology's desire in proposed WAC 173-340-747 to generally improve the scientific basis for setting soil cleanup standards for protecting groundwater. And we have noted that, in the Science Advisory Board's recommendations that served as the impetus for revisions to the soil leaching calculations, it was considered important that the default leaching calculations and models be based on the "best science" available. Unfortunately, however, some of the provisions of proposed WAC 173-340-747 do not represent the current best science for processes that control chemical leaching from soil. Further, in some cases, proven approaches are available that would be simpler to implement and more reliable in more field

applications. Additionally, the proposed models and equations, in part, rely on theoretical concepts not yet verified, assume values not typically found in the State of Washington, and build upon a level of precision that is not supported by current sampling and analytical technologies.

These aspects (discussed in detail below) seriously undermine the notion of "best science", as well as the fairness and utility of the regulatory provision that will be used to set soil cleanup standards at all sites in the State of Washington. It will be most beneficial to all concerned if the MTCA regulation is based on tested and pragmatic approaches that work in field conditions common to Washington with readily available practices and technologies, rather than relying on conceptual theories as reflected in the proposed draft.

The following comments collectively suggest a preferred alternative to the proposed leaching models and equations.

2093 **Critical Assumptions Used in the Leaching Calculations**

Regarding the calculated soil cleanup standards, the primary parameter controlling the leachate concentration (and therefore the soil cleanup standard) is the partitioning relationship between the dissolved and adsorbed phases (when a NAPL is not present). In WAC 143-340-747, Ecology has chosen to use an equilibrium partitioning relationship (K_d) to calculate the soil leachate concentration from an adsorbed chemical on soil. It is important to recognize the key assumptions required to apply partition coefficients to environmental settings since this is the most important parameter in setting soil cleanup goals. The key assumptions are:

- Equilibrium partitioning
- Reversible sorption/desorption
- Dilute concentrations

Unfortunately, these critical assumptions will typically be invalid in many situations to which WAC 143-340-747 will be applied:

- Most soil cleanup standards set under MTCA will be applied to vadose zone soils at sites where equilibrium conditions may not be reached because the moisture content changes frequently due to rainfall and recharge rates.
- The assumption of reversible adsorption/desorption processes is commonly known to be invalid because a significant portion of the adsorbed phase of is irreversibly bound to the soil and cannot be leached (under typical conditions) from the soil, particularly at the low concentrations levels set for site cleanup goals
- The assumption of dilute concentrations is incorrect in the case where high concentrations of organic compounds are present (e.g., where free-

phase fuel is present), or where the soil has a low capacity for adsorption (e.g., low fraction organic carbon).

These significant limitations notwithstanding, K_ds have been commonly used in many groundwater transport models because the simplifying assumptions make the model simulation a much simpler linear problem. If a more accurate sorption relationship (such as a Freundlich isotherm relationship) is used in a chemical transport model, the relationships become nonlinear and the solution much more difficult. The simplified K_d relationship is incorporated into many models out of necessity for computation modeling, not because experimental data indicate that it is accurate or that it represents the "best science".

The Freundlich isotherm is expressed as:

$$S=KC^{1/n}$$

where S= mg solute adsorbed/gm of soil
K =the distribution coefficient $[(mg/g)(L/mg)^{1/n}]$
C =the concentration of solute in the liquid phase (mg/L)
1/n =an empirically derived constant

For applications where the solute concentration is low, the exponent 1/n is approximately equal to one, resulting in a linear partitioning (Kd) between adsorbed and solute phases.

2094 Cleanup Standards for Organic Compounds

For the simple leaching calculations proposed in WAC 143-340-747, using a more generally applicable sorption relationship, such as a Freundlich isotherm, is preferred. In addition, it is a more scientifically defensible approach than the method currently proposed in WAC 143-340-747. A large amount of data exists for characterizing the two parameters of the Freundlich relationship (K and the exponent 1/n). In cases where the adsorption is approximately linear, the Freundlich equation reduces to a linear partitioning equation equivalent to a Kd model. As shown the following table, many of the most common contaminants have exponent parameters (for a Freundlich isotherm) which are not approximately equal to one and therefore the assumptions of a linear partitioning relationship are invalid.

Compound	K_{oc} $(mg/g)(L/mg)^{1/n}$	1/n
Benzene	1	1.6
Toluene	100	0.46
m-Xylene	200	0.42
Ethyl benzene	175	0.53
TCE	28	0.62

PCE	51	0.56
1,2-DCE	12	0.59
Phenol	21	0.54
PCB	14,100	1.03
Source: Water Quality and Treatment, Handbook of Community Water Supplies, 4th Edition, AWWA 1990. (this single source includes data, Koc & 1/n, for ~ 150 toxic organic compounds)		

Since the MTCA revision includes specific formulas, parameters, and default Method A tables in the WAC 173-340-747 revisions (as opposed to general guidance documents), it is important that the revisions represent the most technically defensible approach and represent the most general cases that exist. Using a sorption relationship such as a Freundlich isotherm is a better approach than the currently proposed linear equilibrium partitioning. A Freundlich isotherm approach is more generally applicable and sufficient data exist to apply it to a wide range of toxic chemicals that are commonly encountered.

2095 Infinite Source Assumption used to Set Cleanup Standards

One of the key assumptions that should be considered - in the partitioning approach to setting cleanup standards - is how the total mass of a chemical present at a site (at the cleanup standard) compares with the infinite source assumption used to set the standard. For example, consider TCE with a revised cleanup standard of 0.03 mg/kg. For a 10 ft thick contaminated vadose zone, the total TCE mass would be ~0.00003 lb/ft^2.

This mass of TCE present clearly does not meet the infinite source assumption used to set the standard. Specifically, given the high recharge rate assumption used to set the standard, this mass of TCE would be substantially removed from the soil in the first year. As such, it would not be possible to cause human exposure over the 30-year period used to set the risk based standard for human exposure to groundwater.

As this simple example shows, any calculated soil cleanup standard that results in a very low cleanup level needs to be carefully reviewed by Ecology in terms of the infinite source assumption used to derive the standard. For the above example (although this applies to many other very common contaminants), the assumption of an infinite source is simply not appropriate (or feasible) at the cleanup levels that are being set. Alternatively, it is suggested a simple relationship (a linear multiplication factor) be derived based on the leaching calculations that would correct for the depletion of the

chemical mass (at or near the cleanup standard) over a shortened exposure period (between 5 and 30 years depending on each case).

2096 Infiltration Rate

The estimated infiltration rate is an important parameter driving the migration of chemicals to groundwater. Some reasonable estimate of the infiltration rate is required for estimating migration to groundwater, however, the default values provided are much higher than that encountered in real field conditions. The proposed WAC 143-340-747 provides default infiltration rates as 70% of precipitation for western Washington and 25% of precipitation for eastern Washington. Typical groundwater modeling applications usually have infiltration rates that are much less than this - or typically less than ½ of the listed values. Some of the more arid areas of eastern Washington, such as Hanford, are expected to have a net infiltration that approaches 0% of the precipitation.

On several prior occasions, it was suggested that Ecology staff contact the USGS regarding the typical range that they would recommend based on the numerous modeling studies they have conducted throughout the state. In addition, it was suggested that Ecology conduct a simple water balance of one or more typical areas (such as the Duwamish Valley) to determine a realistic range of recharge rates in the urban areas where the vast majority of the MTCA regulated cleanup sites are located. By selecting infiltration rates that are extremely high, Ecology is defining conditions where a groundwater aquifer cannot physically transmit the quantity of water that is infiltrated (based on conductivity, gradient and discharge area). Precipitation and runoff maps, prepared by the USGS, provide clear indication that a large fraction of the precipitation ends up as runoff; for example, about 50 to 60% for most of western Washington. Another fraction of the total precipitation is removed by evapotranspiration (a factor obviously more significant in eastern Washington), and the net remaining for recharge to groundwater is much less than the default values offered in the revised MTCA.

In short, the revisions to MTCA allow for a site owner to use site-specific recharge estimates subject to the conditions of 173-340-702, i.e., (14) Burden of proof, (15) New scientific information, and (16) Criteria for quality of information. It would be constructive and helpful for the default values put forth in the MTCA rule to meet these same requirements.

2097 The subject of surface cover, and its effect on infiltration, also warrants special consideration. The current text in Section 173-340-747 states:

> "(B) If a site-specific measurement or estimate of infiltration (Inf) is made, it shall be based on site conditions without surface caps (e.g., pavement) or other structures that would control or impede infiltration. The presence of a cover or cap may be considered when evaluating the

protectiveness of a remedy under WAC 173-340-350 through 173-340-360. If a site-specific measurement or estimate of infiltration is made, then it must comply with WAC 173-340-702 (14), (15) and (16)."

It is not exactly clear how this can or will be implemented. If a site is currently paved (as most sites are, including storm water drainage structures), then any site-specific measure of infiltration must necessarily include the existing surface paving. A review of Sections 173-340-350 through 360 does not provide any apparent guidance on how the presence of a cover should be evaluated with respect to impacts to groundwater. Section 173-340-357 does provide a discussion of how surface caps may be considered for dermal exposure to soil (resulting in a reduced exposure frequency factor), however, the more stringent cleanup standards will generally be based on impacts to groundwater, so this guidance may be of limited value. Regarding impacts to groundwater, Section 173-340-357 (3)(d) essentially says the site owner must follow the methods in 173-340-747. Although it may not be intentional, this is circular logic, and it will be very difficult to include surface covers as an obvious means to reduce recharge, thereby effectively eliminating this most effective remedy for protecting groundwater.

The vast majority of cleanup sites in Washington either currently have a surface cover or will include some cover, such as paving, as part of the cleanup action. Department of Ecology project managers will have to resolve this issue of the impact of a surface cover on infiltration (and corresponding remediation levels) on almost every project they review. More specific guidance on the use of surface covers to reduce infiltration - as part of remedy selection and protectiveness evaluation - would be beneficial to the Agency as well as the site owners. It is suggested more practical guidance for this factor be made explicit in the MTCA.

2098 <u>3-Phase and 4-Phase Model Results and Comparisons with Laboratory Data</u>

The Method A tables and Method B formulas for soil cleanup standards include only the adsorbed phase of the chemical present in the soil sample when setting the site cleanup levels which are expected to be protective of groundwater. All field sampling results (that will be used for comparison with the cleanup levels) will also include the mass of chemicals present as a dissolved phase in the soil moisture. In other words, field sampling methods and subsequent laboratory analyses do not separate the fraction of the chemical in the soil adsorbed phase from the fraction in the soil moisture.

The revised MTCA standards and formulas used to set site cleanup levels should include both (but only) the mass adsorbed to soil and the mass present in a dissolved phase because that is the total mass that will be reported by lab analysis. The lab-reported total number is the value that will subsequently be used for comparison with the MTCA criteria. For a compound such as benzene, this would make the Method A standard about 2 to 3 times higher. It

is not clear if this is intentional to make the numbers very conservative and therefore more protective, or if it is an oversight in the conceptualization of the 3-phase model and how it would be applied with laboratory data. The same fundamental concern applies to the 4-phase model.

2099 Cleanup Standards for Inorganic Compounds in Soil

The issues associated with cleanup standards for inorganic compounds are similar to organic compounds in that a sorption relationship such as a Freundlich isotherm (or other) is a better approach than the currently proposed linear equilibrium partitioning model. An additional consideration for inorganic compounds is needed to address the form of the inorganic compound in soil.

The total concentration (C_{tot}) of a specific element in soil is typically defined as:

$$C_{tot} = C_{fixed} + C_{adsorbed} + C_{water}$$

The fixed concentration is a key parameter that should be considered in any soil leaching calculation used to derive soil cleanup standards. Data exist for a variety of inorganic compounds and different soil types that indicate that the fixed concentration of specific toxic compounds is large and can be much higher than the natural background levels. For example, it has been reported that up to 98% of the Cu present in soil (at levels of 125 mg/kg, substantially above background) is typically present in a fixed form that cannot be leached from soil.

The most common inorganic compounds that will set risk levels and drive cleanup standards in Washington State are likely limited to a few compounds such as Cu, As, Pb and Cd in the vast majority of sites. Ecology has completed a limited laboratory testing and sampling program to develop and verify the approaches for cleanup standards associated with fuel releases. It is suggested a similar testing program or data review should be implemented for selected inorganic compounds in order to develop default cleanup standards that are more realistic and technically defensible. Given the extensive investigations and testing conducted by Ecology, EPA, and industry associated with properties in Tacoma, Everett, and Vashon Island, existing data can be used to define a reasonable range for the fixed fraction of selected inorganic compounds.

The obvious impact of the fixed fraction of inorganic compounds can be illustrated by evaluating various Ecology studies and documents that have been used to establish typical background levels of inorganic compounds in soil and groundwater throughout Washington. The following table presents statistical data published by Ecology and the USGS.

Inorganic Compound	Distribution of Measured Concentrations In Soil, Puget Sound [1]		Kd [2]	Calculated concentration in groundwater using WAC 143-340-747 leaching formulas		Distribution of Measured Concentrations in Groundwater, Puget Sound [3]	
	Mean	90th percentile		Mean	90th percentile	Mean	90th percentile
	mg/kg	Mg/kg	L/kg	ug/L	ug/L	ug/L	ug/L
arsenic	3.96	7.3	29	137	252	2.2	4.8
copper	24.4	36.36	22	1,109	1,653	95	121
zinc	51.45	85	62	830	1,371	124	152

[1] Natural Background Soil Metals Concentrations in Washington State, 1994 Ecology Publication #94-115

[2] Partition coefficients taken from Table 747-1, 1999 Ecology Publication #99-606

[3] USGS, 1986. Quality of Ground Water in the Puget Sound Region, Washington. Water Resources Investigation Report 84-4258, prepared by USGS in cooperation with State of Washington Department of Ecology. Data from ~ 200 wells in King, Pierce, and Kitsap counties. (The wells were selected by the USGS and Ecology to represent background conditions in undeveloped/non-industrial areas.)

The key parameters representing the distribution of calculated concentrations in groundwater (based on the leaching formulas from WAC 143-340-747) are significantly higher than the distribution of the actual measured concentrations in groundwater. These data indicate that the proposed leaching models do not provide an accurate prediction of the expected leaching concentrations. The Kd values in WAC 143-340-747 are taken from reasonable literature references but the model predictions appear to systematically over predict the resulting leaching concentration. It is suggested that the errors in WAC 143-340-747 leaching predictions are the result of ignoring the immobile fraction of the inorganic compounds that are not leached from soil under typical natural conditions.

Ignoring the fixed/immobile fraction of inorganic compounds could have two potential impacts on cleanups in Washington State, both of which are bad. If a site owner uses the default leaching parameters (default Kds), the predicted leachate concentrations will be higher than would actually exist, and the owner would then be required to cleanup soils that will actually have no adverse impact on groundwater. Alternatively, if the site owner chooses to measure Kd values, the measured values could then under predict the actual leachate concentration because the immobile/fixed fraction will tend to artificially increase the measured Kd value (since the linear-reversible Kd model is not accurate). In this latter situation, it is possible that the soil

cleanup standards would then be set at levels that are not protective of groundwater.

2100 WAC 173-340-7490(3) Terrestrial Ecological Evaluation Procedures; Goal

Comment: Subsection (3) does not provide sufficient direction regarding what will be considered a "significant" adverse effect in the context of a site specific evaluation. In particular, nothing reflects the PAC agreement that impacts would be evaluated on a species level, except for endangered species.

Suggested language: In lieu of the department's proposal, the following language is suggested, which provides a more complete idea of what "significance" will mean:

> "For the purposes hereof, the significance of an adverse effect relates to the ecological significance of an impairment of reproduction, growth or survival for the impacted species at a site. When site-specific studies are performed, the measurement endpoints should be relevant to the management goals of protecting the terrestrial environment from significant adverse effects. Not all statistically significant changes in measurement endpoints are ecologically significant. For threatened and endangered species, the significance of an adverse effect is evaluated relative to an impacted individual. For all other species, the significance of an adverse effect is evaluated relative to an impacted local population of species of concern, rather than to a particular individual or subgroup, and refers to an adverse effect that is significant in the way that it alters important structural or functional characteristics or components of the affected ecosystem."

If the department does not agree with the foregoing, at least consider adding at the end of the last sentence; " of the species."

2101 Comment: The definition of "commercial property" in Subsection (3)(c) is too narrow for the purposes it is used in this section. The definition is only used in this section for a very limited purpose, that is, to identify which properties in addition to industrial property should be evaluated primarily regarding their effect on wildlife. The definition is only used to distinguish it from other properties, which must consider effects on both wildlife and plants. These properties are typically so highly disturbed that there is only minor native or seminative plant life. Thus, protecting plants should be a minor concern since most are ornamental.

Suggested language: The definition of "commercial property" should be revised to be more along the lines of the following:

> "For purposes of this section, "commercial property" shall mean any property used for non-residential or urban residential/mixed use purposes that is typified by a high degree of land development or disturbance, such that most of the property is either covered with man-

made surfaces, gravel, landscaping, or plants which are primarily ornamental rather than native or semi-native."

2102 WAC 173-340-7490(4)(a) Terrestrial ecological evaluation; conditional point of compliance

Comment and suggestion: There should be additional language recognizing that some situations will require containment of contaminated soils, similar to 740(6)(f). The proposed rules at WAC 173-340-7490(4)(a) provide for a conditional point of compliance to be set at the biologically active zone (approximately a 6 foot depth), but do not address potential barriers to exposure. Realistically, soil containment may be the only suitable remedy, such as at a landfill. Ecology should add language dealing with the potential soil containment scenario.

2103 WAC 173-340-7491(1)(c) Terrestrial ecological evaluation; exclusions

Comment: A cross-reference should be added in 7491(1)(c)(i) to the definition of "site" in section 200 in order to avoid misreading the provision. It is intended to only require addressing areas where soil contamination exists, not all contiguous property in the same parcel.

Suggested language: In 7491(1)(c)(i), add "(as "site" is defined in WAC 173-340-200)" after "within 500 feet of any area of the site".

2104 Comment: The definition of "undeveloped land" in Subsection 7491(1)(c)(iii) is too narrow for the purpose it is to serve. Essentially, it is intended to be a surrogate for what is potential habitat. Requiring that there be impervious surfaces or "other barriers" gets away from the intent, which was to suggest what might be a place where potential receptors would likely be located.

Suggested language: Delete the proposed language and replace it with:

"'Undeveloped land' shall mean land that is characterized by native or semi-native vegetation, and shall not include land which is, or is reasonably expected to be, covered by buildings or roads or otherwise substantially altered as part of its land use, such as lands used for agriculture, industry, commercial development, high density residential development, transportation, or intensive recreation."

2105 WAC 173-340-7491(2) Terrestrial ecological evaluation; exclusions; nonqualifying sites

Comment: Subsection (2)(a)(i) provides: "The site is located on, or directly adjacent to, property where management or land use plans will maintain or restore areas of native or semi-native vegetation (e.g., green-belts, forestlands, locally designated environmentally sensitive areas, open space areas managed

for wildlife, and some parks or outdoor recreation areas. This does not include park areas used for intensive sport activities such as baseball or football)."

This criterion was not discussed during the PAC process. The criterion that was discussed was the presence of existing sensitive habitat in the vicinity of the site. The proposed criterion will result in most if not all non-urban sites having to perform site-specific evaluations. It is also uncertain what level of documentation is required for a "management or land use plan." It should be at the very least something of official public record.

Suggested language: Delete the proposed language and replace it with: "The site is located on, or directly adjacent to, land designated as an environmentally sensitive area under applicable federal, state or local law."

2106 WAC 173-340-750 Cleanup Standards Applied to Air

Comment: In proposed subsection 750(1)(a), Ecology has added language which excludes hazardous substances originating from industrial or commercial sources, or from offsite sources. This is a useful and welcome addition. There will still, nevertheless, be practical problems in distinguishing between these sources and contamination sources (see, e.g., proposed WAC 173-349-0-750(7)(a)). No doubt, there will be also be potential conflicts between department preferences and WISHA guidelines for worker protection (e.g., for confined space entry). We would suggest that the department adopt rule or guidance language which allows/supports using engineering and institutional controls implementing or enhancing existing regulatory programs designed for worker protection in cases where those measures appear sufficiently protective of the likely receptors.

2107 Comment: In proposed subsection 750(1)(a)(ii), air cleanup standards would need to be established at all sites where a soil cleanup level addressing vapors is required by sections 740 or 745. Given the serious concerns expressed above regarding proposed sections WAC 173-340-740(3)(b)(iii)(C) & 740(3)(c)(iv)(A), WAC 173-340-745(5)(b)(iii)(C) & (5)(c)(iv), and WAC 173-340-747, this proposal is also very troublesome. In effect, given the stringency of the proposals in the other sections, it would appear rare that a site with volatile organic contaminants would avoid this section becoming applicable. While there are certainly sites at which this is warranted, it should not be triggered every time the very conservative assumptions incorporated into section 747 prove to be overly restrictive. This becomes circular and self-fulfilling at best.

Suggested language: The Policy Advisory Committee specifically addressed evaluation of other pathways in agreed language at WAC 173-340-708(10)(c), which depended upon the use of modifications under 708(10)(b) of default values for exposure parameters. Base the trigger in 750 on that language.

2108 **Comment: The following includes comments from a consultant hired by Boeing to prepare a technical analysis of Methods B & C under WAC 173-340-750.**

The formulas for cleanup standards applied to air (Equation 750-2) will result in cleanup standards which are orders of magnitude lower than typical analytical detection limits for the primary volatile compounds encountered at the majority of hazardous waste sites. The most common compounds of concern will include benzene, TCE, PCE and vinyl chloride. The applicable cleanup standards from Equation 750-2 will be (approximately):

Benzene	**0.3 ug/m^3**	**(0.0003 ug/L)**
TCE	**1 ug/m^3**	**(0.001 ug/L)**
PCE	**4 ug/m^3**	**(0.004 ug/L)**
Vinyl chloride	**0.029 ug/m^3**	**(0.000029 ug/L)**

Typical analytical detection limits for GC/MS analysis of these compounds in gas samples (e.g., Tedlar bag samples) are on the order of 0.5 to 1 ug/L. Given that the risked-based calculations result in cleanup levels that cannot be proven to exist or not exist at a site, it is suggested that Ecology issue specific guidance on exactly what will be required to meet this standard. The goals set by Ecology need to be clear and quantifiable.

2109 **Comment: In proposed WAC 173-340-750(6) regarding points of compliance, the stricken language at the end of the subsection should be retained. The proposed rules delete the previously available conditional POC for industrial sites. Therefore, air cleanup levels would need to be met throughout the site. This is a problemmatic result. There may be situations in which, for instance, soil contamination is contained (e.g., sheetpile around DNAPL) and related emissions to the air do not meet ambient air standards in the immediate area but do meet those standards elsewhere on the property. Without conditional POC, the proposal may leave no practicable cleanup alternative. [What is the reason for proposing to delete language allowing the department to approve a conditional POC at the property boundary for air at industrial sites under WAC 173-340-750? Obviously, access can be controlled at many industrial sites, and worker exposures are highly regulated. There does not appear to be any justification.]**

Suggested language: In proposed WAC 173-340-750(6) regarding points of compliance, the stricken language in parentheses at the end of the subsection should be retained.

2110 **TABLES**

Table 749-1

Comment and suggestion: A footnote should be added to clarify the usage of the term "site" in the first box. See comments to proposed WAC 173-340-7491(1)(c)(i) above.

2/11 Table 749-2

Comment and suggestion: As we have commented previously, the inclusion of TPH compounds in this table departs from the vigorously discussed criteria set forth in proposed WAC 173-340-7493, i.e., that only those chemicals with a "significant tendency to persist, bioaccumulate, or be highly toxic to terrestrial receptors" should be included on this table. While it has been explained by Ecology experts that a few "fractions" of TPH have some of these qualities, how is that a justification for including a "total" petroleum hydrocarbon concentration rather than the bad-acting fractions themselves? Given that proposed WAC 173-340-708 is moving toward a fractionated approach, and proposed changes to WAC 173-340-830 require much more fractionated testing, why is the department using a TPH approach? Surely "gasoline" and "diesel" range specifications aren't up to the standard expressed in the rule. Including TPH (rather than fractions of specific concern) with pesticides, dioxins/furans, phthalates and other chemicals of known ecological concern is clearly outside of the standard agreed to by the department.

Where will this have impact? Likely every highway and roadside ditch in the State that has ever been affected by runoff from leaking vehicles (since the proposed rules view this as "undeveloped land"- See proposed WAC 173-340-7491(1)(c)(iii) and comments thereon, above).

Suggested language: Delete entries for gasoline and diesel range TPH, and replace them with appropriate numbers for the TPH fractions of concern which meet the standard in WAC 173-340-7493.

Address questions to:

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King County
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City of Seattle
Paul Schell, *Mayor*

October 27, 2000

Thomas Fitzsimmons, Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Dear Mr. Fitzsimmons:

King County and the City of Seattle are hereby transmitting our comments on Ecology's proposed draft rule amendment for the Model Toxics Control Act. Seattle and King County have been working for five years with the City of Tukwila, the Port of Seattle, the U.S. Environmental Protection Agency, the state Pollution Liability Insurance Agency and your staff to identify the best scientific approach to regulating the analysis and cleanup of petroleum contamination.

We strongly believe the attached recommendations offer the best, most defensible path for our state to pursue. We urge you to give these recommendations serious consideration.

Sincerely,

Ron Sims, Executive
King County

Paul Schell, Mayor
City of Seattle

Cc: Sharon Metcalf, Director, Environmental Protection, City of Seattle
ATTN: Peter Hapke, Assistant Attorney, City of Seattle
Norman Maleng, Prosecuting Attorney, King County
ATTN: Katherine Killinger, Senior Prosecutor, King County
Enclosure

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Attachment A

TPH Project Oversight Group Review of Proposed Amendments to the Model Toxics Control Act Cleanup Regulation 173-340 WAC, August 2000

This document is an amended version of the TPH Oversight Group's (POG) consensus comments to the proposed amendments to MTCA dated November 1999. The August 2000 proposed amendments have been reviewed and each issue below has been scrutinized to determine whether the POG comments were rejected or accepted in the August 2000 proposed amendments. For purposes of clarity, the original comment is repeated, and the POG's interpretation of Ecology's response to each comment is provided in a boxed format. This attachment also contains 11 new issues that have emerged as a result of the August 2000 version of the proposed amendments. We encourage Ecology to consult with the POG if there are any questions or if clarification is needed.

The POG emphasizes the need for a TPH guidance document. The proposed amendments provide the backbone of the new TPH approach for evaluating and remediating petroleum contaminated sites. However, as companies and consultants have started collecting data and evaluating the new approach, many questions have been raised that cannot be dealt with adequately in a rule format and should be addressed in guidance.

Page numbers cited in the original comments refer to the November 1999 ("Salmon") version of the Proposed Amendments. The pages referenced in the boxed text reflect page numbers in the August 2000 Proposed Amendments highlighted version of the rule issued by Ecology.

Issue 1A
200, Page 10, Definitions, Aromatic hydrocarbons

The proposed definition of aromatic hydrocarbons is

> ...organic compounds that are characterized by one or more benzene rings.

It is suggested that the definition be changed to the following:

...relatively stable cyclic organic compounds containing a delocalized electronic structure. For purposes of evaluating TPH using the fractionation approach, aromatic compounds include alkyl-substituted compounds such as toluene or 2-methylnaphthalene, but do not include compounds with substitutions by other elements, such as 1,4-dichlorobenzene.

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

The proposed definition of aliphatic hydrocarbons is:

...organic compounds that are characterized by a straight, branched, or cyclic arrangement of carbon atoms.

It is suggested that this be changed to the following:

...Organic compounds primarily composed of carbon and hydrogen, including alkanes, alkenes, alkynes and cyclic organic compounds (such as cyclohexane) which do not contain delocalized electronic structures. For purposes of evaluation of TPH using the fractionation approach, aliphatics include alkyl-substituted compounds (such as 2-methyl pentane) but do not include compounds with substitutions by other elements (such as cis-1,2-dichloroethene).

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

Issue 1B
200, Page 12, Definitions, Direct contact

The existing definition of direct contact is:

"...exposure to hazardous substances through ingestion or dermal contact."

It is suggested that this be changed from "ingestion or dermal contact" to "ingestion and/or dermal contact," since ingestion and dermal contact both must be evaluated for TPH-contaminated soil in the proposed changes to MTCA. Dermal contact must be evaluated for other substances under specified circumstances.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

Issue 2
200, page 13, Definitions, Equivalent carbon number

The proposed definition is:

> ...a value assigned to a component of a petroleum mixture, empirically derived from the boiling point of the component

normalized to the boiling point of n-alkanes or the retention time of n-alkanes in a boiling point gas chromatography column.

The POG recommends substituting the word "fractions" for "components," as "components" implies that hazardous substances that may be associated with TPH are assigned EC numbers. The term "EC fractions" is consistent with the manner in which equations for determining TPH cleanup levels are presented in sections 720 and 740.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

Issue 3
200, Page 17, Definitions, Natural biodegradation

It would be preferable to refer to "human intervention" rather than to "man's intervention" in this definition.

Comment accepted (page 19) and appropriately revised in August 2000 proposed amendments.

Issue 4
200, page 17, Definitions, Natural Attenuation

The definition includes the statement that "natural attenuation is not an active measure."

The POG concurs with an explanation of natural attenuation given in a USEPA policy document ("Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," June 9, 1997), which states that monitored natural attenuation is not a "no action" or "walk-away" solution, but that it may be "an alternative means of remediation that may be appropriate for a limited set of site circumstances." Source control is considered to be a crucial component of remedial actions which must be taken before monitored natural attenuation can be included as part of the final remedy.

The POG recommends that the definition be entitled "Monitored natural attenuation" and that the statement "[N]atural attenuation is not an active remedial measure" be deleted from the definition. The POG views natural attenuation as an important option in remediating certain TPH-contaminated sites, such as those in the Duwamish corridor and other Brownfields areas in the state.

Comment rejected (page 18). The POG wishes to reiterate this comment. We additionally recommend that the final sentence be amended to say: "Natural attenuation *other than natural biodegradation* is not an active remedial measure."

Issue 5
350(12)(d), page 47, Input parameters

This paragraph directs the reader to 173-340-708(10) for "input parameters" that may be modified for establishing remediation levels. The term "input parameters" is not used in 173-340-350(12)(d); rather, the term "exposure parameters" is used. "Input parameters" also is not defined in the definitions section of the rule. The POG suggests replacing the term "input parameters" with "exposure parameters" for consistency and clarity.

Comment accepted (page 54) and appropriately revised in August 2000 proposed amendments.

Issue 6
370(6), page 59, Expectations for cleanup action alternatives

This states that, for facilities adjacent to a surface water body, Ecology "expects that dilution will rarely be the sole method for demonstrating compliance with cleanup standards." This appears to conflict with page 179, 173-340-730(6)(b), which states: "Where hazardous substances are released to the surface water as a result of ground water flows, no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels." The latter is not new language, except that the term "mixing zone" previously was "dilution zone." On page 166, 720(9)(d)(i)(C), which deals with points of compliance for sites abutting surface water, it is stated: "Use of a mixing zone under WAC 173-201A-1to demonstrate compliance with surface water cleanup levels shall not be allowed." Again, "mixing" is a new term, having been substituted for the previous word "dilution."

It is not clear to the POG whether the use of the term "dilution" in the first cited passage means the same as "mixing zone" or something different. This is particularly confusing since the use of "mixing zone" has been substituted for the prior use of "dilution zone" in the second two cited passages. The POG recommends that the meaning of the language in 173-340-370(6) be clarified, in particular as to whether it does or does not conflict with the language in 173-340-720 and -730, cited above.

Comment rejected. This sentence has been adjusted but the terms mixing zone and dilution are still used interchangeably (pp 181, 194) making the language difficult to understand. The POG reiterates the comment.

Issue 7
440(4)(d), page 74, Institutional Controls

This now reads:

> The cleanup level is based on the assumption of land use other than residential, such as industrial or commercial.

For clarification of Ecology's intentions, the POG recommends that the sentence be modified as follows:

The cleanup level is based on any exposure parameters other than residential.

Comment altered (page 81). Section 440(4) is new. See New Issue 1D below.

Issue 8
450(6)(a)(ii), page 81, Releases from Underground Storage Tanks

This requires that a remedial investigation and feasibility study be conducted when "[F]ree product is found". The POG recommends substituting the following language: [when] "[F]ree product removal is not achieved according to (4)(a)."

Comment withdrawn (page 90). Addition of new language satisfies POG expectations.

Issue 9
700(5)(b), page 115, Method B Universal Method

This states that Method B is the "universal method" and can be used "at all sites." There should be a clarification that, for substances for which Method B cleanup levels cannot be calculated, but for which cleanup levels are available in Method A tables, that the Method A cleanup levels are to be used. Examples of chemicals for which Method B cleanup levels cannot be calculated are MTBE in ground water and lead in any medium. There should be a similar provision in 173-340-700(5)(c), which discusses Method C.

Comment rejected. (pp 130-131). The POG reiterates this comment.

Issue 10
700(8)(b)(ii), page 121, Method B and Method C tiered approach

The first sentence reads as follows:

> This chapter provides for a three-tiered approach for establishing Method B and Method C cleanup levels at sites that involve a release of TPH.

It is recommended that this sentence be revised as follows (changes in italics):

> This chapter provides for a three-tiered approach for establishing Method B and Method C tiered cleanup levels *and remediation levels* at sites that involve a release of TPH."

This will clarify that the TPH tiered approach may be used to calculate cleanup and remediation levels.

Comment rejected (page 135). The POG reiterates this comment.

Issue 11
700(8)(b)(ii)(B)(II) and (III), pp 122, Specific procedures for setting cleanup levels at petroleum contaminated sites

The POG believes that the following sentence, which is present in both subsections, does not add benefit to the discussion of procedures for establishing cleanup levels, and instead could add confusion; and therefore recommends its deletion:

> Consideration of current and future site uses may be considered in establishing remediation levels.

Comment rejected. (page 136). The POG did not include this sentence in the TPH Overview, and it was not deleted as recommended. All TPH sites, and presumably all MTCA sites are always considered in context of current and future land uses for establishing *both* cleanup levels and remediation levels. This language is out of place and should be located in Section 700. It is not appropriate to place this sentence in the description of TPH Tiers 2 and 3. The POG strongly recommends its deletion.

Issue 12
702(16)(b), page 126, Criteria for quality of information

This paragraph states, in part, the following:

> When deciding whether to approve or require modifications to the default methods or factors specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or factors, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) Whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community; etc.

It appears that the first two uses of the term "factors" should actually refer to the term "exposure parameters," a defined term in this chapter. The third, generic use of "factors" in this paragraph is appropriate. It is recommended that the first two references to "factors" be changed to "exposure parameters."

Comment rejected (page 141). The first "factor" was changed to "assumption." The second "factor" was not changed. We do not understand Ecology's meaning of the words "factors" and

"assumptions". The term "exposure parameters" is, however, in the definitions section. The POG recommends the following language:

When deciding whether to approve or require modifications to the default methods or ~~factors~~ exposure parameters specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or ~~factors~~ exposure parameters, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community etc.

Issue 13
708(3)(d), page 135, Reasonable maximum exposure

(a) It appears that the word "scenarios" was intended to be placed after the term "potential future site exposure" in the second sentence, but was left out. If this is the case, it is recommended that the word "scenarios" be inserted at that location.

Comment rejected (page 152). The POG reiterates this comment.

(b) It is difficult to distinguish between land use and the exposure assumptions associated with a specific land use in this paragraph. It suggests that one cannot use Method A or B for land uses other than residential and industrial. The following sentences from this paragraph are an example:

> Land uses other than residential and industrial, such as agricultural, recreational, and commercial, shall not be used as the basis for a reasonable maximum exposure scenario for the purpose of establishing a cleanup level. However, these land uses may be used as the basis for an alternate reasonable maximum exposure scenario for the purpose of developing a remediation level.

The POG recommends that this language be deleted from the paragraph as unnecessary and potentially confusing to the reader.

Comment rejected. The POG reiterates this comment.

Issue 14
708(7)(f), page 138, Reference doses

The EPA document which should be cited for development of reference doses is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

Comment rejected. The POG reiterates its comment. The sentence in the proposed amendments refers to EPA RAGS to develop RfDs (page 156). The reference is incorrect; the correct EPA document to derive toxicity values is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

Issue 15
720(4)(b)(iii), page 158, and 720(5)(b)(iii), page 161, Free product limitation

This free product limitation language applies only to ground water cleanups under Methods B and C, as written. The POG recommends that it also apply to ground water cleanups under Method A. [Note: Additional comments pertaining to this language are included in Attachment I, Issue 16.]

Comment partially accepted. Comment withdrawn.

Background: The free product limitation was recommended for TPH by the POG, as a "safety net" to assure that ground water cleanup levels set in 720 did not result in accumulations of TPH as separate phase product. If NAPL is present at or above the cleanup level, then that cleanup level needs to be re-examined. The NAPL limitation was a way of recognizing that some type of check was needed for TPH mixtures (i.e., mineral oil) where maximum dissolved concentrations might not exceed the allowable risk levels. The POG therefore believes the demonstrations described in the recommended language below are appropriate.

Apply to Petroleum Hydrocarbons Only: The free product limitation language for ground water (page 180) has been moved from 720(4)(C)(iii) (Method B cleanup levels for potable ground water/Petroleum Mixtures – page 177) and modified. In its new location in the rule, it appears to apply to hazardous substances in addition to petroleum hydrocarbons, an enlargement of scope not recommended by the POG. Therefore, the language should be moved to 720(4)(C) and (5)(C) and limited to TPH in its application.

Ground Water Degradation from Non-TPH Sources: The POG has concerns that the language mentioning "sheen, discoloration, sludge and emulsion in the groundwater" could result in serious problems for sites where these conditions might occur due to background or naturally-occurring sources (i.e., peat deposits). The proposed wording below is amended to include "attributable to petroleum hydrocarbons."

The revised language recommended by the POG is as follows:

" (d) For total petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product accumulating in or on the ground water. Any of the following

observations of ground water at or above the cleanup level attributable to petroleum hydrocarbons may be used to demonstrate compliance with this requirement: (i) the absence of measurable (1/8-inch) product using an appropriate measuring protocol (a clear bailer, an interface probe, or other devices as approved by the department; (ii) the absence of a film, sheen, discoloration, sludge and emulsion in the ground water; (iii) other site-specific methods approved by the department. Such demonstrations must use procedures to ensure that sampling/observation points have the highest likelihood of observing NAPL relative to the groundwater point of compliance and taking into account the vertical and horizontal migration of the NAPL in the groundwater system."

Note: The measurable product thickness of 1/8 inch is a method used by a number of states in determining whether a product layer is present [personal communication: Charles San Juan, Ecology – results of a recent state-by-state survey of state environmental agencies performed by Eric Sadoyama of Hawaii through the Association of State and Territorial Solid Waste Management Officials (ASTSWMO)].

Issue 16
730, pages 172-181, Surface water cleanup standards for TPH

Ecology has added considerable TPH-specific language that was not recommended by the POG. The POG recommended that, since there are no federal or state surface water criteria specific to TPH, and there are no bioconcentration factors for TPH fractions that would allow for a calculation of a surface water cleanup level, that the ground water cleanup levels for TPH in Table 720-1 (Method A) be the default cleanup level for TPH in surface water for the protection of human health.

The POG offers the following specific comments on the new TPH language in section 730:

1. Add a new paragraph, (iv), under 730(2)(b) (Method A), which reads: "For TPH, a concentration that does not exceed the TPH cleanup levels provided in Table 720-1."

Comment rejected. It is still in 730(3)(b)(iii)(C)(page 190), a paragraph which we recommended deleting. The POG reiterates the above comment and addresses it further in (2) below.

2. Delete 730(3)(b)(iii)(C) and 730(4)(b)(iii)(C). It is not possible to use Equation 720-1 for TPH since bioconcentration factors for the fractions are unavailable, and it is unnecessary to have a separate subsection for hazardous substances that may be associated with the TPH, because they are covered in 730(3)(b)(iii)(A) and (B) and 730(4)(b)(iii)(A) and (B) (surface water cleanup levels for noncarcinogens and carcinogens). The POG also is concerned that the inclusion of this equation for petroleum could be construed to infer that the cleanup level calculated using it (assuming appropriate fraction-specific BCFs are developed in the future) would be protective of human health and the environment. In fact, ecological receptors are more at risk from the presence of petroleum in surface waters than are

humans. The POG encourages Ecology to concentrate its efforts to address petroleum and surface water on ecological receptors.

Comment rejected (page 190). The POG continues to strongly recommend that Equation 730-1 (surface water cleanup level calculation for noncarcinogens) not be made applicable for petroleum hydrocarbons for the following reasons:

1) Bioconcentration factors for TPH fractions have not been established, but are necessary for use of the equation.

2) A human health-only surface water cleanup standard is both misleading and unnecessary, and potentially harmful. Even if BCFs become available, use of the equation readily could be construed to imply protectiveness of the resulting cleanup number to surface water receptors in general. Petroleum mixtures are more threatening to ecological surface water receptors than to human surface water receptors (i.e., consumers of seafood); therefore, Ecology should concentrate on the ecological receptors of petroleum discharges to surface waters. Such an effort would also protect human health.

3) State and federal statutory prohibitions on the discharge of petroleum to surface waters based on physical (not quantitative or chemical) criteria have long existed. Before promulgating an equation for the calculation of quantitative, chemical-based petroleum surface water cleanup levels, there should be some assurance on the part of Ecology that such cleanup levels would not be likely to violate the statutory prohibitions on petroleum discharges to surface waters. No such assurances exist at this time; therefore, the POG recommends that the text be revised to eliminate the reference to Equation 730-1 for petroleum, and instead to emphasize the statutory prohibitions as well as the requirement to ensure no adverse effects on the environment, the latter given at 730(3)(C)(ii). The POG agrees with the retention of the reference to the Method A ground water cleanup levels for petroleum as an adequate surface water cleanup level, since their historical use has not demonstrated that they are likely to result in violations of the statutory prohibitions on the discharge of petroleum to surface water.

Issue 17
730(b)(v), page 176, Free product limitation

The free product limitation language written by Ecology for ground water cleanup levels has been incorporated into surface water cleanup levels. The POG is concerned that among other things, allowing the use of TPH solubility limits for complying with the free product limitation, instead of just physical observations of sludges, emulsions or sheens, could undermine, or give the impression of undermining, the federal and state prohibitions on petroleum releases to surface water, which rely specifically on those physical observations. The POG recommends that the following changes be made:

1. Change "petroleum products" to "TPH" or "petroleum hydrocarbons" to comport with the definitions in the rule.

Comment accepted. Deleted on pp 190-191. Moved to section 730(5)(d) page 194.

2. Delete the word "discoloration" in the second sentence, as it is an inappropriate criterion for a surface water standard.

Comment rejected. Water discoloration, as well as films and sheens, can result from natural processes as well as released contaminants. The POG believes that significant inconsistency exists in how free product is determined and/or remediated at various sites and that clarifying language will be of assistance to MTCA users. The POG recommends the following clarification to the free product limitation language in section 730(5)(d) (page 194).

(d) Free product limitation. For ~~organic hazardous substances and~~ petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product being present in or on the surface water. Physical observations of surface water at or above the cleanup level, such as the lack of a film, sheen, discoloration, sludge or emulsion attributed to the released organic petroleum hydrocarbons in the surface water or adjoining shoreline, may be used to determine compliance with this requirement.

The POG recommends this language only be applied to petroleum hydrocarbons (see similar justification for the free product limitation for ground water (Issue 15).

3. The third sentence reads: "The solubility limit for the hazardous substance may also be used to determine compliance with this requirement." Petroleum should be excluded from this provision, as the solubility limits of petroleum mixtures in the environment are difficult to estimate accurately, and it is possible that using solubility limits to demonstrate the lack of free petroleum product could result in a violation of the state and federal prohibitions concerning petroleum releases to surface water.

Comment accepted for surface water as reflected in the August 2000 proposed amendments (page 194).

4. The limitation on free product should be applicable to cleanups conducted pursuant to Method A in addition to Methods B and C.

Comment withdrawn (page 194). The Method A numbers are restrictive enough so that they should not result in formation of free product.

Issue 18
730(6)(b), page 179, Point of compliance

The reader is directed to 173-340-720(10)(d) for requirements regarding sites where contaminated ground water flows into surface water. That subsection deals with statistical procedures. It appears that the reference should be to 173-340-720(9), which deals with points of compliance.

Comment accepted (page 194) and appropriately revised in August 2000 proposed amendments.

Issue 19
740(2)(d)(2), page 184, Method A soil cleanup levels

Language should be included to state that sites which have cleaned up to Method A soil levels throughout the site are presumed to have addressed soil vapors. Such language was included in the December 1998 draft proposed amendments but appears to have been eliminated.

Comment rejected (page 198). The POG reiterates this comment.

Issue 20
740(3)(b)(iii)(B), page 188, and 745(5)(b)(iii)(B) page 207

These subsections deal with soil cleanup levels under Methods B and C for carcinogens; therefore, the words "other than petroleum" should be deleted. Cleanup levels for carcinogenic substances associated with a petroleum mixture must be determined using the appropriate equations provided in these sections.

Comment accepted (page 200) and appropriately revised in August 2000 proposed amendments.

Issue 21
740(3)(c)(iii), page 192, Modified Method B soil cleanup levels, Dermal contact

The last sentence in this paragraph states:

> When conducting this evaluation the following equations and default exposure assumptions shall be used.

It is recommended that the words "or chemical-specific" be added after "default," because the conditions of Equation 740-4 allow for the use of chemical-specific or default dermal absorption fraction values.

Comment rejected (pp 202-203). The POG reiterates this comment.

Issue 22
740(3)(b)(iii)(C), page 190, and 745(5)(b)(iii)(C), page 209:

The POG participated in the development of the soil cleanup equations for petroleum presented in these subsections, and endorses the inclusion of dermal contact with ingestion in the calculation of cleanup levels for direct contact with soil, for both standard and modified Methods B and C.

Comment accepted (page 203) and appropriately revised in August 2000 proposed amendments.

Issue 23
740(3)(c)(iv)(B), page 194, Modified Method B soil cleanup levels and 745(5)(b)(iv)(B), page 210, Method C industrial soil cleanup levels

An additional bullet item is recommended, as follows, in addition to the others, which delineate when soil cleanup levels can be assumed to be protective of air pathways, as follows:

> The conceptual site model indicates that vapors cannot reach receptors.

Comment rejected (page 205-206). The POG reiterates and adds the following clarification to this comment. There may be cases when a conceptual site model shows that the vapor pathway is incomplete. This is a standard risk assessment procedure that would be a helpful tool at sites where potential exposure to vapors is a consideration.

Issue 24
740(3)(c)(iv), page 194, and 745(5)(b)(iv), page 210, Soil vapors for Methods B and C

New language proposed by Ecology for soil vapors incorporated some of the recommendations contained in the POG consensus letter of September 21, 1999. However, important portions were omitted, including the following:

1. The requirement to evaluate soil vapors when TPH containing less than 8% volatiles by weight is present in soil at levels exceeding 10,000 mg/kg and which meet certain building proximity stipulations was retained from the December 1998 draft proposed amendments. However, there now is no language explaining that, in the presence of more than 8% volatiles, soil cleanup levels will be determined on a site-specific basis. It is recommended that language addressing sites where TPH in soil exceeds 8% volatiles by weight be specifically included in the rule. [Note: It is recommended that the term "petroleum distillates" in these subsections be replaced with the term "total petroleum hydrocarbons." "Petroleum distillates" is not a defined term in the rule.]

Comment rejected (page 205). The POG reiterates this comment. The user needs to know that the vapor pathway is important when volatiles exceed 8%. The language is unclear as written now. We recommend modifying 740(3)(C)(iv)(A)(I) as follows:

(I) Petroleum Mixtures. Evaluation of soil vapors for sites where petroleum mixtures are released shall be required when the soil cleanup level is based on a condition set forth in 740(3)(C)(iv)(A) and;

(i) The volatile constituents comprise eight percent (8%) or greater of the total mixture by weight; or,

(ii) The volatile constituents comprise less than eight percent (8%) volatile constituents by weight (such as diesel range organics), a potential indoor air pathway exists, and soil cleanup levels exceed 10,000 mg/kg within one foot of: the wall of a structure; bottom slab or a structure; or, conduit that could facilitate transport to a structure.

2. The POG believes that in most cases where an indoor air pathway is being assessed, that assessment would be protective of ambient air quality. Therefore, the language originally proposed by the POG (excluding the requirement to measure ambient air where indoor air is shown to be the more protective point of exposure) should be included.

Comment accepted (page 205) and appropriately revised in August 2000 proposed amendments.

The POG offers the following additional comments regarding the proposed language on soil vapors:

3. The words "other than total petroleum hydrocarbons" should be inserted in parentheses after the words "When the soil cleanup level for a volatile hazardous substance is based on protection of ground water..." in the second bullet items on pages 194 and 210. This is suggested because the first bullet item is specific to the conditions under which soil vapors must be evaluated at TPH-contaminated sites.

Comment rejected (page 205). The POG reiterates this comment.

4. Requirements to evaluate soil vapors should be limited to those sites (and corresponding conceptual site models) where potential vapor exposure pathway(s) are identified and the soil cleanup levels are high enough that indoor air or ambient air concentrations could pose a significant exposure. The current language does not consider whether or not actual pathways are identified, triggering an evaluation based solely on the soil cleanup level.

Comment rejected (page 205). The POG reiterates this comment.

5. Measurement of the soil vapor concentrations: The wording should be changed as follows, for clarification purposes: "... using methods approved by the department, demonstrating vapors in the soil between the source and the point of compliance ~~building~~ would not result in the exceedance of ~~exceed~~ air cleanup levels at the point of compliance established under WAC 173-340-750."

Comment rejected (page 205). The POG reiterates this comment but recommends the following modification to the above: "…. Using methods approved by the department, demonstrating vapors in the soil ~~between the source and the point of compliance building would~~ not result in the exceedance of air cleanup levels at the point of compliance established under WAC 173-340-750."

6. The POG recommends that (740)(3)(c)(iv) and (745)(5)(b)(iv) stipulate which soil exposure parameters may be changed which could result in "soil cleanup levels that are high enough that indoor air or ambient air could become a significant potential exposure pathway." It appears that only air-filled porosity, dilution factor, inhalation correction factor, soil GI absorption and inhalation absorption are exposure parameters which are allowed to be altered that could significantly impact soil CULs. Other parameters would be allowed only for the determination of remediation levels. It is recommended that this be made clear in the rule language.

Comment rejected (page 205). The POG reiterates this comment.

Issue 25
740(3)(c)(iv)(A), second bullet item, page 194, and 745(5)(b)(iv)(A), second bullet item, page 210, Soil vapors for Methods B and C

The reference to site-specific risk assessment for nonpotable ground water under 173-340-720(8) does not appear to be appropriate to the subject matter. The POG suggests that this should reference 720(7).

Comment accepted and appropriately revised in the proposed August 2000 amendments.

Issue 26
747, pages 215-226, Deriving Method B soil concentrations for ground water protection

The POG has developed suggested changes in the arrangement of how 747 is presented as well as certain specific changes in the requirements and allowances contained in the section. These are presented as Exhibit A, Recommended Language for Section 747. Following is an itemization of the major changes suggested, as they are reflected in Exhibit A:

1. Re-title Section to indicate it is applicable to both Method B and Method C. There is no reason to exclude the 4-phase model from the Standard Methods (B and C). Modify the available options under Standard and Modified methods so both the 3-phase and 4-phase models are available under each. The logical approach is to allow both models under Standard Methods B and C – used with default parameter values. Site-specific parameter values would then be allowed under Modified Methods B and C. Reorganize the text to reflect this overall approach.

Comment accepted and appropriately revised in the proposed August 2000 amendments.

2. Where necessary, edit the descriptions of the models and variable definitions to make sure the reader understands they are not limited solely to TPH mixtures. The text should be clear that 4-phase models are applicable only when a substance or substances are present which have the potential to form NAPL. As written, no distinction is made between 3-phase and 4-phase models in terms of applicability (except that the 4-phase model is limited to the modified method). The description of procedures for the use of the 4-phase model should not be specific only to petroleum hydrocarbons, as it is currently presented in the proposed rule. It should be usable for sites with all manner of potentially NAPL-forming substances. The explanation of elements of the various equations in 747 should be consistent in referring to "each chemical or EC fraction, for TPH" instead of references to "NAPL components" which are confusing as to meaning.

Comment accepted and appropriately revised in the proposed August 2000 amendments.

3. The description of the 3-phase model implies that it can be used for petroleum hydrocarbons. However, as Equation 747-1 is presented, there is no methodology for using TPH fractions. It is suggested that the following language be incorporated after Equation 747-1 "For TPH mixtures using the TPH fraction approach, the three-phase partitioning model should be applied such that the resulting concentrations of individual fractions and associated noncarcinogenic volatile hazardous substances (see Table 830-1) in ground water do not exceed a hazard index of 1.0 Fraction-specific soil organic carbon-water partitioning coefficients and Henry's law constants, as provided in Table 747-3, must be used." A TPH-specific equation could also be provided.

Comment rejected. The POG reiterates this comment.

4. Except for Table 747-2, the subsection on residual saturation should be applicable to all potentially NAPL-forming chemicals.

Comment accepted and appropriately revised in the August 2000 proposed amendments.

5. Under Modified Method B/C: Provide a list of parameters common to both the 3- and 4-phase model, with discussions of how the parameter may be derived (this is done now, but it appears in two places, once under the 3-phase model description, and once under the 4-phase description and there is some lack of consistency). A separate list can follow for parameters specific to an individual model. Be sure the user can readily understand which parameters are considered "hydrogeologic parameters".

Comment withdrawn. The POG expects that this list will be provided in pending guidance.

6. The text should warn the potential user that mixtures containing chemicals with widely different solubilities may not be appropriate for the fate and transport models, and that serious errors may occur with such use.

Comment withdrawn. The POG expects that this warning will be provided in pending guidance.

7. The use of Modified Methods B and C for TPH should stipulate that site-specific EC fraction data must be used as inputs to models, i.e., that retrofitting of data or assumptions of product compositions is not permissible. Correlation should be allowed, however.

Comment withdrawn. Retrofitting and correlation are discussed in the TPH overview.

8. Move the prohibition of NAPL to the front of the section, so it is readily apparent and so that it does not need to be repeated in subsections.

Comment accepted and appropriately revised in August 2000 proposed amendments.

9. Check the numbering of the equations and tables. Tables referred to as 747-3 and 747-4 in the text and appearing at the end of the rule are numbered as Tables 747-1 and 747-2. Equations numbered 747-2 and 747-4 are present, but no equation numbered 747-3, although it is referred to in the text (apparently as mistaken references to 747-2).

Comment accepted and appropriately revised in August 2000 proposed amendments.

10. The allowance for empirical demonstrations at 747(4)(d)(I)(A) should specifically include direct measurement of ground water flow rate (Qa), if such data are available.

Comment rejected, page 230-231. The POG believes that empirical demonstrations of Qa should be allowed. It is recommended that an additional paragraph (i) be inserted ahead of the current (i) ("Calculating ground water flow volume) as follows:

(i) **Direct measurements of ground water flow volume.** Direct measurements of the volume of ground water flow (Q_a) using standard geophysical methods or other methods as may be approved by Ecology may be used.

(ii) **Calculating ground water flow volume.** The following equation shall be used, etc.....

Note that the subscripts "a" and "p" in Q_a and Q_p should be subscripted.

11. Table 747-2 (footnote). The footnote indicates the screening levels are "for coarse sand and gravelly soils only." This would seem to imply that it could not be used for silts, clays, fine sands etc. This needs to be changed to indicate that it simply is instructional as to what assumptions were made in deriving the screening levels.

Comment accepted and appropriately revised in August 2000 proposed amendments.

12. Language at 747(3)(b)(iii) describing Leaching Tests: Subsection (iii) should be changed to say that if leaching tests using methods other than those prescribed in (i)(A) and (B)are

used, they shall be based on methods approved by the department. As written, all methods must be approved by the department.

Comment accepted and appropriately revised in August 2000 proposed amendments.

13. The subsection on residual saturation should be changed to apply to hazardous substances that can potentially form NAPL, in addition to TPH, with the exception of Table 747-2, which is specific to TPH. Suggested language for this change is included in Exhibit A.

Comment accepted and appropriately revised in August 2000 proposed amendments.

Issue 27
750(2)(b)(ii), page 241, Method A air cleanup levels

This states the following:

> For a hazardous substance deemed an indicator hazardous substance under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background or the practical quantitation limit, subject to the limitations in this section.

This would appear to require that owners of properties where a TPH release to soil has occurred, must measure air concentrations under all circumstances, in order to make a demonstration that soil concentrations have not caused exceedances of TPH in air greater than natural background or PQLs. The POG recommends that this requirement be deleted. It is understood that it is the same language included for Method A ground water, surface water and soil cleanup requirements; however, the POG suggests that the requirement to sample air should require a different threshold than for other media.

Comment accepted (page 264). Ecology decided not to include Method A CULs for air.

Issue 28
750(3)(b)(ii)(C), page 242, Method B air cleanup levels for petroleum mixtures, and
750(4)(b)(ii)(C), page 244, Standard Method C air cleanup levels for petroleum mixtures

These paragraphs require that air cleanup levels for petroleum be calculated using Equation 750-1, adjusting it to account for petroleum fractions and associated volatile hazardous substances. The POG recommends that these paragraphs be deleted unless reliable sampling and analysis methods exist for evaluating TPH in air. Section 830 (Analytic procedures, 173-340-830(3)(f), analytical methods for TPH in air), states that methods will be selected on a "case-by-case basis," implying that no standard analytical procedures exist or have been identified or developed. If Ecology later determines that reliable sampling and analysis

procedures exist for evaluating TPH in air, Equation 750-1 could readily be adapted for use with TPH fractions and associated volatile hazardous substances, if and when such methods become available. Retaining these paragraphs when such methods are unavailable would serve to confuse the owner as to how to comply with MTCA regulations.

Comment rejected (p.266). The POG reiterates this comment.

Issue 29
Table 720-1, Method A Cleanup Levels for Ground Water

1. The POG does not endorse the proposed ground water cleanup levels for Diesel-Range Organics (DROs), Heavy Oils and Mineral Oil, because it believes that Ecology's proposed cleanup levels are not based on SAB- or POG-recommended methods of using a four-phase partitioning model to obtain Method A ground water cleanup levels. This subject is discussed in Exhibit B to this attachment.

Comment rejected (page 285). The POG reiterates this comment and adds the following summary of Exhibit B:

Exhibit B consists of a memo (previously shared with Ecology) setting forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments. We again encourage Ecology to carefully evaluate this issue and develop ground water cleanup levels for these type of TPH mixtures that are based, to the best extent possible, on how these materials dissolve (or do not dissolve) in the water phase.

2. A footnote should be added for TPH that references 173-340-720(4)(b)(iii), the paragraph covering free product limitations for petroleum releases using Methods B and C, as it also should be applicable to Method A TPH ground water cleanups. It also should be included in 720(3), Method A cleanup levels for drinking water aquifers flowing into nearby surface water.

Comment withdrawn (page 285). This footnote is no longer necessary with the proposed Method A cleanup levels.

3. Footnote x (Total Petroleum Hydrocarbons) indicates that the Method A ground water cleanup values are based on mid-range estimates of the composites of the various

petroleum products. The user is directed to Method B or C for products with significantly different compositions. This information is valuable only if the user is directed to a location where the product compositions appropriate to the Method A values is provided. Otherwise, the user would have no way of knowing whether the Method A TPH ground water numbers are appropriate for a particular site. The POG suggests that this information be provided in a table in the rule.

Comment accepted. Paragraph deleted from footnote (page 285).

4. The POG disagrees with the fourth bullet item in Footnote x, which does not require analysis of ground water contaminated with mineral oil if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." Details concerning the POG's disagreement with this are given in Attachment I, Issues 19 and 25.

Comment accepted (page 286) and appropriately revised in August 2000 proposed amendments.

Issue 30
Table 740-1, Method A Soil Cleanup Levels for Unrestricted Land Uses; and Table 745-1, Method A Soil Cleanup Levels for Industrial Properties

1. Footnote c indicates that the cleanup level in the tables is appropriate only for benzene contained in weathered gasoline releases. A Method A soil cleanup number is needed for non-weathered gasoline spills as well as for weathered gasoline. The POG evaluated this matter and determined that the use of the same 3-phase model used by Ecology for determining the cleanup level for benzene in weathered gasoline would result in the same cleanup level for benzene in fresh gasoline. This is apparently because benzene is the risk driver in both cases. The POG recommends that Footnote c be amended to delete the word "weathered" prior to "gasoline" and to delete the second sentence stating that the value may not be protective of ground water for fresh gasoline. However, the POG recommends that there be an added statement directing owners of sites where there have been releases of benzene as a "pure" or commercial-grade product (i.e., not as part of a TPH mixture) to Section 747 for the determination of soil benzene cleanup levels protective of ground water.

Comment partially accepted (page 287). Remainder of comment withdrawn.

2. The POG agrees that soil cleanup levels for ethylbenzene, toluene, and xylenes were calculated correctly for pure products (not mixtures). It is not clear whether the soil cleanup levels for xylenes are based on a risk-based number (or the MCL) in ground water, or on the ground water cleanup level for xylenes given in Table 720-1. Footnote t in Tables 740-1 and 745-1 states that they are "based on protection of ground water for drinking water use..." The POG recommends that Ecology indicate in footnote t precisely what ground water concentration the cleanup levels for xylenes in soil is based on.

Comment partially accepted. The footnotes now specify that the three-phase model [747(4)]

was used. However, it is still not clear whether Ecology used Method B or the MCL to derive the target ground water concentration. This information needs to be added to the footnote. One recommended solution is to refer to the ground water CUL in Table 720-1, if this in fact is the basis for the Table 740-1 and 745-1 values.

3. The POG disagrees with item (3) in Footnote q for Total Petroleum Hydrocarbons, allowing for the assumption that PCBs which might be associated with mineral oil would not exceed PCB soil cleanup levels if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." This item is discussed in detail in Attachment I, Issue 19.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

4. The identification of footnotes associated with specific chemicals in Table 745-1 is in some cases inconsistent with the actual footnotes following the tables. For example, toluene is given footnote r in the table, but footnote r describes 1,1,1 trichloroethane. Toluene is described in footnote p. These inconsistencies should be corrected in the final rule amendments.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

Issue 31
Tables 720-1, 740-1 and 745-1: Derivation of media cleanup levels for carcinogenic PAHs (cPAHs). [Note: this comment was developed with the assistance of Dr. Damon Delistraty, a Department of Ecology toxicologist in the Eastern Regional Office.]

Footnote r in Table 720-1 and Footnote m in Tables 740-1 and 745-1 explain that the cleanup levels were derived based on the cancer potency factor for benzo(a)pyrene (B(a)P) and the assumption that 7 cPAHs "are present in the sample." Discussion with Ecology representatives revealed that the cleanup levels were based on a multiplication of the Method-B derived cleanup level of B(a)P by a factor of 7. This effectively allows for a risk of 7E-6 in Method A, while the Method B cleanup levels reflect maximum cancer risks of 1E-6. In addition, the cancer potency of B(a)P was assumed to represent all of the other six cPAHs; and the mobility of B(a)P through soil was assumed to represent the other cPAHs as well.

The POG has concluded that the cPAH cleanup levels in Method A tables were derived incorrectly. Ecology has proposed in ((708)(8)(e)) to allow for the use of toxicological equivalence factors (TEFs) for the assessment of the cancer potency of cPAHs relative to B(a)P, using the TEFs published by CalEPA. The language in 708 does not limit the use of the TEF approach to Methods B and C (nor should it). Therefore, it should be available to users of Method A tables.

The POG is confident that a single cPAH cleanup number can be given in the three tables, representing the relative toxicity and mobility of the various cPAHs, while offering the owner the opportunity to evaluate his/her analytical data in a manner which is more likely to result in effective cleanup levels in soil and ground water which reflect the actual contamination at the site. This is not unlike the method proposed for TPH fractions, in which fraction-specific toxicities and (for soil cleanup levels) fraction-specific transport characteristics are accounted for to derive overall cleanup levels. Methodologies for achieving the above for ground water and soil are offered below.

Ground water : The Method A cleanup level for ground water should be 0.012 ug/L B(a)P toxic equivalents (TEQ), based upon the calculation of a Method B ground water cleanup level based on B(a)P alone. This corresponds to a 1E-6 excess individual lifetime cancer risk. Because of the TEF approach to evaluating the cPAHs, they are considered an "individual" contaminant, as opposed to multiple contaminants; and therefore the maximum acceptable risk of 1E-6 is appropriate and is compliant with MTCA policy. The owner should be free to assume that all cPAHs present have TEFs of 1.0, i.e., that they are as potent as B(a)P; but if that TEQ exceeds 0.012 ug/L, the owner has the option of making use of the TEF approach to determine if the TEQ calculated in that fashion exceeds 0.012 ug/L. In that case, the site-specific TEQ would be the sum of the products of the concentration of each cPAH present in the sample and its corresponding TEF. Since none of the other cPAHs has a potency as high as that of B(a)P, the effective cleanup level (in terms of total ug/L of cPAHs) will be higher than 0.012 ug/L, but the B(a)P TEQ of 0.012 ug/L will be preserved, as will the maximum acceptable excess cancer risk level of 1E-6 for an individual carcinogen, i.e., B(a)P, in this case.

Soil : The situation for soils is more complicated because of the soil to ground water leaching pathway, in addition to direct contact (i.e., incidental ingestion). According to Ecology, leaching pathway cleanup levels have been developed for 6 of the 7 cPAHs, using the 3-phase model. The cleanup levels and the CalEPA TEFs are given below:

CPAH	Leaching CUL, mg/kg	CalEPA TEF
Benzo(a)anthracene	0.086	0.1
Benzo(b)fluoranthene	0.43	0.1
Benzo(k)fluoranthene	0.21	0.1
Benzo(a)pyrene	0.23	1.0
Chrysene	0.10	0.01
Dibenzo(a,h)anthracene	0.43	0.4
Indeno(1,2,3-cd)pyrene	Insufficient information	0.1

Using the above, leaching equivalent factors (LEFs) could be derived by ratios, again with B(a)P as the reference compound (to be consistent with TEFs). These would be derived, for example, by dividing the leaching cleanup level for B(a)P by the leaching cleanup level for benzo(a)anthracene to calculate an LEF of 2.7 for benzo(a)anthracene. Next, a composite index for toxicity and leaching would be calculated by multiplying the LEF by the chemical-

specific TEF, or 2.7 x 0.1 for benzo(a)anthracene, for an effective "toxicity leaching equivalence factor" or "TLEF" of 0.27. [Note: this is not a standard term but is suggested to help explain this methodology.] No TLEF can be calculated for indeno(1,2,3-cd)pyrene because a leaching cleanup level has not been derived.

Because Ecology has determined that direct contact is the risk driver, and therefore the basis, for unrestricted soils, the cleanup level for cPAHs would be 0.14 mg/kg B(a)P TEQ, based on the Method B calculation for the ingestion of soil contaminated with B(a)P. For industrial soils, Ecology has determined that leaching is the risk driver. Therefore the Method A cleanup level would be 0.23 mg/kg B(a)P TLEQ.

In order to allow for the derivation of ground water and soil cleanup levels of cPAHs as equivalent to B(a)P, tables giving TEFs (for ground water and unrestricted soils) and TLEFs (for industrial soil) would need to be provided for the user. In addition, a default TLEF for indeno(1,2,3-cd)pyrene would need to be established by Ecology.

The POG recommends that Ecology adopt the above methodologies for establishing Method A ground water and soil cleanup levels based on B(a)P, while allowing for the owner to assess site data more reflective of Ecology's approach to toxicity and leaching. It is recognized that, in certain cases, the PQL could exceed the calculated CUL in soil and/or ground water, in which case, the PQL would be the effective CUL.

Comment accepted, but a direct reference for cPAHs was removed from Tables 720-1, 740-1, 745-1, while a value and footnote for benzo(a)pyrene was added. This change may lead Table A users to believe that one does not have to test for cPAHs other than benzo(a)pyrene. See the POG comment under New Issue 7.

Issue 32
Table 830-1, Required Testing for Petroleum Releases

The POG concurs with the current version of Table 830-1, with the following exceptions:

1. The inclusion of PCBs with mineral oil, as discussed in Issue 19, Attachment I.

Comment rejected (page 304). The POG never agreed to the language in this footnote. It appears that Ecology accepted our request for alteration of the footnote in Tables 720-1, 740-1, and 745-1. The POG requests that footnote 14(3) be changed to comport with the language in Table 720-1(footnote "X") and Tables 740-1 and 745-1 (footnote S), fourth bullet which says:

3) it can be documented that the oil released was recently tested and did not contain PCBs.

2. Footnote (8) should be added to the cells for Naphthalenes/Gasoline Range Organics, Naphthalenes/Diesel Range Organics and Naphthalenes/Heavy Oils.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

3. In footnote (12)(b), change "when the inhalation exposure pathway may be required" to "when the inhalation exposure pathway is evaluated" for clarification purposes.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

4. In footnote (12)(c), delete the first sentence if footnote (8) is added to the Naphthalenes/Diesel Range Organics cell, as recommended in item 3), above.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

5. Include naphthalenes with "Volatile Petroleum Components" instead of with "Semivolatile Petroleum Components," because they are defined as volatiles for the purposes of evaluating petroleum in MTCA sections 740, 745 and 750.

Comment accepted (page 304). The table was appropriately amended.

6. Footnote (8) should be deleted from the cell for PCBs/Heavy Oils and substituted with a new footnote which requires PCB testing only of heavy oils known to have been historically manufactured using PCBs or historically used in processes/activities known to include PCBs. Examples include transformers, railroad transformers, mining motors, hydraulic systems, heat transfer systems, electromagnets, compressors, capacitors, switches, and miscellaneous electrical devices.

Comment rejected (page 304). Comment reiterated.

7. Change the title of the row that currently reads "TPH Analytical Methods for Use with Method A cleanup Levels" to "TPH Analytical Methods for Total TPH." Change the title of the row that currently reads "TPH Analytical Methods for Use with Methods B or C (TPH "fractions") to "TPH Analytical Methods for Use with TPH Fractions."These recommended changes are to increase the clarity of the analytical applicabilities.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

8. Delete footnote (10) from the cell representing GRO and Volatile Fuel Additives and Blending Compounds, and add an "X" to the cell. Ecology's own research has demonstrated that these hazardous substances are found in this state, and geographic location of a release is not sufficient for prediction purposes. Therefore, these should be

standard analytes when gasoline has been released. (If analyses over time show there is little or no reason for concern, this requirement could be amended/deleted.)

Comment withdrawn because it was appropriately revised.

9. Amend footnote (10) language to make clear that it applies to DRO releases only.

Comment accepted. The DRO above is a typo and should have read "GRO".

10. Add the following language to the note "Use of Table 830-1" immediately under the table: "An 'X' signifies that the analytical requirement applies to both ground water and soil samples, when those are media of concern at a site."

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

New POG Issues

The following issues have emerged as a result of revised MTCA August 2000 Proposed Amendments.

New Issue 1- Institutional Controls WAC, 173-340-440, (page 81-82)

Issue 1A Section 440(1) Purpose (page 81)

The POG requests clarification on the last sentence of the first paragraph which reads: "Institutional controls include:....."
We interpret this language to mean one or more of the items are institutional controls. To prevent the user from thinking that all of the named institutional controls are required, we recommend adding to the sentence to read:

"Institutional controls include one or more of the following:"

Issue 1B, Section 440(1)(e) (page 81)

The POG recommends deleting the following:

"Financial assurances (see subsection (11) of this section.)."

Financial assurances are not institutional controls. Rather, they can be used as mechanisms to ensure that institutional controls will be maintained during the appropriate time frame. Since 440 (11) is titled and discusses financial assurances for institutional controls, deleting the language in 440(1)(e) will not change the mechanisms or requirements for financial assurances. Whereas keeping the subsection (e) in the proposed regulations creates a logical circularity that confuses the reader. For example, the question naturally arises "How can a financial assurance be used to implement a financial assurance?

Issue 1C. Section 440(4) Circumstances required. (page 81)

The POG recommends modifying part of the language in the first sentence to read:

"Institutional controls shall be required for the property ~~to assure both the continued protection of human health and the environment and the integrity of an interim action or cleanup action~~ in the following circumstances."

The POG recommends adding "for the property" because there is a required MTCA-specified process [720(8)(d)(i)(G), 720(8)(d)(iii)(D), 600] whereby other affected property owners must be notified and provided with the opportunity to participate and comment on the decision-making process. The recommended change to incorporate the term "property" is an important one, in that if institutional controls were required for all properties within a "site," the new approaches for defining points of compliance provided for in the MTCA amendments [i.e., 720(8)] would not be workable. Deletion of the language "to assure both the continued protection of human health

and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

Deletion of the language "to assure both the continued protection of human health and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

Issue 1D, Section 440(d)

The following language has been inserted into this section:

> "A ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."

The language in 440(4)(d) creates potentially unnecessary requirements for institutional controls for sites where a ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level. Institutional controls and/or deed controls should not automatically be triggered simply because a site exists in an area of ground water nonpotability. Not all ground water cleanup levels must be based on potable criteria. For example, some may be based on the protection of surface water. In all cases, when cleanup levels are approved by the department have been met, no institutional controls should be required. As written, it would require institutional controls at many sites (such as along the Duwamish River and around Harbor Island), even when cleanup levels have been achieved. Therefore, the POG recommends that this sentence be clarified to say:

> "A ground water cleanup level is established using a site-specific risk assessment that includes institutional controls as part of the scenario under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."

This is a very important section. The POG recommendation should not be considered lightly or overlooked by Ecology. It is not adequate to say that the language of 440(4)(d) has been moved form another section of the law. In placing this language of 440(4)(d) in this section, it should be revised as recommended by the POG. It must be made to make logical sense in the totality of the new section on Institutional Controls.

Issue 1E, Section 440(4)(e)

Part (e) should be changed as follows:

> "..a conditional point of compliance is established as the basis for measuring compliance at the property ~~site~~."

The POG recommends changing "site" to "property" to comport with our recommendation in

Issue 1C, above. Otherwise, this requirement would impose a deed restriction on every property participating in an area-wide point-of-compliance or every property deemed to be within a site. This paragraph would otherwise limit implementation of area-wide cleanups in areas such as the Duwamish.

Issue 1F, Section 440(10)

Local government notification: In the first sentence of this paragraph, the POG recommends that Ecology change the words "with land use planning authority" to read "with both land use planning and permit issuance authority." In larger government organizations, such as the City of Seattle, land use planning and permitting are in different departmentsp, and the database for tracking such things as institutional controls is actually kept with the permit issuance department.

Issue 1G, Section 440(11)

The POG asks for clarification. The phrase "all costs associated with the operation and maintenance of the cleanup action" created some confusion among POG members. What is intended here by Ecology? The POG recommends that financial assurances come into play at the time that cleanup actions are completed, in that it is our understanding that this section applies to the integrity of any engineered and institutional controls implemented in connection with the cleanup action.

Issue 1H, Section 440(11)(b)

The POG recommends that Ecology delete the word "similar" that appears before the words "financial hardship" at the end of this paragraph.

New Issue 2. Section 730(2)(b)(iii) (page 188)

This subsection reads as follows:

> "For a hazardous substance deemed an indicator hazardous substance for surface water under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantitation limit, subject to the limitations in this chapter."

It has come to the POG's attention that, in response to the above language, at least some consultants and Ecology site managers are preparing tables which contain all detected chemicals at a site , with the assumption that they must all be cleaned up to Background or the PQL if no ARAR or risk-based CUL exists. Some TPH examples are: isopropyltoluene, n-butylbenzene, n-propylbenzene, trimethylbenzene, 4-methylphenol, and phenanthrene. The

POG believes that Ecology did not intend to impose a requirement to cleanup all chemicals without ARARs or risk-based cleanup levels to background concentrations or PQLs, but rather that the wording of the regulation is not sufficiently clear, so that some people can interpret it to in fact make such a requirement.

The POG therefore recommends the following modifications to the language, for clarification purposes:

> Section 708(2), (page 151) - Selection of indicator hazardous substances (IHS) should be moved to Section 700(5), Methods for setting cleanup levels. This is important because the selection of IHS is a necessary component of Method B and C evaluations, not just risk to assessment procedures.

Section 708(2)(a) language should be modified to say:

> "When defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, ~~the department may eliminate from~~ further consideration of hazardous substances may be eliminated when they: 1) do not have toxicity values as defined in 708(7) or (8) unless they are deemed by the department to be toxic and in addition, either bioaccumulative, persistent or highly mobile in environmental media; or 2) contribute a small percentage of the overall threat to human health and the environment.

Section 708(b) language should be modified as follows:

> ~~"If the department considers this approach appropriate for a particular site~~, The factors evaluated when eliminating individual hazardous substances from further consideration shall include:..."

New Issue 3. Section 708(7)(f)

The way that the language in Section 708(7)(f) is written, it appears that when an RfD is missing, the user must ("shall") calculate an RfD. The POG recommends changing the language from "shall" to "may" and inserting an important comma, as follows: "...may be established on a case by case basis, using the methods described in "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993 available on the internet at http://www.epa/gov/iris/rfd.htm." This change will clarify that developing an RfD is optional, but that if an RfD is developed, the cited document must be used.

New Issue 4, Section 700(8)(a), page 134.

A new paragraph on terrestrial ecological receptors was added to the TPH Overview under

(8)(a).

> "For soil contamination, the soil cleanup level must not result in any significant adverse effects on the protection and propagation of terrestrial ecological receptors. This determination must be made in accordance with the requirements and procedures specified in WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under ....."

The POG believes that the first sentence adds confusion rather than clarification to this subsection. The POG recommends deleting the first two sentences of subsection 700(8)(a) and replacing this language with the language from the 1999 proposed amendments:

> "The potential impact of TPH on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494."

It is acceptable to retain the rest of the new language in subsection (8)(a).

New Issue 5, Section 740 (3)(a)(iii)(C) and Section 745(3)(a)(iii)(C) Soil Vapors (pp. 202 and 218)

This new section is confusing because it conflicts with the soil vapors language in 740(3)(c)(iv) (page 205). Subsection (3)(a)(iii)(C) does not allow (A) Applicability. We do not believe that this was Ecology's intent. For clarity, the POG recommends that the entire subsection 740(3)(c)(iv) would be more appropriately located in 740(3)(a)(iii)(C). Then in Section 740(3)(c)(iv), soil vapor users can be referred to the earlier subsection. (This recommendation applies to Section 745 as well.)

New Issue 6, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3 (page 218)

The currently proposed language in equations 720-3, 740-3 and 745-3 reads:

> "F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the four phase partitioning approach model under WAC 173-340-747(6)."

The POG recommends modifying the language above to say:

> "F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the ~~four phase partitioning approach model under WAC 173-340-747(6)~~ the soil-to-groundwater partitioning approaches defined in WAC 173-340-747(4) or 173-340-747(6)."

New Issue 7, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3 (page 218)

The currently proposed language reads:

> "n = The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1)"

POG members are receiving analytical data from the labs in a format that displays EPH concentrations, VPH concentrations, and the volatile organic compound concentrations (as indicators) below. The definition of n above suggests that to compute the Hazard Index, one must sum the EPH plus the VPH plus the indicators. However, ethylbenzene and xylenes in the C8-C10 range would be double counted, potentially overestimating the HI. The POG understands that defining n is complex. We request Ecology's clarification and assurance that the definition of n above does NOT restrict the user from subtracting double counted chemicals. This definition of n and the manipulation of these risk equations underscores the need for TPH guidance.

New Issue 8, Tables 720-1, 740-1, 745-1

Ecology has deleted PAHs(carcinogens) from these tables and replaced it with Benzo(a)pyrene. The POG believes that deleting cPAHs from these tables will lead users to believe that they do not have to test for cPAHs. The POG recommends retaining cPAHs in all three tables and under the cleanup level, place a note saying "See Benzo(a)pyrene."

New Issue 9, Tables 740-1 and 745-1, Method A Cleanup Levels

The POG would like to express its concern regarding the new benzene soil cleanup level of 0.03 mg/kg, which has been decreased from 0.1 mg/kg. We understand that both the 3 phase and 4 phase partitioning models were used to generate this concentration (intended to be protective of groundwater). We are concerned that smaller businesses that cannot afford more sophisticated evaluations and techniques for addressing benzene in soils will be exposed to undue hardship with this decreased Method A cleanup level, if in fact the currently proposed level is unnecessarily low. The POG believes that there are several mechanisms, unaccounted for in the partitioning models, which may cause increased degradation and adsorption of benzene in soils and that with time this Method A cleanup value will prove to be significantly overprotective. We strongly encourage Ecology to develop a database with empirical data demonstrating the relationship between benzene in soils and in groundwater, so that the soil cleanup level can be adjusted in the near future, if so warranted.

New Issue 10, Table 720-1

The POG recommends that footnote bb for Xylenes be amended to say:

> "Cleanup level based on xylene not exceeding the maximum allowed cleanup level"

this table for total petroleum hydrocarbons and on prevention of adverse aesthetic characteristics."

New Issue 11, Method A Adjustments to Reflect Changes in RfD's

The RfDs for calculating TPH cleanup levels may change in the future. An example of this is the recent "retirement" of the EPA risk assessment issue papers recommending provisional noncancer toxicity values for inhalation and ingestion of benzene. EPA's Superfund Technical Support Center now recommends the use of the values presented in the document entitled "Toxicological Review of Benzene (Noncancer Effects)," NCEA-S-0455, dated September 1998 (the document may be read and/or downloaded at http://www.epa.gov/ncea/benztox.htm.). The currently recommended values are 1E-3 mg/kg-day (RfD) and 9E-3 mg/m3 (RfC). However, the document is under review, and values different from these may be posted to the IRIS database in the future.

The POG requests that Ecology commit to proposing amendments to Method A tables or releasing a policy statement with revised Method A cleanup levels when changes to toxicity values for petroleum fractions or individual petroleum-related chemicals are changed by EPA or under WAC 173-340-708(7)(g) or (8)(f) such that significant changes to Method A cleanup levels would result.

EXHIBIT 1

To: Brownfields/TPH Project Oversight Group
From: Warren Hansen – Onsite Enterprises
Re: Proposed MTCA ground water cleanup levels for diesel range organics, heavy oil and mineral oil.

Introduction

This memo puts forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments.

Methodology as included in proposed MTCA amendments

The four-phase model described in Section 747 predicts that the concentration of DRO dissolved in ground water under the Method A conceptual site model assumptions and TPH-saturated soil conditions is 107 ug/L. The composition of the dissolved DRO fractions at 107 ug/L represents a hazard index (HI) of 0.22. Up to this point, there is no disagreement on the assumptions and the use of the 4-phase model. However, to estimate the ground water concentration representing the balance of the allowable HI (i.e., 1.0 minus 0.22, or 0.78), Ecology essentially assumed that the composition of the fractions in the additional (remaining) DRO is the same as that of the solubilized fractions. This results in an additional ground water concentration of 379 ug/L, for a total of 486 ug/L, (rounded up to 500 ug/L, the proposed cleanup level).

Recommended Methodology

The recommended method put forth here is a hybrid between the solubility and whole-product approaches to estimating the composition of DROs and mineral oil in ground water. This method posits that the equivalent carbon fractions comprising the additional DRO are

better represented in the accepted Method A conceptual site model (leaching from the vadose zone to groundwater) as undissolved components moving into the groundwater. Remaining TPH (that is, the balance of the TPH comprising the remaining hazard index) is best represented by the same relative equivalent carbon fraction concentrations contained in the original (parent) product. For diesel, the concentration corresponding to the remaining HI of 0.78 is 546 ug/L, resulting in a more scientifically justifiable DRO ground water cleanup level of 107 + 546 = 653 ug/L (which can be rounded up to 700 ug/L or down to 650 ug/L, as a matter of policy).

For Mineral Oil, Ecology's approach to deriving the currently-proposed cleanup level of 1,000 ug/L is similar to that used for diesel. In the May 18, 1999 memo From Steve Robb to the MTCA Science Advisory Board, the allowable (dissolved) mineral oil concentration in ground water (using the same method describe for DRO's above) at a hazard index of 1.0 and saturated soil conditions is 465 ug/L (Note: Ecology later relied on two-phase partitioning experiments to propose a CUL of 1,000 ug/L). Use of the method recommended herein results in a cleanup level of approximately 1,500 ug/L for mineral oil.

DIESEL-RANGE ORGANICS	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	107	107	0.22
Remaining allowable concentration- assumes chemically similar to whole product	--	546	0.78
Remaining allowable concentration – assumes chemically similar to solubilized fractions	379	--	0.78
TOTAL	486*	653	Ecology Method: 1.0 Optional Method: 1.0

* Value based on original diesel fraction estimates by Ecology. Ecology subsequently decided to base the 500 ug/L cleanup level in the recently Proposed Amendments (November 1999) on the results of 2-phase partitioning experiments (Memo from P. Kmet to MTCA Science Advisory Board, December 20, 1999).

MINERAL OIL	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	18	18	0.04
Remaining allowable concentration- assumes	--	1440	0.96

chemically similar to whole product			
Remaining allowable concentration – assumes chemically similar to solubilized fractions	447	–	0.96
TOTAL	465*	1458	Ecology Method: 1.0 Optional Method: 1.0

* Value based on original mineral oil fraction estimates by Ecology. Ecology subsequently decided to propose an alternate cleanup level of 1000 ug/L in the recently Proposed Amendments (November 1999), based on soluble fractions laboratory test data provided by Puget Sound Energy (P. Kmet, ibid).

Cleanup levels using the compositions of diesel fuel and mineral oil employed by Ecology and Puget Sound Energy in their partitioning experiments (P. Kmet, ibid, Table 1) were also calculated using the proposed method. For Diesel fuel, the HI was exceeded by the soluble fractions, and this was attributed to the detected concentrations of BTEX in the samples. According to calculations by the Pollution Liability Insurance Agency (PLIA) if benzene is present, that compound would then control or "drive" the cleanup. In such cases, the corresponding TPH cleanup level for groundwater (assuming benzene is addressed separately) could be over 700 ug/L. Table 830-1 of the Proposed Amendments requires testing for benzene in groundwater when diesel contamination is suspected. Again, Ecology's proposed DRO cleanup level is overly conservative.

Summary

The recommended approach to calculating ground water cleanup levels for DROs and mineral oil presented in this memo is more scientifically justifiable than the method used for the proposed MTCA amendments, because it adheres to the leaching conceptual site model recommended to Ecology by the Science Advisory Board. The use of two-phase (product/groundwater) partitioning is not scientifically justifiable and results in overly conservative cleanup levels, as it in effect presumes the presence of NAPL on the water table. Yet the Proposed Amendments prohibit groundwater petroleum cleanup levels from exceeding a "concentration that would result in free product being present in or on the ground water" (WAC 173-340-720(4)(b)(iii)). The method A cleanup levels for diesel-range organics and mineral oil using the recommended method would be 700 (or 650) and 1,500 ug/L, respectively. Because of the much higher solubility of gasoline range organics, the optional method presented here is not recommended for calculating ground water cleanup levels for that petroleum category. I suggest the POG consider recommending this approach for DROs and mineral oil in its next round of recommendations to Ecology. The POG reiterates this comment.

Akana, Trish Alicia

From: Jill Nordstrom [JNordstrom@thermoretec.com]
Sent: Wednesday, October 25, 2000 2:22 PM
To: taka461@ecy.wa.gov
Subject: MTCA Comments

2616 Comment 1:

720(4)(b)(ii) "Concentrations established in accordance with the methods..." is not a complete sentence. Should it read "Concentrations MUST BE (or ARE TO BE) established in accordance with the methods..."?

2617 Comment 2:

173-340-720(8)(d)(ii) - Sites near but not abutting surface water.

The section refers back to criteria in (d)(i) of this section. This is contradictory since some of the criteria in (d)(i) specifically apply to sites abutting surface water, while this section [(d)(ii)] applies to sites not abutting surface water. For instance, under 173-340-720(8)(d)(i)(A) you must demonstrate that contaminated groundwater is entering the surface water. It seems illogical that to consider a conditional point of compliance for a non-abutting-surfacewater site that one MUST have impacted surface water. If the site is not abutting surface water, it would make sense that the impacted groundwater might not have reached the surface water yet. If this criteria is left in place, it would be beneficial to a PLP to wait to clean up a site until this condition is met. Futher, the paragraph under (d)(ii) goes on to say that "if the contamination has not yet reached the surface water..." indicating that it is acceptable to have an off property point of compliance without prior impact to surface water.
This inconsistency might be addressed by including the specific criteria under the "near but not abutting" section rather than referring back to the "abutting surface water" section.

2618 Comment 3:

WAC 173-340-720(2)(iv) - "The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source."

This criteria, inserted in the most recent version of the proposed amendments, makes it all but impossible for a determination that a site's groundwater beneficial use is as recharge to surface water, unless the site is actually adjacent to surface water. This is contrary to the formerly purported message that the revisions would be favorable to brownfields redevelopment efforts and help cleanups to occur in areas where cleanups might otherwise never be started. In the Duwamish Industrial area, for instance, it is not reasonable to assume that groundwater will be used as a source of drinking water. Cleanups in that area should take into account

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recharge to the Duwamish River as the highest beneficial use. However, given the permeable aquifer in the area, no sites other than those abutting the surface water would be able to obtain a determination that the water is non-potable. This places an undue burden on industry trying to cleanup sites, and encourages responsible parties to walk away from impacted sites.

LOWER ELWHA TRIBAL COUNCIL

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(360) 452-8471
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October 25, 1999

Trish Akana, Rules Coordinator
Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Akana:

We are writing with regard to the proposed revisions to the MTCA rules.

2112 The Lower Elwha Klallam Tribe has made two agreements with the Department of Ecology, a Preliminary Agreement and a Superfund Deferral Agreement, which contemplate that Ecology will carry out a CERCLA-protective cleanup at the Rayonier Mill Site in Port Angeles Harbor. Included in those agreements is Ecology's undertaking to use site-specific tribal exposure parameters in carrying out risk assessments and setting cleanup levels. The proposed rule repudiates those agreements; if it is adopted as written it will result in their termination in favor of a federal superfund cleanup.

The Tribe's comments regarding proposed revisions to the Model Toxics Control Act (MTCA) procedures for human health risk assessment, specifically with respect to exposure parameters at WAC 173-340-708(10)(b), follow:

Currently, MTCA rules provide that exposure parameters developed by the Department of Ecology (with the exception of gastrointestinal absorption rate, inhalation correction factor, bioconcentration factor, or inhalation absorption rate) shall not be modified for individual hazardous substances or sites *in a manner which results in a less stringent cleanup level.* This provision would seem to allow for modification of certain exposure parameters, such as fish consumption rates, based on site-specific exposures, that could result in more stringent cleanup levels. Because a significant percentage of tribal and other subsistence fishers may be consuming fish at a rate higher than that established by Ecology, use of a higher consumption rate is be necessary at certain sites to ensure that cleanup levels are protective of human health.

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In the proposed revisions to MTCA, however, the subsection on exposure parameters (WAC 173-340-708(10)(b)) indicates that the default exposure parameters, including fish consumption rates, "shall not be changed when calculating cleanup levels." The provision no longer allows for modification of the exposure parameters, even if those parameters may underestimate actual exposures. Based on recent tribal fish consumption surveys for the Puget Sound and the Columbia River regions, actual fish consumption rates of adult tribal members may be significantly higher than the rate of 54 grams per day established by Ecology. The most recent consumption survey, completed by the Suquamish Tribe in cooperation with the Washington Department of Health and the Agency for Toxic Substances and Disease Registry (ATSDR), indicates that mean adult fish consumption rates are four times higher than the rate established by Ecology, and high end (95th percentile) consumers may be consuming 10 to 15 times more than the established rate.

Not allowing for modification of exposure parameters at sites where higher exposures occur will result in cleanup levels which are not protective of tribal fishers or other subsistence fish consumers.

The Tribe suggests that Ecology avoid a one-size-fits-all approach to protecting the state's diverse communities. Specifically, the Tribe requests that Ecology include provisions for site-specific modification of certain exposure parameters for human health risk assessment where those modifications are necessary to protect human health, as long as the modifications do not result in less stringent cleanup levels.

Thank you for the opportunity to comment.

Sincerely,

Russell N. Hepfer
Tribal Chair

WSPA
Western States Petroleum Association

Daniel T. Riley
Northwest Regional Manager

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NINETY YEARS OF SERVICE
to the Petroleum Industry in the West
1907-1997

October 26, 2000

Ms. Trish Akana
Rules Coordinator, Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Comments on Proposed Amendment to the Model Toxics Control Act Regulation

Dear Ms. Akana,

Thank you for the opportunity to once again comment on the proposed amended Model Toxics Control Act Regulation. Western States Petroleum Association (WSPA) is a trade association whose members conduct much of the production, refining, transporting and marketing of petroleum and petroleum products in the Western United States. Our members have participated extensively in the 5-year process to improve the MTCA regulation. Following this cover letter are specific comments on some of the more critical issues to our members.

WSPA appreciates Ecology's hard work and effort in developing the proposed regulations. However, the proposed amendments fall short of the goal to make MTCA "fairer, easier to understand, more flexible, less ambiguous and less expensive". WSPA stands by its previous recommendation that Ecology either significantly modify the proposed amendments so that they are reflective of the Policy Advisory Committee recommendations, or withdraw the notice of proposed rule making and reconvene negotiations to develop the rule in accordance with RCW 34.05.310. We make this recommendation fully aware that everyone, including our members, has spent a significant amount of time in this effort. We all wish to see this process reach its conclusion, but it is far more important to have a regulation that will work for all involved.

WSPA members remain committed to working with Ecology to develop a cleanup regulation that will serve the needs of business, the environmental community and the state.

Sincerely,

Daniel T. Riley

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Comments by the Western States Petroleum Association on Amendments to the Model Toxics Control Act Regulation Proposed by the Department of Ecology

October 26, 2000

INTRODUCTION

On August 16, 2000, the Department of Ecology (Ecology) formally issued a notice of proposed rule making to amend the Model Toxics Control Act (MTCA) regulation.[1] This is the second formal proposed rule making issued by Ecology in the long process of MTCA reform, the first having been issued on November 17, 1999,[2] and withdrawn on May 3, 2000.[3] The purpose of the amendments is to "[i]mplement changes recommended by the Policy Advisory Committee in its December 1996 report to the legislature and ecology; comply with other laws and the governor's executive order on regulatory reform." [4]

The Western States Petroleum Association (WSPA) is a trade association whose members conduct much of the producing, refining, transporting and marketing of petroleum and petroleum products in the western United States. WSPA has a strong interest in the implementation of MTCA. It has participated in the 5-year effort to improve the program from the beginning. Two WSPA members served as alternates on the Policy Advisory Committee; WSPA has been an unofficial member of the Duwamish Brownfields/TPH Project Oversight Group; and WSPA members or representatives have participated in numerous discussions and negotiations with Ecology and other MTCA stakeholders.

More than three years ago, when Ecology initiated the formal rule making process, it stated: "It is intended that these changes will make the business of environmental cleanups fairer, easier to understand, more flexible, less ambiguous and less expensive."[5] As Ecology noted, these goals were the focus of all of the recommendations made by the Policy Advisory Committee.[6] WSPA fully agrees with Ecology and the Policy Advisory Committee. These goals succinctly describe the objectives of MTCA reform, and they provide a standard by which we should evaluate the proposed amendments.

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[1] WSR 00-16-135 (Aug. 16, 2000) (Proposed Amendments).

[2] WSR 99-22-077 (Nov. 17, 1999).

[3] WSR 00-09-083 (May 3, 2000).

[4] Proposed Amendments at 345.

[5] Rule Authorization Document, Revisions to Chapter 173-340 WAC Model Toxics Control Act (Mar. 1997).

[6] Ibid.

WSPA appreciates Ecology's hard work and dedication in developing the proposal. We know that it represents a great effort by many talented people within the department. However, the proposed amendments fall woefully short of the goal to make MTCA "fairer, easier to understand, more flexible, less ambiguous and less expensive." Although we believe that this objective remains within reach, we do not believe that it can be achieved by Ecology merely reviewing and responding to public comment on the proposal. The fact that the proposal still falls short of the needed reforms, notwithstanding one full round of formal notice and comment rule making, reinforces our belief. As presently drafted, the proposed amendments would make MTCA worse, not better.

2113

RECOMMENDATION

WSPA recommends that Ecology either significantly modify the proposed amendments so that they are reflective of the Policy Advisory Committee recommendations or again withdraw the notice of proposed rule making, and reconvene negotiations to develop the rule in accordance with RCW 34.05.310.

WSPA made this recommendation once before, in commenting on the last proposal. As then, we remain fully aware that everyone, including our members, wishes to see this process reach its conclusion. It has already taken far too long. Although we are all tired, the incredible commitment of time and talent by so many hundreds of individuals, businesses and organizations should motivate us to make sure we get it right.

2114

GENERAL DISCUSSION

Ecology Did Not Fulfill Its Commitment to Negotiate the Terms of the Rule

When Ecology commenced the process to rewrite the MTCA regulation, it committed itself to engage in a negotiated rule making.[7] However, it has not fulfilled that commitment. That is particularly unfortunate, since real improvements to MTCA have always been achieved by negotiation among all stakeholders.

1995-1996: The Policy Advisory Committee

The effort to improve MTCA began in 1995, when the Legislature passed ESHB 1810.[8] That legislation directed Ecology to establish the Policy Advisory Committee (PAC) "to provide advice to the legislature and the department on administrative and legislative actions to more effectively implement the model toxics control act...."[9] "In conducting its review the committee

[7] WSR 97-10-092 (May 21, 1997).

[8] Laws of 1995, ch. 359.

[9] ESHB 1810, sec. 1(1).

shall, wherever possible, operate on a consensus basis and, when consensus is not possible to achieve, the committee should encourage the development of recommendations that are broadly supported within the committee."[10]

Over a period of approximately 17 months, the PAC met 25 times as a full committee. Four subcommittees, focused on risk assessment, remedy selection, independent cleanups and implementation, and a number of task forces, met even more often. As required by the Legislature, the PAC submitted its final report on December 15, 1996.[11] The report addressed 28 issues, making specific consensus recommendations for most of them.

As a member of the PAC, Ecology consistently indicated to other PAC members that its intention was to adopt a rule that would implement the PAC's recommendations. In 1997, Ecology reiterated this commitment: "The overarching direction from the Committee is a clear expectation that Ecology amend the rule. Throughout participation as a member of the Committee, Ecology's commitment has been to do a rule; to remain as faithful as legally possible to language already negotiated; and to bring the parties together to negotiate language where the Committee did not develop proposed rule." Ecology stated that "[t]o ignore the recommendations would be a breach of faith and would thwart the intent of the legislation that created the Committee process."[12]

1997- 2000: Formal Rule Making

However, the rule development process has involved very little negotiation. Instead, Ecology formed an External Advisory Group with which it occasionally consulted as it wrote the rule language itself. Ecology's interaction with the External Advisory Group was not a negotiation in any sense of the word. It certainly was not a negotiation as contemplated under the Administrative Procedures Act. The intent of a negotiated rule making is to "seek to reach consensus on the terms of the proposed rule";[13] in other words, to develop consensus-based rule language that is filed as the proposed rule for official public hearing and comment.[14]

In February 1998, Ecology released a pre-proposal draft rule that was the culmination of its internal rule writing process. That draft was almost universally criticized as overly complex and unworkable, and as failing to reflect the recommendations of the PAC. Eventually, even Ecology admitted that the February 1998 draft was fundamentally flawed. It invited stakeholders

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[10] ESHB 1810, sec. 1(4).

[11] Final Report of the Model Toxics Control Act Policy Advisory Committee (Dec. 15, 1996).

[12] Rule Authorization Document, Revisions to Chapter 173-340 WAC Model Toxics Control Act (Mar. 1997).

[13] RCW 34.05.310(2)(a) (emphasis added).

[14] Office of Financial Management, A Guide to Negotiated Rule Making, Appendix A.

to participate in a series of negotiations in the summer of 1998, and specifically encouraged parties to submit alternative rule language for those negotiations.

For a brief period, then, Ecology did conduct a negotiated rule making. Among the ground rules for the negotiations, it was agreed that "[t]he focus is to draft specific rule language at these sessions, and reach a consensus among those at the table."[15] However, these negotiations failed to address key elements of the amendments. And although specific rule language was agreed upon in a few instances, for the most part, Ecology reserved for itself the authority to unilaterally draft language – or even change language that had been agreed upon.

On November 17, 1999, Ecology issued a formal proposed rule. After receiving dozens of written comments, taking testimony at public hearings and conducting meetings with a variety of stakeholders, approximately six months later Ecology withdrew the rule because of a technical error. Since withdrawing the proposed rule, it has revised the proposal once again. Unfortunately, none of the revisions address adequately the key concerns identified below.

2115

The Proposed Amendments Fail to Improve MTCA

As noted above, Ecology has said that the intent of MTCA reform is to make the business of environmental cleanups fairer, easier to understand, more flexible, less ambiguous and less expensive. The proposed amendments will not meet this goal. In fact, if implemented in its current form, the proposal would result in longer, more complex and more expensive cleanups. More importantly, these longer, more complex and more expensive cleanups will not result in better protection of human health and the environment.

The priority of both the potentially liable person (PLP) and Ecology in an environmental cleanup should be the protection of human health and the environment. A major challenge is to maintain this protection within the reality of limited public and private resources. In order to achieve maximum benefits to human health and the environment, a cleanup regulation must be based on sound science and must ensure that finite resources are focused on those sites (and the specific aspects of sites) that pose the greatest risk to human health and the environment.

A cleanup regulation must also contain the elements of certainty, clarity and consistency so that PLPs, prospective purchasers, lenders, the general public, and others can accurately gauge the true cost and benefits of the cleanup. A rule that lacks certainty, clarity and consistency may have the effect of discouraging some PLPs from voluntarily entering into the cleanup process.

After having read the proposed amendments, we conclude that it is unlikely that the revised rule could meet its stated goals with just a small number of fixes or language changes. Unfortunately, we believe that Ecology needs to take a step back and look at the intention of the revisions, at the recommendations of the PAC and the POG, and at the need to make the rule a truly risk-based system before proceeding any further with the process.

[15] Guidelines for MTCA PAC Rule Facilitation (July 27, 1998) (emphasis in original).

WSPA Comments on Proposed MTCA Amendments
October 26, 2000

Following is a discussion of major aspects of the proposed amendments that we believe need to be addressed. Included are examples of the rule's excessive complexity and incompatibility with a risk-based decision making process. This is followed by comments on specific provisions of the proposed amendments. We have tried to be thorough in these specific comments. However, the scope and number of needed changes that we have identified prompts us to caution that this is not an exhaustive list. It is likely that additional revisions to the proposed amendments are needed for the rule to meet its goal of making MTCA fairer, easier to understand, more flexible, less ambiguous and less expensive.

2116

Risk-Based Cleanup

The proposed amendments contain the structure of a three-tiered system for establishing cleanup levels. Ecology has claimed that this is a risk-based approach based on the nationally recognized ASTM Risk-Based Corrective Action[16] (RBCA) model[17]. However, a close examination clearly reveals that the similarities are almost entirely superficial and that the proposed amendments fail to incorporate even the basic principles of the ASTM RBCA model. The ASTM RBCA contains two key elements that are largely missing in the proposed amendments:

- allowance for a reasonable assessment of potential exposure; and
- a tiered-system for setting cleanup levels with significant flexibility at the higher levels.

Reasonable Assessment of Potential Exposure

It is simply not possible to have a risk-based program that does not allow for a realistic evaluation of potential risks. A fundamental problem in the proposed amendments is the very limited ability to evaluate and use realistic exposure scenarios in establishing cleanup levels. MTCA (and the ASTM RBCA) provides for the use of reasonable maximum exposure (RME) scenarios based on estimates of current and future resource uses. MTCA defines RME as "the reasonable maximum exposures for ground water, surface water, soil, and air."[18] It establishes default RMEs for each pathway, but provides for the use of alternate RMEs where the PLP demonstrates that default RMEs "are not appropriate for a particular site."[19] However, the proposed amendments constrain PLPs' ability to use alternate RMEs even if the default RME is

[16] ASTM E1739-95, Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites © 1997 American Society for Testing & Materials.

[17] Fact Sheet: Proposed Changes to the Model Toxics Control Act Cleanup Regulation – Petroleum Cleanup (November 1999).

[18] WAC 173-340-708(3)(b).

[19] WAC 173-340-708(3)(c).

not appropriate. Under the proposed amendments, an alternate RME may be used only if specifically authorized in the medium-specific provisions.[20] A review of these provisions reveals that the only alternate RMEs allowed for cleanup levels are non-potable ground water, industrial soil and industrial air.

For example, the proposed amendments establish that ground water use as drinking water will be the RME at most sites, allowing for only very limited exceptions. The criteria for demonstrating that ground water is not a reasonable current or future source of drinking water are very narrowly defined and result in the over-classification of a number of ground water resources. This stipulation of almost all ground water as drinking water is over-conservative and is inconsistent with the RME definition of "reasonably expected to occur at a site under current and potential future site use".[21] This is particularly true given the current understanding of attenuation processes and the natural degradation of petroleum compounds over time.

Under the ASTM RBCA process, it is fully anticipated that cleanup levels at many, if not most, sites will be based on RMEs other that ground water ingestion. However, the proposed MTCA amendments contain only a very limited ability to establish cleanup levels based on non-drinking water RMEs. Further, establishing cleanup levels based on non-drinking water use is technically complex. For example, the establishment of cleanup levels for non-potable ground water requires the use of a site-specific risk assessment[22]. By comparison, the ASTM RBCA provides for Tier 1 cleanup levels for both soil and ground water based on a variety of exposure pathways including ingestion, direct contact, and transport to other media. This results in a system that is more useable for all sites.

Tiered System With Significant Flexibility

The three tiered-system for establishing cleanup levels in the proposed amendments is not comparable to the ASTM RBCA process. Method A contains very conservative cleanup levels based exclusively on the RME of ground water as drinking water. Cleanup levels for other exposure pathways are not included. There are two methods for establishing Method B and C cleanup levels: standard and modified. Ecology has indicated that site-specific information can be used in establish cleanup levels. According to Section 700(5)(b), Modified Method B provides for the use of site-specific information to change selected default assumptions. However, a review of the Modified Method B for ground water reveals that the changeable assumptions are not in fact site-specific, but rather are various toxicity factors that do not result in site-specific cleanup levels tailored to the risks at a site[23]. The only site-specific information used in establishing ground water cleanup levels is the use of TPH composition to set a fraction-

[20] Proposed Amendments at 419. Section 708(3)(c).

[21] Proposed Amendments at 419. Section 708(3)(b).

[22] Proposed Amendments at 431. Section 720(6)(b)(ii).

[23] Proposed Amendments at 429. Section 720(4)(c).

based level. Further, an initial review suggests that the output of the Method B and C equations is very similar to the Method A values. This is completely inconsistent with the ASTM RBCA model in which site-specific information is used to reduce uncertainties assumed in the conservative Tier 1 calculations regarding exposure or fate and transport of constituents. This adjustment of exposure or modeling features to address site specific uses and conditions is done without changing the target risks and level of health protection. Under an ASTM RBCA approach, the result of using site specific information in Tier 2 or Tier 3 is frequently higher cleanup levels. In fact the primary flexibility in the higher tiers within MTCA is allowed solely for purposes of establishing remediation levels or for justifying a remedy selection.

2117

The Remedy Selection Process

The proposed amendments regarding remedy selection are not consistent with the recommendations of the PAC and do not meet the goal of making cleanups more equitable, more flexible, easier to understand, less ambiguous, and less expensive. The current remedy selection process contains a number of competing concepts that must be evaluated including "permanent solutions," "technically possible," and "practicable". These concepts should be replaced to the maximum extent possible by one simple concept; cleanup to the extent necessary for protection of human health and the environment.

2118

The remedy selection process is clearly biased toward active remediation as opposed to selecting cleanup actions based on protection of human health and the environment. For instance, the proposed amendment states that "[c]leanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a cleanup action alternative that utilizes a more permanent cleanup action for all or a portion of the site."[24] This provision is plainly inconsistent with the PAC's recommendation that "institutional controls [be] judged by the same remedy selection standards, including protectiveness and long-term effectiveness, as are used to judge other cleanup actions."[25] Although application of the PAC-recommended remedy selection standards would not be expected to often lead to cleanup actions based primarily on institutional controls, such a categorical proscription is unjustified. If a cleanup action based on institutional controls is protective of human health and the environment and meets the other standards for selection of a remedy (e.g., is permanent to the maximum extent practicable, etc.), it should be acceptable.

This provision seems to preclude the use of an "industrial use" designation even where such a designation would fully protect human health and the environment. For example, how would this provision apply to an industrial site with moderate to high levels of soil contamination that are shown to not present a contact risk to humans or wildlife, and to not present a risk to a beneficial use of ground water? At this type of site, the obvious remedy would be to place an institutional control on the site that restricts its use as industrial only. The proposed

[24] Proposed Amendments at 385. Section 360(2)(e).

[25] PAC Report at 33.

amendments, however, appear to preclude the selection of this cleanup action; instead, it appears to require a remedy that is "technically possible" (e.g., excavation), regardless of the risk posed by the site.

2119 Another example is the categorical requirement to use a technology-based remedy, such as AKART. This requirement is illogical where a non-treatment-based remedy meets the applicable remedy selection standards (including permanent to the maximum extent practicable), and is inconsistent with the PAC recommendation to eliminate the priority given to treatment technologies in remedy selection. Moreover, it is contrary to the PAC recommendation "to limit, to the extent allowed by law, the instances when an AKART analysis must be conducted in addition to the remedy selection analyses required by WAC 173-340-360."[26]

2120 Yet another example of the bias for active treatment is found in the criteria for use of Method C. The proposed amendments retain a requirement of the current rule that a PLP may use a risk-based method C cleanup level only after "all practicable methods of treatment are used."[27] If method C levels are protective of human health and the environment, and a non-treatment-based cleanup action meets the applicable remedy selection standards (including permanent to the maximum extent practicable), what is the logical justification for requiring treatment? The retention of this language is inconsistent with the PAC recommendation to eliminate the priority given to treatment technologies in remedy selection.[28]

2121 An additional issue of concern is the use of conditional points of compliance. Section 720(8)(c) states that a conditional point of compliance can be used "[w]here it can be demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level throughout the site within a reasonable restoration time frame". Use of the concept of practicability muddles what should be the overriding issue in establishing cleanup standards – whether moving a point of compliance to a property boundary (or to a point beyond the property boundary for that matter) presents an unacceptable level of risk to human health and the environment. The section then goes on to say that "[w]here a conditional point of compliance is proposed, ... all practicable methods of treatment are to be used in the site cleanup."[29] As discussed above with respect to the use of Method C cleanup levels, if a cleanup standard is protective of human health and the environment, and a non-treatment-based cleanup action meets the applicable remedy selection standards (including permanent to the maximum extent practicable), there is no logical justification for requiring treatment. Moreover, such a requirement is inconsistent with the PAC recommendation to eliminate the priority given to treatment technologies in remedy selection.

[26] PAC Report at 35.

[27] Proposed Amendments at 417. Section 706(1)(a).

[28] PAC Report at C-46.

[29] Proposed Amendments at 432. Section 720(8)(c).

2122

Cleanup Levels

The proposed amendments regarding cleanup levels have resulted in an extremely conservative approach that is inconsistent with the stated intent of making cleanups more equitable, more flexible, easier to understand, less ambiguous, and less expensive.

Of particular concern are the changes to Method A Soil Cleanup Levels for TPH as gasoline and BTEX compounds. These changes are based on an overly simplistic model that ignores basic principles of how hydrocarbons act in the environment. The model uses overly conservative values for input parameters that result in redundant conservatism. The results of the model suggest that the current Method A Soil Cleanup Levels are not adequately protective of ground water. However, a large number of sites have already been remediated using current Method A Soil Cleanup Levels. We are aware of no empirical evidence that suggests that the existing cleanup levels have been unprotective. What this comparison between empirical evidence and the model results demonstrates is the inappropriateness of the model and assumptions used to generate the Method A Soil Cleanup Levels.

Furthermore, it is this same model that is used to develop Standard Method B Soil Cleanup Levels. There is essentially no difference in Method A and Standard Method B Soil Cleanup Levels, except that Method B allows for use of a fraction-based approach for TPH. In order to insert any flexibility into the process and move away from Method A Soil Cleanup Levels, the Modified Method B must be used. Although the alternatives described under Modified Method B contain flexibility, they will require a substantial effort that may not be appropriate for many sites. In other words, a complicated and expensive Modified Method B cleanup level must be calculated just to establish cleanup levels equivalent with current Method A Soil Cleanup Levels. It is difficult to understand how these changes meet the stated intent of the proposed amendments.

2123

Additionally, the establishment of cleanup levels lacks significant flexibility. This is primarily due to the use of ground water as drinking water as the RME at the vast majority of sites. The criteria for demonstrating non-potability[30] are overly narrow and prevent a realistic assessment of potential exposure pathways and the selection of cleanup levels based on a reasonable determination of potential risk. Realistically, cleanup levels at a large percentage of sites should be based on RMEs such as ground water discharging to surface water, vapor transport to outdoor or indoor air, or direct contact with soils. This would be consistent with risk-based programs in numerous other states where non-drinking water pathways frequently drive the establishment of cleanup levels. The combination of very conservative models and assumptions, along with the inability to use realistic RMEs produces cleanup levels that are unnecessarily conservative and result in cleanups with much higher costs than are necessary to protect human health and the environment.

[30] Proposed Amendments at 426. Section 720(2).

Most of the flexibility allowed regarding establishment of cleanup levels is only permitted for setting remediation levels or for evaluating a proposed remedy. When conducting this type of an evaluation the default RME (drinking water) can be changed to reflect a more reasonable exposure scenario for the site.[31] However, cleanups involving remediation levels are not considered permanent solutions and require the use of institutional controls. Thus this apparent flexibility is not available for establishing actual cleanup levels.

COMMENTS ON SPECIFIC PROVISIONS

2124 **WAC 173-340-200 DEFINITIONS**

(1) Ecology proposes to add a definition of "natural attenuation" that states: "Natural attenuation is not an active remedial measure."[32] Since "[e]xtending the restoration time frame shall not be used as a substitute for active cleanup actions, when such actions are practicable",[33] it appears that monitored natural attenuation – which, by its nature, typically involves a longer restoration time frame – may not be selected as a cleanup action.

Recommendation: Strike the last sentence in the definition.

2125 (2) Ecology proposes to amend the definition of "routine cleanup action".[34] It proposes to limit the definition to those sites that qualify for an exclusion from a simplified or site-specific terrestrial ecological evaluation. There is no reason to determine categorically that routine cleanup actions may not include remedial actions at sites that conduct a simplified terrestrial ecological evaluation.

Recommendation: Amend the fourth bullet to provide that sites excluded from further terrestrial ecological evaluation under either the proposed WAC 173-340-7491 or 173-340-7492 may be considered routine cleanup actions if they meet the other pertinent criteria.

2126 (3) Based on concerns arising out of the nondelegation doctrine, Ecology proposes to eliminate certain provisions under the MTCA regulations that incorporate various state and federal rules and laws, as well as certain industry and professional standards. For example, the definition of "carcinogen" is based on the U.S. Environmental Protection Agency's Guidelines for Carcinogen Risk Assessment "as presently published or as

[31] Proposed Amendments at 444. Section 740(3)(d).

[32] Proposed Amendments at 369.

[33] Proposed WAC 173-340-360(4)(f). Proposed Amendments at 386.

[34] Proposed Amendments at 371.

subsequently amended or republished."[35] However, Ecology proposes to eliminate the reference to revisions to the guidelines.[36] Although this does not make for technically-sound environmental policy, Ecology is probably correct that the nondelegation doctrine leaves it with little choice.[37] In addition to definitions proposed to be modified by Ecology, the following also may be affected by this doctrine: applicable state and federal laws, Cohen's method, conducting land use planning under chapter 36.70A RCW, hazardous substance, health effects assessment summary tables (HEAST), industrial properties, integrated risk information system (IRIS), Land's method, legally applicable requirements, relevant and appropriate requirements, threatened or endangered species, underground storage tank (UST), volatile organic compound, and zoned for (a specified) use.[38]

Recommendation: Clarify whether and how the above definitions, or others, are affected by the nondelegation doctrine.

2127 **WAC 173-340-300 SITE DISCOVERY AND REPORTING**

(4) Subsection (2)(b) states that persons should use best professional judgment in deciding whether a release of a hazardous substance may be a threat or potential threat to human health or the environment.[39] It then provides a non-exhaustive list of "examples of situations that generally should be reported under this section".[40] The term "'should' means the provision is optional and permissive, and does not impose a requirement.[41] The list of examples would be more appropriately placed in guidance than the rule, since the examples clearly are not, and should not, be enforceable requirements.

[35] WAC 173-340-200.

[36] Proposed WAC 173-340-200. Proposed Amendments at 366. Ecology has proposed similar amendments to the definitions of "federal cleanup law", "maximum contaminant level", "maximum contaminant level goal", and "secondary maximum contaminant level". Proposed Amendments at 367 – 369.

[37] According to the Washington Supreme Court, the Legislature may "enact statutes which adopt *existing* federal rules, regulations, or statutes," but it may not adopt "legislation which attempts to adopt or acquiesce in *future* federal rules, regulations, or statutes." *State v. Dougall*, 89 Wn.2d 118, 122, 570 P.2d 135 (1977) (emphasis by the court). Similarly, while the Legislature may adopt standards developed by a private association, it may not adopt standards that have not yet been developed. *State ex rel. Kirschner v. Urquhart*, 50 Wn. 2d 131, 136-37, 310 P.2d 261 (1957).

[38] Proposed Amendments at 366 – 372.

[39] Proposed Amendments at 373.

[40] Proposed Amendments at 373.

[41] Proposed WAC 173-340-210(6). Proposed Amendments at 372.

Recommendation: Strike the list of examples and retain them in guidance.

2128 (5) Subsection (2)(b)(viii) provides that a person generally should report a release where chemicals have leaked or been dumped on the ground.[42] Does this include instances where a release to the ground surface occurred, but prior to the discovery all surface contamination is gone?

Recommendation: Clarify that this provision refers to the discovery of current surface contamination, not historic contamination.

2129 (6) Subsection (2)(b)(ix) provides that a person generally should report a release from a leaking underground petroleum storage tank not already reported under WAC 173-340-450.[43] Is this meant to include underground petroleum storage tanks not regulated under chapter 90.76 RCW (e.g., most home heating oil tanks)? Why does it exclude regulated non-petroleum underground storage tanks?

Recommendation: Clarify that this provision refers to regulated underground storage tanks, and that the reporting requirements are specified under WAC 173-340-450.

2130 **WAC 173-340-350 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY**

(7) Subsection (7)(c)(iii)(F)(I) requires that the RI include any information needed to conduct a terrestrial ecological evaluation or to establish an exclusion.[44] Does this mean that all information-gathering activities arising under the proposed WAC 173-340-7490 through 173-340-7494 must be completed prior to completion of the RI? Does this include completion of a site-specific evaluation – if one is conducted – in accordance with the methods under the proposed WAC 173-340-7493(4)?

Recommendation: Clarify that an RI needs to include all information needed to conduct a terrestrial ecological evaluation only if that evaluation will be conducted before selecting a health-based cleanup action.

2131 (8) Subsection (7)(c)(iii)(F)(II) authorizes a terrestrial ecological evaluation to be conducted after evaluation of the cleanup action alternatives for protection of human health under appropriate circumstances.[45] Does this mean that, under the appropriate circumstances, the terrestrial ecological evaluation may be deferred until after human health cleanup action alternatives are evaluated, but must be conducted before the health-based cleanup action is selected?

[42] Proposed Amendments at 373.

[43] Proposed Amendments at 373.

[44] Proposed Amendments at 378.

[45] Proposed Amendments at 378.

Recommendation: Clarify that a terrestrial ecological evaluation need *not* be conducted prior to selection of the human health-based remedy unless there is a specific reason to do so.

2132 (9) Subsection (8)(c)(i)(E) requires that, if necessary, the FS shall evaluate residual threats that would accompany each cleanup action alternative and determine whether remedies that are protective of human health will also be protective of terrestrial receptors, then refers back to the proposed WAC 173-340-350(7)(c)(iii)(F).[46] Does this subsection require anything more than the requirements under the cross-referenced proposed WAC 173-340-350(7)(c)(iii)(F)? If so, what additional requirements are imposed? If not, these provisions are redundant, and one of the them should be stricken. Also, what circumstances would render an evaluation of the residual threats "necessary"? Finally, the context of this sentence suggests that this requirement to evaluate residual threats is limited to an evaluation of the residual threats to terrestrial ecological receptors. Is this correct? If not, what circumstances would render an evaluation of the residual threats to human health "necessary"?

Recommendation: Strike this provision as redundant.

2133 **WAC 173-340-357 QUANTITATIVE RISK ASSESSMENT OF CLEANUP ACTION ALTERNATIVES**

(10) Subsection (3)(f) provides exposure parameter values that may be used to evaluate risk to human health resulting from soil ingestion at an active commercial gas station when establishing a remediation level.[47] This is based on a PAC recommendation,[48] but the condition that the station be active goes beyond the PAC recommendation. There appears to be no justification for requiring that the gas station be active if the appropriate controls are in place to prevent higher exposure levels.

Recommendation: Eliminate the condition that limits use of this scenario to active stations.

2134 (11) Subsection (3)(f) only addresses the soil direct contact pathway. The PAC recommended that Ecology also develop approaches for setting remediation levels for other relevant pathways, including vapor and soil to ground water.[49]

[46] Proposed Amendments at 379.

[47] Proposed Amendments at 381.

[48] PAC Report at 29-30.

[49] PAC Report at 29.

Recommendation: Ecology should adopt default exposure scenarios applicable to commercial gas stations for other relevant pathways.

2135 **WAC 173-340-360 SELECTION OF CLEANUP ACTIONS**

MINIMUM REQUIREMENTS

(12) Subsection (2)(d) requires that contaminated soils at current or potential future residential areas, schools and day care centers be treated, removed or contained.[50] Does this requirement prohibit anything other than a cleanup action that relies exclusively on institutional controls?

Recommendation: If other types of cleanup actions are prohibited, they should be identified. Otherwise, this provision should be clarified to simply say that such cleanup actions shall not rely exclusively on institutional controls.

2136 (13) Subsection (2)(d) also identifies that factors that are to be considered in determining whether property is a potential residential area, there is no discussion of how to determine whether property is a potential school or day care center.[51] The latter term is not even defined in the rule, and the definition of school provides no insight into how to determine whether property might be used as a school in the future.

Recommendation: Clarify the kinds of properties that are subject to this provision.

2137 (14) Subsection (2)(e)(ii) requires that cleanup actions using institutional controls "meet each of the minimum requirements specified in this section, just as any other cleanup action."[52] The same language is found in Section 440(5).[53] This does not reflect the PAC recommendation, which was that institutional controls be "judged by the same remedy selection standards, including protectiveness and long-term effectiveness, as are used to judge other cleanup actions."[54] Indeed, in prior drafts of the proposed amendments Ecology has remained faithful to the PAC language in this regard.[55]

Recommendation: Retain the language used in the November 1999 proposed rule.

[50] Proposed Amendments at 385.

[51] Proposed Amendments at 385.

[52] Proposed Amendments at 385.

[53] Proposed Amendments at 393.

[54] PAC Report at 33.

[55] WSR 99-22-077 at 120.

2138 (15) Subsection (2)(e)(iii) prohibits cleanup actions from relying primarily on institutional controls and monitoring where it is technically possible to implement an alternative that utilizes a more permanent cleanup action for all or a portion of the site.[56]

The term "primarily" needs clarification. Does it mean that a certain proportion of the hazardous substances subject to the cleanup action must be addressed by a remedial action component other than an institutional control? If so, what proportion, and is the proportion to be based on volume, weight, toxicity or some other consideration? Alternatively, is the determination as to what constitutes a cleanup action that relies primarily on institutional control a site-specific issue that requires the use of best professional judgment?

Recommendation: Strike this provision.

2139 (16) Subsection (2)(f) requires that cleanup actions prevent or minimize present and future releases and migration of hazardous substances.[57] Presumably this requirement requires only that releases and migration be prevented or minimized to the maximum extent practicable.

Recommendation: Clarify that releases and migration shall be prevent or minimized to the maximum extent practicable.

2140 (17) Subsection (2)(g) requires that cleanup actions shall not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.[58] This is yet another provision that may preclude the selection of a cleanup action based on monitored natural attenuation.

The term "primarily" in this provision suffers from the same lack of clarity as in subsection (2)(e)(iii), discussed under Comment (15) above. It is likewise unclear how to determine whether costs *grossly* exceed the benefits.

Recommendation: Strike the provision.

2141 EVALUATION CRITERIA

(18) Subsection (3)(f)(i) includes improvement of the overall environmental quality as a factor to be considered in connection with the protectiveness criterion.[59] Is the intent here to incorporate into the analysis an evaluation of whether the cleanup action itself has an

[56] Proposed Amendments at 385.

[57] Proposed Amendments at 385.

[58] Proposed Amendments at 386.

[59] Proposed Amendments at 386.

adverse effect on the environment (e.g., destroying a wetland as a consequence of a cleanup action)? Or, is the intent to incorporate consideration of environmental benefits that go beyond protection of human health and the environment from the threat posed by hazardous substances released at the site? If so, that would go beyond the purpose of MTCA, and could have the effect of requiring some property owners to pay for public environmental benefits that are unrelated to the release of hazardous substances at the site.

Recommendation: Clarify that this factor refers to potential adverse environmental effects of an alternative.

2142 (19) Subsection (3)(f)(iv) includes a parenthetical definition of "long-term reliability" which somewhat obscures the point of the reliability consideration.[60]

Recommendation: Rewrite this consideration along the following lines: "its reliability for the period of time during which hazardous substances are expected to remain on site at concentrations that exceed cleanup standards,".

2143 **DISPROPORTIONATE COST ANALYSIS**

(20) Subsection (3)(a) limits the purpose of the disproportionate cost test to determining whether an alternative in the FS meets the requirement that a cleanup action be permanent to the maximum extent practicable.[61] This is a far less significant role for the disproportionate cost test than envisioned by the PAC. The disproportionate cost test is the linchpin of the PAC's remedy selection framework. According to the PAC: "The test for selecting a remedy shall be a 'disproportionate cost' test."[62]

Recommendation: Clarify that the disproportionate cost test is the basis for selecting a cleanup action.

2144 (21) The discussion in subsection (3) regarding how to apply the disproportionate cost test is extremely confusing.[63] What it appears to prescribe is the following:

- Rank the alternatives evaluated in the FS from most to least permanent.
- Compare the costs and benefits (using the evaluation criteria under WAC 173-340-360(f)) of the alternatives. In conducting this comparison, the most practicable permanent alternative is to be the baseline alternative against which other alternatives are compared.

[60] Proposed Amendments at 386.

[61] Proposed Amendments at 125.

[62] PAC Report at C-48.

[63] Proposed Amendments at 385-86.

- The costs of an alternative are disproportionate to its benefits if the incremental costs of the baseline alternative over those of a lower cost alternative ($C_b - C_{lc}$) exceed the incremental degree of benefits achieved by the higher cost alternative over those of the lower cost alternative ($B_b - B_{lc}$). This can be expressed mathematically as follows: Costs are disproportionate to benefits if $(C_b - C_{lc}) > (B_b - B_{lc})$.

This brief description of the disproportionate cost test does not provide adequate information to ensure its consistent implementation. For example, the function of the baseline alternative is not clear. Under the proposed rule, is it only necessary to compare the alternatives in the FS against the baseline alternative? If so, what is the result if the costs of the baseline alternative are disproportionate to its benefits with respect to two lower cost alternatives – which of the two lower costs alternatives is considered permanent to the maximum extent practicable?

On the other hand, if the proposed rule requires that all alternatives be compared against one another, what is the purpose of designating one as the baseline alternative? And what would be the purpose of continuing to compare the baseline alternative against other alternatives once it has been found to be disproportionately costly? If the baseline alternative is disproportionately costly when compared to any other alternative, shouldn't the baseline be discarded from further consideration at that point?

Recommendation: Provide more clarity as to how a disproportionate cost test may be conducted.

2145 (22) Subsection (3)(b) provides that the costs and benefits to be evaluated in the disproportionate cost analysis are the evaluation criteria under the proposed WAC 173-340-360(f).[64] However, it is not clear which of these criteria are costs and which are benefits. Perhaps some costs and benefits fall under the same criteria. For example, under the protectiveness criterion, achieving an acceptable level of risk to human health would be considered a benefit, while increased off-site risks might be considered a cost. Is the determination of what constitutes costs and what constitutes benefits a site-specific matter? Or does Ecology intend that all disproportionate cost analysis will uniformly treat certain matters as costs and certain matters as benefits?

Recommendation: Clarify that there may be both costs and benefits associated with the same criterion, and that the determination as to what constitutes a cost and what constitutes a benefit is a site-specific determination.

2146 (23) Subsection (3)(e)(B) describes how the baseline alternative is identified.[65] During the course of a disproportionate cost analysis, one baseline may be discarded and another

[64] Proposed Amendments at 385.

[65] Proposed Amendments at 386.

identified. Potentially, this could occur sequentially until all but one alternative has been discarded. This provision only describes how the initial baseline alternative is identified.

Recommendation: Insert "initial" before "baseline" both times it occurs.

2147 **RESTORATION TIME FRAME**

(24) Subsection (4)(c) authorizes the use of a longer restoration time frame for cleanup actions that have a greater degree of long-term effectiveness than disposal, isolation or containment.[66] This provision is a relic of the technology hierarchy mindset, which the PAC rejected.

Recommendation: Strike this provision.

2148 (25) Subsection (4)(f) provides that extending the restoration time frame shall not substitute for active cleanup actions when such actions are practicable.[67] What does the phrase "active cleanup actions" mean?

Recommendation: Define "active cleanup actions". At a minimum, ensure that active cleanup actions may include monitored natural attenuation.

2149 **WAC 173-340-390 MODEL REMEDIES**

(26) Subsection (2) authorizes Ecology to issue model remedies.[68] Although Ecology staff have acknowledged the value of model remedies for certain types of sites (e.g., commercial gasoline service stations), it is not clear when the resources to develop such model remedies will be made available.

Recommendation: Ecology should place a high priority on the development of one or more model remedies applicable to commercial gasoline service stations.

2150 (27) Subsection (2) does not describe the administrative mechanism for issuance of model remedies, but Ecology staff have expressed a preliminary view that issuance of a model remedy may require rulemaking. This should not be necessary since, as discussed below, application of a model remedy at a given site is not mandatory. Either Ecology or the PLP may elect to go through the standard remedy selection process.

Recommendation: Clarify that model remedies may be issued as guidance documents.

2151 (28) Subsection (3) provides that where a site meets the circumstances identified by Ecology, the components of the model remedy may be selected as the cleanup action or portion of

[66] Proposed Amendments at 386-87.

[67] Proposed Amendments at 387.

[68] Proposed Amendments at 388.

the cleanup action.[69] This language appears to establish that even where the site qualifies for a model remedy, if either the PLP or Ecology wish nevertheless to conduct a feasibility study or disproportionate cost test rather than simply adopt the model remedy, they may do so. In other words, a model remedy is presumptively protective and presumptively permanent to the maximum extent practicable – but it is not presumptively required.

Recommendation: The language appears clear enough on its face. If there is a question of ambiguity, the language could be clarified consistent with the above comments.

2152 **WAC 173-340-400 CLEANUP ACTIONS**

(29) Subsection (8) implies that for independent remedial actions, an engineering design report, construction plans and specifications, and an operation and maintenance plan must be submitted under the proposed WAC 173-340-515.[70] Presumably, the intent of this language was to specify that, for independent remedial actions, the requirements of WAC 173-340-400 are satisfied by compliance with WAC 173-340-515.

Recommendation: The language should be clarified to state that for independent remedial actions, the requirements of WAC 173-340-400 are satisfied by submittal of documents required under the proposed WAC 173-340-515.

2153 **WAC 173-340-410 COMPLIANCE MONITORING REQUIREMENTS**

(30) Subsection (3) provides that where the selected cleanup action is on-site disposal, isolation or containment, long-term monitoring shall be required until residual hazardous substances no longer exceed cleanup levels.[71] This ignores the point of compliance aspect of cleanup standards.

Recommendation: Strike "no longer exceed cleanup levels" and insert "comply with cleanup standards".

2154 (31) Subsection (6) provides that sites with institutional controls shall remain subject to periodic reviews as long as the institutional controls are required.[72] This seems to mean that such sites remain subject to periodic reviews as long as the conditions giving rise to the institutional controls continue to exist. The property owner may choose to retain the institutional controls for reasons unrelated to MTCA; however, if the conditions giving

[69] Proposed Amendments at 388.

[70] Proposed Amendments at 390.

[71] Proposed Amendments at 391.

[72] Proposed Amendments at 392.

rise under MTCA to the institutional controls no longer exist, there is no reason to require Ecology to continue conducting periodic reviews.

Recommendation: Clarify that sites with institutional controls shall remain subject to periodic reviews as long as the conditions giving rise under MTCA to the need for the institutional controls continue to exist.

2155

WAC 173-340-430 INTERIM ACTIONS

(32) Subsection (7) implies that for independent remedial actions, an advance report on an interim action must be submitted under the proposed WAC 173-340-515.[73] Presumably, the intent of this language was to specify that, for independent remedial actions, the information requirements of WAC 173-340-430 are satisfied by compliance with WAC 173-340-515.

Recommendation: The language should be clarified to state that for independent remedial actions, the information requirements of WAC 173-340-430 are satisfied by submittal of documents required under the proposed WAC 173-340-515.

2156

WAC 173-340-440 INSTITUTIONAL CONTROLS

(33) Subsection (6) prohibits cleanup actions from relying primarily on institutional controls and monitoring where it is technically possible to implement an alternative that utilizes a more permanent cleanup action for all or a portion of the site.[74] See the discussion of this issue under Comment (15) above.

Recommendation: Strike this provision.

2157

(34) Subsection (9)(c) requires notice be given to Ecology of the owner's intent to convey any interest in a site for which a restrictive covenant has been required.[75] It is not clear whether this requirement is satisfied by a single notice that the owner intends to convey an interest, which notice might precede the owner finding a party who intends to receive the conveyance, or, alternatively, whether the owner must notify Ecology of specific conveyances each and every time they occur. For example, would the owner of a warehouse satisfy this requirement by notifying Ecology that it intends to lease space in the warehouse to other parties, or would the warehouse owner need to notify Ecology about each lease as it is made? The latter requirement would seem to be unnecessarily

[73] Proposed Amendments at 392.

[74] Proposed Amendments at 393.

[75] Proposed Amendments at 394.

burdensome, particularly in light of the proposed new requirement under subsection (9)(e) that conveyances include notice of the restrictive covenant.[76]

Recommendation: Clarify that where an owner periodically conveys an interest in a site (e.g., through lease) or conveys interests in multiple portions of the site (e.g., through sales of subdivided property) this provision does not require the owner to notify Ecology of each individual conveyance, but rather is satisfied by notice that the owner intends to make such conveyances.

2158 **WAC 173-340-515 INDEPENDENT REMEDIAL ACTIONS**

(35) Section (3)(b) clarifies that requirements for Ecology consultations, approvals or determinations do not apply to independent remedial actions, but that such actions must still meet the substantive requirements of 173-340 WAC.[77] However, it is not always clear whether a particular requirement is substantive or procedural.

Recommendation: Clarify which requirements are substantive for purposes of an independent remedial action.

2159 (36) Subsection (3)(c) clarifies that when specific documents are required in WAC 173-340-350, 173-340-355, 173-340-357, 173-340-360, 173-340-380, 173-340-400, 173-340-410, 173-340-430, 173-340-450, 173-340-700 through 173-340-760, and 173-340-810 through 173-340-850, a person conducting an independent remedial action need not use the same title or format, as long as sufficient information is included to serve the same purpose.[78] Are there any documents required under any section not referenced? If so, why would a person conducting an independent remedial action need to adhere to the rule's format for such documents?

Recommendation: Clarify that the referenced sections are the only ones that require the preparation of documents by a person conducting a remedial action.

2160 (37) Subsection (3)(c) requires that deed restrictions, unlike any other document discussed under MTCA, must use the same title and format as provided under WAC 173-340-440(9).[79] There is no justification for requiring that deed restrictions use the same title and format as provided under that section. It should be enough that sufficient information is included in the deed restriction to serve the same purpose as WAC 173-340-440.

[76] Proposed Amendments at 394.

[77] Proposed Amendments at 397.

[78] Proposed Amendments at 397.

[79] Proposed Amendments at 397.

Recommendation: Strike this sentence.

2161 **WAC 173-340-545 PRIVATE RIGHTS OF ACTION**

(38) Subsection (2)(c)(iv) provides that in order for an independent remedial action to be considered the substantial equivalent of a department-conducted or department-supervised remedial action, it must achieve substantial equivalency with technical standards and criteria identified in WAC 173-340-545(4).[80] In turn, the latter subsection provides that substantial equivalency requires that the independent remedial action be conducted substantially equivalent with the *substantive* provisions of the technical standards and criteria under WAC 173-340-350, 173-340-355, 173-340-357, 173-340-360, 173-340-380, 173-340-400, 173-340-410, 173-340-430, 173-340-440, 173-340-450, 173-340-700 through 173-340-760, and 173-340-810 through 173-340-850.[81] However, it is not always clear whether a particular requirement is substantive or procedural. Failure to clarify this issue is likely to lead to protracted litigation between private parties, and could be a disincentive to proceeding with an independent remedial action.

Recommendation: Provide better clarity as to what is a substantive requirement and what is procedural.

2162 (39) Among the provisions cited under subsection (4) is WAC 173-340-380.[82] What standards or criteria does Ecology find in WAC 173-340-380 that are not either purely procedural or more specifically described elsewhere?

Recommendation: Clarify or strike this reference.

2163 **WAC 173-340-700 OVERVIEW OF CLEANUP STANDARDS**

(40) Subsection (5)(a) provides that site cleanups that achieve Method A cleanup levels can be used without future restrictions on the property due to residual levels of contamination unless institutional controls are required by WAC 173-340-440(4).[83] A similar provision exists for Method B cleanup levels.[84] It appears that this is a reference to institutional controls that might be required as part of the ecological evaluation process. If so, that should be stated more clearly in order to avoid the potential inference that WAC 173-340-440 might authorize institutional controls for such sites for any other reason.

[80] Proposed Amendments at 401.

[81] Proposed Amendments at 141.

[82] Proposed Amendments at 141.

[83] Proposed Amendments at 411.

[84] Ibid. Section 700(5)(b).

Recommendation: Modify the cross-reference to read "WAC 173-340-440(4)(f)".

2164 (41) Subsection (5)(b) states that modified Method B formulas may be used to establish cleanup levels, and that other modifications to such formulas may be used to establish remediation levels.[85] A similar provision exists for Method C cleanup levels.[86] The implication is that a quantitative risk assessment being used for purposes of establishing a remediation level has more flexibility than simply changing the input parameters described in WAC 173-340-720 through 173-340-760. This implication is supported by the following specific provisions: WAC 173-340-720 (4)(d) and (5)(d) (ground water),[87] 173-340-730(3)(d) (surface water),[88] 173-340-740(3)(d) (soil),[89] 173-340-745(5)(d) (industrial soil),[90] and 173-340-750(3)(d) (air).[91] It is important that this be clearly stated.

Recommendation: Clarify that a quantitative risk assessment for a remediation level may be based on modified input parameter described in WAC 173-340-720 through 173-340-760, or other modifications that meet the appropriate standards of WAC 173-340-702 and 173-340-708.

2165 (42) Subsection (8) provides an overview of how petroleum releases are addressed under MTCA.[92] In 1997, Ecology adopted the Interim TPH Policy.[93] Substantively, this policy resulted in modest incremental changes in petroleum cleanups. However, it represented a dramatic shift in thinking for Ecology. For the first time, Ecology applied risk-based principles to the cleanup of petroleum-contaminated soils. Subsection (8) and other provisions give the appearance that the proposed rule builds on the innovations of the Interim TPH Policy. Cleanup levels that protect human health are based on a more sophisticated fractionation of petroleum products. Additional tools are added for evaluating the soil to ground water pathway. Conceptual site models are used to identify other exposure pathways that should be considered at sites.

[85] Proposed Amendments at 411.

[86] Ibid. Section 700(5)(c).

[87] Proposed Amendments at 430.

[88] Proposed Amendments at 437.

[89] Proposed Amendments at 444.

[90] Proposed Amendments at 452.

[91] Proposed Amendments at 466.

[92] Proposed Amendments at 413-14.

[93] Ecology, Interim Interpretive and Policy Statement, Cleanup of Total Petroleum Hydrocarbons (TPH) (Pub. 97-600, Jan. 1997).

Unfortunately, in this case, appearances are deceiving. When considered as a whole, the proposed rule does not build on the improvements in the Interim TPH Policy. Instead, for most people, it takes them away – albeit through the back door. This can be illustrated as follows:

Before the Interim TPH Policy, Method A was the exclusively means for establishing petroleum cleanup levels at most sites. This meant that, for a release of gasoline to soil, the cleanup levels would be as follows:

	TPH-Gasoline	Benzene	Ethylbenzene	Toluene	Xylenes
Cleanup Level (mg/kg)	100	0.5	20	40	20

Table 1. Current Method A Soil Cleanup Levels for Gasoline

The Interim TPH Policy allows PLPs to develop Method B and Method C soil cleanup levels that are more appropriate for a specific site. Method B and Method C cleanup levels often are higher than the Method A levels. However, under the proposed rule, it will be more difficult to establish these site-specific cleanup levels. Typically, Method B and Method C cleanup levels will be the same as the Method A cleanup levels, because these are based on the proposed rule's default soil to ground water equilibrium partitioning equations. These result in the following cleanup levels applicable to gasoline:

	TPH-Gasoline	Benzene	Ethylbenzene	Toluene	Xylenes
Cleanup Level (mg/kg)	30/100	0.03	6	7	9

Table 2. Proposed Method A Soil Cleanup Levels for Gasoline

In other words, soil cleanup levels for gasoline spills will go down to less than half their pre-Interim TPH Policy levels. Although the partitioning equations are not the exclusive methods for calculating petroleum soil cleanup levels that protect ground water, the alternatives (fate and transport models or empirical demonstrations) both require that the PLP demonstrate compliance with the "new science" criteria.[94]

It is possible to use site-specific data in applying the equilibrium partitioning equations. The key parameter that may be varied is the fraction of organic content (f_{oc}).[95] In Washington State, this has been estimated to range from 0.01 – 5.0 percent.[96] The

[94] Proposed WAC 173-340-747(8)(c) and 173-340-747(9)(c). Proposed Amendments at 458.

[95] The other variable parameters are not particularly significant. If the fraction of organic content is not changed, BTEX cleanup levels based on site-specific information potentially double. That does not even return them to current levels.

[96] Foster Wheeler Environmental Corporation, Technical Memorandum re Allowable Parameter Ranges (Aug. 4, 1997) at table 8.

Method A values for BTEX are based on a default f_{oc} of 0.1 percent; at the high end, the values potentially increase by approximately 1.5 orders of magnitude. Unfortunately, because of the high variability in f_{oc} data, it may be that Ecology will require numerous samples to be taken and correlated before accepting site-specific data.

Thus, the existence of Method B or Method C as alternative methods for establishing cleanup levels will be, for many PLPs, an illusion at best.

Recommendation: Revise the proposed rule to ensure that petroleum cleanups are conducted in accordance with the principles of risk-based corrective action.

2166 (43) Subsection (8)(b)(ii)(B) provides that current and future site uses may be considered in establishing Tier 2 or Tier 3 remediation levels.[97] The implication is that current and future site uses may not be considered in establishing Tier 2 or Tier 3 cleanup levels. This is contrary to the first sentence of each of the following specific cleanup standard provisions: WAC 173-340-720(1)(a) (ground water),[98] 173-340-730(1)(a) (surface water),[99] 173-340-740(1)(a) (soil),[100] and 173-340-750(1)(b) (air).[101]

Recommendation: Revise the last sentence under subsections (8)(b)(ii)(B)(II) and (8)(b)(ii)(B)(III) to read: "Consideration of current and future site uses may be considered in establishing cleanup levels and remediation levels."

2167 **WAC 173-340-702 GENERAL POLICIES**

(44) Subsection (3) requires that cleanup *actions* provide conservative estimates of risk to human health and the environment,[102] whereas the current rule only applies this requirement to cleanup *standards*.[103] This appears to undercut the role of remediation levels, which are intended to be based on *realistic* estimates of risk.

Recommendation: Strike the reference to cleanup *actions*.

[97] Proposed Amendments at 413-14.

[98] Proposed Amendments at 425.

[99] Proposed Amendments at 435.

[100] Proposed Amendments at 438.

[101] Proposed Amendments at 465.

[102] Proposed Amendments at 414.

[103] WAC 173-340-700(7)(c).

2168 (45) Subsection (14) extends the burden of proof requirements to persons proposing the use of alternate RME scenarios and the use of site-specific exposure parameter values.[104] These changes were not part of the PAC recommendation.

Recommendation: Strike the new language extending these requirements beyond the PAC recommendation.

2169 (46) Subsection (15) requires that when establishing cleanup levels and remediation levels *for individual sites*, Ecology shall consider new scientific information that meets certain quality of information standards. In doing so, Ecology is required, as appropriate, to consult with the SAB, Department of Health and the EPA.[105] The reference to individual sites could be read to imply that a PLP who desires to use new scientific information at a site other than the one at which it was first reviewed would have to go through the same review processes.

Recommendation: Clarify that new scientific information, once approved for use, may be used at subsequent sites where it is appropriate, without the need to go through the same review processes. This might be done by clarifying that the meaning of the word "new" does not include scientific information that has previously been approved for use in establishing a cleanup level or remediation level.

2170 (47) Subsection (16)(a) identifies certain criteria to be used when evaluating proposed modifications to methods or assumptions specified in MTCA, "or proposing methods or assumptions not specified in this chapter for calculating cleanup levels and remediation levels."[106] This language was specifically recommended by the PAC.[107] It appears to allow a PLP to propose methods or factors for site-specific risk assessment beyond those addressed in WAC 173-340-720 through 173-340-760.

Recommendation: Clarify that this provision allows a PLP to propose methods or factors for site-specific risk assessment beyond those addressed in WAC 173-340-720 through 173-340-760.

2171 **WAC 173-340-706 USE OF METHOD C**

(48) Subsection (1)(b) does not allow the use of Method C to establish soil cleanup levels other than at facilities qualifying for an industrial soil cleanup level under WAC 173-340-745.[108] Ecology believes that this is consistent with a PAC recommendation, based on a

[104] Proposed Amendments at 415.

[105] Proposed Amendments at 415.

[106] Proposed Amendments at 415.

[107] PAC Report at C-4.

[108] Proposed Amendments at 417.

memo prepared by Ecology staff.[109] That memo proposed restructuring MTCA to allow for two types of land use: unrestricted and industrial. All sites not qualifying as industrial property under WAC 173-340-745 would be subject to the unrestricted land use scenario, and would establish cleanup levels using either Method A or Method B. Industrial properties would establish cleanup levels using Method A or Method C. However, reliance on the memo is not justified. As a footnote to the memo explains, those portions of the memo that represent the PAC's recommendation have been incorporated into that recommendation.[110]

In reviewing the actual PAC recommendation, it is clear that the PAC intended to eliminate the default commercial/industrial exposure scenario under the current WAC 173-340-740(1)(c).[111] However, the PAC did not recommend eliminating the ability for non-industrial sites to establish a Method C cleanup level under the current WAC 173-340-740(4). The latter provision does not relate the site's land use, which was the subject of the PAC discussion and recommendation, but rather it authorizes the use of Method C cleanup levels where the site meets one or more of the conditions under WAC 173-340-706(1)(a) – that is, Method A or B cleanup levels are below area background concentrations, attainment of Method A or B cleanup levels has the potential for creating a significantly greater overall threat to human health or the environment than attainment of Method C cleanup levels, or it is not technically possible to achieve Method A or B cleanup levels.

Recommendation: Retain the provisions of the current regulation that allow use of Method C to establish soil cleanup levels at non-industrial sites where one of the three conditions under WAC 173-340-706(1)(a) exist.

2172

WAC 173-340-708 HUMAN HEALTH RISK ASSESSMENT PROCEDURES

(49) Subsection (3)(c) states that the evaluation criteria in WAC 173-340-720 through 173-340-760 may be used to demonstrate that the reasonable maximum exposure (RME) scenario specified in those sections are not appropriate at a particular site.[112] It is not clear what constitutes "evaluation criteria" under those sections, nor how such criteria would be used to make this demonstration.

Recommendation: Clarify which provisions in WAC 173-340-720 through 173-340-760 are used, and how they are used, to make this demonstration.

[109] PAC Report at C-12 – C-15.

[110] PAC Report at C-12.

[111] PAC Report at 26 (Recommendation 1).

[112] Proposed Amendments at 419.

Subsection (3)(d) prohibits basing an alternative RME scenario on land uses other than residential or industrial to establish a cleanup level.[113] Unlike most of the amendments to WAC 173-340-708, this proposal was *not* included in the PAC recommendations. In fact, it is inconsistent with the PAC recommendation that the *default* commercial exposure scenario be eliminated, but that commercial sites be allowed to establish *cleanup levels* using a site-specific risk assessment including the use of alternate exposure scenarios. The PAC even stated that it expects many types of commercial sites to qualify for alternative exposure scenarios.[114]

Recommendation: Strike the third sentence of this provision.

2173 (50) Subsection (7)(d) requires that reference doses be based on IRIS, HEAST or NCEA data, if available.[115] These data bases are constantly evolving. Subsection (8)(a) includes a similar requirement for cancer potency factors.[116] See the discussion under Comment (3) above regarding the effect of the nondelegation doctrine.

Recommendation: Clarify whether and how the nondelegation doctrine affects Ecology's ability to consider future additions or modifications to these data bases.

2174 **WAC 173-340-710 APPLICABLE STATE AND FEDERAL LAWS**

(51) As discussed under Comment (3) above, the nondelegation doctrine appears to preclude Ecology from incorporating into the rule future statutes, regulations, standards, or guidance (including amendments to current statutes, regulations or guidance) – whether federal, state, local or private. Perhaps the most significant part of the rule that may be affected by the doctrine is the use of so-called "relevant and appropriate" state and federal requirements to establish cleanup standards. MTCA directs Ecology to adopt cleanup standards that are "at least as stringent as the cleanup standards under section 121" of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and "at least as stringent as all applicable state and federal laws, including health-based standards under state and federal law".[117] Under the current rule, Ecology construes applicable state and federal laws to include "those requirements that the department determines ... are relevant and appropriate requirements."[118]

[113] Proposed Amendments at 419.

[114] PAC Report at 26.

[115] Proposed Amendments at 420.

[116] Proposed Amendments at 421.

[117] RCW 70.105D.030(2)(e).

[118] WAC 173-340-710(1).

Several relevant and appropriate requirements are specifically incorporated by various provisions of the regulations. For example, maximum contaminant levels (MCLs) adopted by EPA and the State Board of Health are not of themselves legally applicable to cleanup actions, but Ecology has determined that they are relevant and appropriate when establishing ground water cleanup levels.[119] Under the nondelegation doctrine, it appears that Ecology may incorporate *existing* MCLs (and other "relevant and appropriate requirements") that have been promulgated by state and federal agencies prior to adoption of the revisions to the MTCA rule. However, it is difficult to square the nondelegation doctrine with the use of *future* MCLs.

At first blush, it may appear that legally applicable state and federal requirements suffer from the same problem. However, there is an important distinction. Legally applicable requirements are standards, criteria or limitations "that specifically address a hazardous substance, cleanup action, location, or other circumstances at the site."[120] In other words, they apply to a cleanup action by their own terms and are not dependent upon the MTCA regulation for such application. To the extent that amendments and modifications to legally applicable requirements continue, of themselves, to apply to a cleanup action, their application depends on their own terms – not on the adoption of future standards under MTCA.

Recommendation: Clarify whether and how the nondelegation doctrine affects the ability of Ecology to rely upon future local, state and federal laws in determining what laws are legally applicable requirements or are relevant and appropriate requirements.

2175 **WAC 173-340-720 GROUND WATER CLEANUP STANDARDS**

(52) Table 720-1 bases the Method A cleanup level for MTBE on EPA's Drinking Water Advisory,[121] which is itself based on aesthetic considerations (taste and odor).[122] The purpose of MTCA is to protect human health and the environment, not to protect aesthetic considerations. The Advisory indicates that this level provides "a large margin of exposure (safety) from toxic effects."[123]

Recommendation: The Method A cleanup level for MTBE should be based on the protection of human health.

[119] WAC 173-340-720(2)(a)(ii).

[120] WAC 173-340-200.

[121] Proposed Amendments at 216 (fn. p).

[122] EPA, Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Methyl Tertiary-Butyl Ether (MtBE) (EPA-822-F-97-009, Dec. 1997) (MTBE Advisory) at 2.

[123] MTBE Advisory at 2.

2176 (53) Table 720-1 states that the Method A cleanup level for xylene is based in part on "not exceeding the cleanup level for total petroleum hydrocarbons".[124] The implication is that a cleanup action that adequately addresses TPH will necessarily adequately address xylenes. Therefore, there appears no need to sample or monitor for xylenes as such.

Recommendation: In Table 830-1, clarify that there is no requirement to test for xylenes in ground water.

2177 (54) Subsection (7)(d) requires that the cleanup level not exceed a concentration that would result in free product being present in or on the ground water. Physical observations (e.g., the lack of a film, sheen or discoloration) or the solubility limit may be used to determine compliance with this requirement.[125]

Recommendation: It should be clarified that the concentration is acceptable where physical observations do not detect the presence of a measurable layer of product. Also, it should be clarified that while the *lack* of a film, sheen or discoloration would indicate that free product is not present, the *presence* of a film, sheen or discoloration would not necessarily indicate that free product is present.

2178 (55) Subsection (1)(d)(v) authorizes Ecology to impose more a stringent cleanup level when, based on a site-specific evaluation, it determines that the more stringent cleanup level is necessary to protect nearby surface waters.[126] This provision does not include the language in the current WAC 173-340-720(3)(b)(v), which states that such cleanup levels generally "will be based on attaining surface water cleanup levels in the surface water as close as technically possible to the point or points where the ground water flows into the surface water."[127] There is no justification for striking the current language. In these situations, the cleanup level will be more stringent than drinking water standards; therefore, any use of the water prior to its discharge to surface water will be sufficiently protected. If a lower cleanup level is needed to protect surface water, the surface water will be protected by ensuring attainment of surface water standards at the point of discharge.

Recommendation: Retain the current language.

2179 (56) Subsection (8)(c) modifies the language regarding circumstances under which a conditional point of compliance for ground water may be adopted.[128] It is not clear

[124] Proposed Amendments at 216 (fn. bb).

[125] Proposed Amendments at 432.

[126] Proposed Amendments at 426.

[127] Proposed Amendments at 166.

[128] Proposed Amendments at 432.

whether this modified language is intended to be a substantive or procedural change from the current regulation, or whether it is merely intended to clarify the current language without effecting any substantive or procedural change.

Currently, a conditional point of compliance may be adopted where hazardous substances remain on site as part of the cleanup action. Ecology proposes to strike this language, and to replace it with a requirement that it be demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level throughout the site within a reasonable restoration timeframe. Would a PLP meet this demonstration requirement simply by virtue of going through the remedy selection process? In other words, if an alternative in the FS that includes a conditional point of compliance is selected as the cleanup action under WAC 173-340-360, is the demonstration requirement under subsection (8)(c) met? Selection of the alternative requires that it be determined to be permanent to the maximum extent practicable under the proposed WAC 173-340-360(3) and that it provide for a reasonable restoration time frame under the proposed WAC 173-340-360(4); therefore, it would appear that nothing else need be established to justify adoption of a conditional point of compliance. On the other hand, if this is the case, it is not clear why Ecology does not find the current language satisfactory.

Recommendation: Retain the original language and strike the proposed new language.

2180 **WAC 173-340-730 SURFACE WATER CLEANUP STANDARDS**

(57) Subsections (3)(b)(i)(B) identifies Federal water quality criteria based on protection of aquatic organisms and human health as applicable federal laws.[129] Other than the national toxics rule,[130] these Federal water quality criteria are not binding criteria. Therefore, presumably Ecology considers them to be relevant and appropriate requirements under the proposed WAC 173-340-710(4). As discussed under Comment (51) above, the nondelegation doctrine appears to preclude Ecology from incorporating into the rule additions or modifications to these criteria.

Recommendation: Clarify whether and how the nondelegation doctrine affects the ability of Ecology to rely upon future additions or modifications to the federal water quality criteria.

2181 (58) Subsection (3)(b)(iii)(B) currently requires cleanup levels to address carcinogenic effects if the surface water supports fish or shellfish populations. Ecology proposes to amend this to include those surface water which have the potential to support fish or shellfish

[129] Proposed Amendments at 436.

[130] 40 CFR 131.36.

populations[131] (which conforms to the current language for Method C cleanup levels). Is this potential determined by the characteristic use classifications under 173-201A WAC? If so, won't that mean that all surface waters will be covered by this provision, since all water classes identify fish or fish and shellfish as a characteristic use?

Recommendation: Clarify the scope of surface waters covered by the amended subsection (3)(b)(iii)(B).

2182 (59) Subsection (5)(d) requires that the cleanup level not exceed a concentration that would result in free product being present in or on the surface water. Physical observations (e.g., lack of a film, sheen, discoloration, sludge or emulsion) or the solubility limit may be used to determine compliance with this requirement.[132] See the discussion of this issue under Comment (54) above.

Recommendation: It should be clarified that the concentration is acceptable where physical observations do not detect the presence of a measurable layer of product. Also, it should be clarified that while the *lack* of a film, sheen, discoloration, sludge or emulsion would indicate that free product is not present, the *presence* of a film, sheen or discoloration would not necessarily indicate that free product is present.

2183 **WAC 173-340-740 UNRESTRICTED LAND USE SOIL CLEANUP STANDARDS**

(60) Subsection (4) prohibits the use of Method C to establish soil cleanup levels other than at facilities qualifying for an industrial soil cleanup level under WAC 173-340-745.[133] See the discussion of this issue under Comment (48) above.

Recommendation: Retain the provisions of the current regulation that allow use of Method C to establish soil cleanup levels at non-industrial sites where one of the three conditions under the proposed WAC 173-340-706(1)(a) exist.

2184 **WAC 173-340-747 DERIVING SOIL CONCENTRATIONS FOR GROUND WATER PROTECTION**

(61) Subsection (5) provides that a fixed parameter 3-phase partitioning model may be used for any hazardous substance.[134] One of the equations used for this model (Equation 747-2) uses a default value for soil fraction of organic carbon content (foc) of 0.1 percent.[135]

[131] Proposed Amendments at 436.

[132] Proposed Amendments at 175-76.

[133] Proposed Amendments at 444.

[134] Proposed Amendments at 454.

[135] Proposed Amendments at 454.

This may be more conservative than the value used in any other jurisdiction. EPA's Soil Screening Guidance uses 0.2 percent as its default value. Other jurisdictions range as high as 1.0 percent. Although this value may accurately reflect a very small proportion of sites in Washington, it surely is uncommon. If a more representative value were used as the default value, Ecology would still retain the authority to require use of the more conservative value at specific sites where the soil contains very little organic carbon.

Recommendation: As the default value for the soil fraction of organic content, substitute the value of 0.2 percent.

2185 (62) Subsection (9)(c) provides that empirical demonstrations shall be based on methods approved by Ecology.[136] It also states that the appropriateness of the empirical demonstration shall be evaluated based on the quality of information requirements under WAC 173-340-702,[137] which presumably means that these criteria are what Ecology shall use in determining whether or not to approve the method. It is not clear whether this means methods that Ecology has generically approved in guidance or rule, or whether it means that a PLP must obtain Ecology's approval of a proposed method of making an empirical demonstration. The former interpretation would be overly restrictive and would delay the ability of PLPs to use this method until such time as Ecology issues the appropriate guidance or rule. The latter interpretation is more reasonable (that is, for a remedial action occurring under Ecology's oversight), although it is probably unnecessary to include it in the rule. Under the proposed WAC 173-340-515(3)(b), persons conducting an independent remedial action should not need Ecology approval.

Recommendation: Clarify that empirical demonstrations may be used where approved by Ecology on a site-specific basis, and that Ecology's decision shall be based on the quality of information requirements under WAC 173-340-702.

2186 (63) Subsection (10)(d)(ii) refers to a table (Table 747-5) of default soil residual saturation values for petroleum hydrocarbons.[138] As noted beneath the table, these highly conservative values are based on the release of petroleum hydrocarbons to coarse sand and gravelly soil. Conservative default values for other soil types are available.

Recommendation: Include default values for other soil types commonly found in Washington State.

[136] Proposed Amendments at 458.

[137] Proposed Amendments at 458.

[138] Proposed Amendments at 459.

2187 **WAC 173-340-7490 TERRESTRIAL ECOLOGICAL EVALUATION PROCEDURES**

(64) Subsection (5) authorizes Ecology to require additional measures to evaluate potential threats to terrestrial ecological receptors based on a site-specific review.[139]

Recommendation: This authority should be subject to WAC 173-340-702.

2188 **WAC 173-340-7491 EXCLUSIONS FROM A TERRESTRIAL ECOLOGICAL EVALUATION**

(65) Subsection (1) provides for four exclusions from the terrestrial ecological evaluation requirements.[140] These exclusions are intended to narrow the focus of the terrestrial ecological provisions to those sites where there is a potential for significant adverse effects on terrestrial ecological receptors. However, most sites qualifying for an exclusion under this subsection are likely to have mandatory institutional controls imposed upon them, notwithstanding that they do not represent a threat to the environment. Indeed, if soil concentrations of a hazardous substance exceed natural background levels within 15 feet of the ground surface (a common circumstance), the only available exclusion that would not result in institutional controls would be if there is less than 1.5 acres of contiguous undeveloped land (1/4 acre for some substances) within 500 feet of any area of the site. It is difficult to imagine many sites, outside downtown urban areas, that would qualify for this exclusion.

The PAC intended that Ecology, before adopting a rule, address certain specific issues and concerns,[141] including "[h]ow to avoid unnecessary land use type controls or regulation on sites and avoid incentives for excessive paving" and "how to identify what is needed regarding institutional controls for preventing exposures to ecological receptors".[142] There is no evidence that Ecology has implemented this PAC recommendation.

Recommendation: Require institutional controls as a condition of an exclusion only if it is demonstrated that the institutional control is necessary to protect terrestrial ecological receptors from significant adverse effects.

2189 (66) Subsection (1)(c) provides for an exclusion if there is less than a specified amount of contiguous undeveloped land "on the site or within 500 feet of any area of the site."[143] Concern about the ambiguity of this phrase was expressed by some evaluators in the pilot

[139] Proposed Amendments at 460.

[140] Proposed Amendments at 460-61.

[141] PAC Report at C-39.

[142] PAC Report at C-39.

[143] Proposed Amendments at 460.

study, but Ecology refused to provide greater clarity because "[t]he existing statute and rule are quite clear that a site is comprised of all places where contamination resulting from release(s) of hazardous substances has come to be located."[144] Ecology's response obscures the fact the PAC flowchart, on which the terrestrial ecological evaluation provisions are ostensibly based, did not recommend counting all of the contiguous undeveloped land "on the site or within 500 feet of the site". The flowchart envisioned, instead, that the point of reference would be "within 500 feet of the area of contamination".[145]

Recommendation: Adopt the language from the flowchart: "within 500 feet of the area of contamination". Make the same change in Table 749-1.

2190 **WAC 173-340-7492 SIMPLIFIED TERRESTRIAL ECOLOGICAL EVALUATION PROCEDURE**

(67) Subsection (2)(c)(i) provides that no further evaluation is required if no hazardous substance listed in Table 7 is present at concentrations higher than those provided in Table 749-2.[146] This table includes TPH values,[147] notwithstanding the scarcity of data supporting the inclusion of petroleum hydrocarbons. In the pilot study conducted on these provisions, it was recommended by some of the external reviewers "that the petroleum numbers should be removed from the tables, since the numbers are not derived in the same rigorous manner as other risk-based values in the tables."[148] Ecology's response was that it had developed a risk-based approach for deriving petroleum values based on work done for the Duwamish TPH/Brownfields Project Oversight Group (POG).[149] However, the POG has indicated that its recommendation applies only to the petroleum numbers recommended for industrial/commercial land uses (i.e., 12,000 – 15,000 mg/kg).

Recommendation: Eliminate the petroleum numbers for unrestricted land use from Table 749-2.

2191 (68) Subsection (3) provides that institutional controls may be required if a simplified terrestrial ecological evaluation is used to demonstrate that no further ecological

[144] Ecology, Terrestrial Environmental Evaluation Pilot Study Report (Pub. 99-604, Nov. 1999) (Pilot Study Report) at 7.

[145] Final Draft Flowchart (Nov. 4, 1996) (incorporated by reference, Pilot Study Report at 5).

[146] Proposed Amendments at 462.

[147] Proposed Amendments at 479.

[148] Pilot Study Report at 10.

[149] Pilot Study Report at 10.

evaluation is needed.[150] It appears that the only circumstances under which institutional controls would not be mandatory are where the total area of soil contamination is not more than 350 square feet, the exposure pathway is cut off through natural barriers or all hazardous substances are located more than 15 feet below the ground surface. Even where cleanup levels are adopted based on the Table 749-2 screening levels, institutional controls are mandatory. These sites "do not have a substantial potential for posing a threat of significant adverse effects to terrestrial ecological receptors".[151] As discussed under Comment (65) above, the PAC recommended to Ecology that before adopting a rule, it consider how to avoid unnecessary land use controls or regulation arising under the terrestrial ecological provisions and to identify what is needed regarding institutional controls. This has not occurred.

Recommendation: Require institutional controls as a condition of an exclusion only if it is demonstrated that the institutional control is necessary to protect terrestrial ecological receptors from significant adverse effects.

2192 **WAC 173-340-7493 SITE-SPECIFIC TERRESTRIAL ECOLOGICAL EVALUATION PROCEDURES**

(69) The PAC recommended that before adopting a final rule regarding terrestrial ecological evaluations, Ecology address conduct a pilot study to evaluate the provisions' "ease of use, practicability, economic impact and comprehensiveness, and to identify recommended revisions."[152] However, the pilot study conducted by Ecology did not include a single site that would have been subject to a site-specific terrestrial evaluation.[153] Ecology's external reviewers expressed concern about this:

> Reviewers expressed uncertainty about whether Ecology would interpret the rule at a particular site in the same way evaluators would, since no site was subjected to the site-specific process. There was concern that as consultants they might not be able to provide adequate guidance to their clients given this lack of certainty. This also left the group feeling they lacked proof that the site-specific process will work since they did not specifically test it.[154]

[150] Proposed Amendments at 462.

[151] Proposed WAC 173-340-7492(1)(a). Proposed Amendments at 461.

[152] PAC Report at C-39.

[153] Pilot Study Report at 1 ("[T]he site-specific evaluation methodology was not tested by reviewers on an actual site to develop cleanup levels or remedial action approaches.").

[154] Pilot Study Report at 9.

Ecology's response to this concern was that it intends to provide guidance, but it nevertheless anticipates that differences in interpretation will be ongoing.[155] This response illustrates the relaxed attitude Ecology has taken to implementing the pilot study as intended by the PAC.

Recommendation: Proposed WAC 173-340-7493 should be implemented only on a voluntary pilot basis until Ecology has sufficient information to conduct the evaluation recommended by the PAC. At that time, Ecology should propose appropriate revisions to the section and propose it as a final rule.

2193 (70) Subsection (3) provides that the soil concentrations listed in Table 749-3 may be used as cleanup levels, which apparently would obviate the need for further evaluation.[156] As with Table 749-2 screening levels, Table 749-3 includes values for petroleum releases.[157] See the discussion of this issue under Comment (67) above.

Recommendation: Eliminate the petroleum numbers for unrestricted land use from Table 749-3.

2194 **WAC 173-340-830 ANALYTICAL PROCEDURES**

(71) Subsection (2)(i) requires that petroleum contaminated sites meet the testing requirements under Table 830-1.[158] Table 830-1 describes sampling requirements for sites where there has been a release of petroleum hydrocarbons.[159] Sampling requirements for other types of hazardous substances are not codified in the rule, and there is no apparent reason why those applicable to petroleum hydrocarbons should be.

Recommendation: Strike Table 830-1 and place it in guidance.

2195 ## ESTIMATE OF PROBABLE COSTS AND BENEFITS

The Department of Ecology released its Preliminary Draft of Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act on October 13, 2000. The document is not a cost-benefit analysis of the proposed amendments, as required under RCW 34.05.328(1)(c). Ecology is required to "[d]etermine that the probable benefits of the rule are greater than its probable costs ...." Ecology's methodology does not allow it to

[155] Pilot Study Report at 10.

[156] Proposed Amendments at 463.

[157] Proposed Amendments at 481.

[158] Proposed Amendments at 470.

[159] Proposed Amendments at 485-86.

make this determination. Instead, what Ecology does is estimate the costs and benefits of selected amendments on so-called *model sites*. Selection of model site characteristics reflects the subjective judgment of Ecology's policy staff, not a scientifically-designed representative set of sites with estimates of variance and standard deviation.

2196 Second, Ecology is required to evaluate costs and benefits in the context of "the specific directives of the statute being implemented ...." The specific statutory directive addressing cleanup levels requires Ecology to establish cleanup standards at least as stringent as those under CERCLA and applicable state and federal laws. However, Ecology does not consider the extent to which the proposed cleanup levels exceed the standards under CERCLA and applicable state and federal laws. For example, neither CERCLA nor any applicable state or federal law requires a benzene soil cleanup level of 0.03 mg/kg, or a TPH-G cleanup level of 30 mg/kg, both of which are proposed by Ecology. The proposed benzene cleanup level does not improve Ecology's ability to achieve the benefits of MTCA's specific statutory directive. However, when the evaluation is conducted in a vacuum, as done here, there is no standard by which to determine what constitutes a benefit or a cost – no standard, that is, other than the subjective values of the policy staff.

2197 A specific methodological problem is presented by Ecology's attempt show that more stringent soil cleanup levels will reduce the cost of ground water cleanup. Ecology's analysis is faulty in several respects. First, Ecology assumes that 100 percent of residual soil contaminants will leach to ground water, ignoring the many physical, chemical and biological mechanisms that will affect the residual contaminants' ability to reach ground water. Second, Ecology assumes that the residual soil contamination leaching to ground water will always cause an exceedence of ground water cleanup levels, and will require removal of 100 percent of the contaminant mass. These are overly simplistic assumptions that grossly inflate Ecology's projected "avoided cost" of ground water cleanup.

2198 Finally, Ecology's preliminary cost-benefit analysis addresses only one of the APA requirements for a significant legislative rule. Among the requirements that must be met before Ecology adopts the final MTCA amendments, are the following:

- Provide a clear, detailed statement of MTCA's general goals and specific objectives that are implemented by the amendments.
- Determine that the amendments are needed to achieve these goals and objectives, and analyze non-rulemaking alternative to achieve these goals and objectives.
- Determine that the amendments' probable benefits exceed their probable costs, taking into account both the qualitative and quantitative benefits and costs and MTCA's specific directives.
- After considering alternative versions of the rule, determine that the proposed amendments are the least burdensome alternative for the regulated community that will achieve MTCA's general goals and specific objectives.

CONCLUSION

As stated above, the proposed rule is unacceptable for many reasons. Although it professes to include a process for establishing risk-based cleanup levels, it does not include even the minimal elements of the RBCA process. Additionally, the proposal for developing cleanup levels relies on models that use extremely conservative assumptions, resulting in cleanup levels that are inconsistent with Ecology's experience under MTCA. Furthermore, at the vast majority of sites cleanup levels are based on ingestion of water, an exposure scenario that is inappropriate for many sites. With regard to remedy selection, the proposed amendments ignore the PAC recommendations regarding the elimination of the bias towards active remediation. As a result of these and other issues, the rule fails the standard that Ecology set for itself; that environmental cleanups would be fairer, easier to understand, more flexible, less ambiguous and less expensive.

Akana, Trish Alicia

From: Laurie Valeriano [lvaleriano@watoxics.org]
Sent: Friday, October 27, 2000 1:52 PM
To: Akana, Trish Alicia
Cc: pkme461@ecy.wa.gov; gwingard@earthlink.net; rbrown@martenbrown.com
Subject: WTC MTCA comments

comments_10=27.c oc ATT695283.txt

Attached please find my comments on the MTCA rule. If you have any questions, please call me. Thanks, Laurie

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October 27, 2000

Ms. Trish Akana
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RE: MTCA rule comments

Dear Ms Akana:

Please accept these comments on the proposed Model Toxics Control Act rule. The Washington Toxics Coalition is a statewide environmental and public health advocacy organization with about 1500 members across the state. We were involved in the MTCA Policy Advisory Committee (PAC) and have assisted numerous local groups in Washington dealing with cleanup sites.

2199 General Policy

We are concerned with the general policy direction of the rule to rely more on site-specific risk assessments. A main concern is that risk assessments cannot adequately determine actual risk. They really only assess a few of the many risks associated with contaminant exposures and cannot predict the complex interactions among the many chemicals to which potential victims are always exposed. Risk assessments also typically make the assumption that the exposed person is healthy, without immune system, reproductive problems, learning disorders or cancer, which might make them more susceptible to a particular chemical. In addition, outcomes can be influenced by the biases of

the risk assessors and it is easy to bias an outcome through inappropriate use of overly favorable assumptions.

We are also concerned that site specific risk assessments will make it more difficult for the public to be involved as well as make it more difficult for the Department of Ecology to provide adequate oversight and be able to manage the workload of many risk assessments, which are all site specific. Finally, in our experience, we have seen risk assessments used mostly for establishing less protective cleanup levels not more protective levels and this is extremely concerning. How will the Department ensure that this will not occur under the new MTCA?

2200 Ecology has announced that it will be pursuing a strategy to eliminate persistent bioaccumulative toxics (PBTs), including at cleanup sites. If Ecology is serious about this strategy these chemicals need to be specifically addressed as part of this rule. We think this means that Ecology should be as aggressive as possible when dealing with sites where these chemicals exist and independent cleanups and risk assessments should not be an option. Achieving cleanups as close as possible to zero or uncontaminated "background" levels at these sites should be a priority. We would like the agency to include a clear policy statement about PBTs in the rule.

Specific Comments on the Rule

Although the shift towards more site specific risk assessments has made the rule longer and much more complicated, the new question and answer format is a little more user friendly and the use of examples, diagrams and overview discussions is helpful.

2201 Section 357:

As we stated above, we are opposed to the use of site-specific risk assessment. Because of this we are opposed to allowing modifications to default assumptions in Method B and C equations as specified in Subsection (3). This allows industry to pit their experts against Ecology's and they have a better chance of winning because of more resources and political power. It also does not make for good public policy because it is impossible for average community residents to understand these site specific risk assessments and be a part of the process in a meaningful way. Once default numbers are allowed to change there is no consistency and all sites will wind up with different assumptions, which will result in varied remediation levels. One merely has to look at Asarco Tacoma to see this, where a site specific risk assessment resulted in a cleanup level of 230 ppm. This really created problems for the state and community members in Everett who are seeking a much more protective cleanup based on Method A cleanup levels for arsenic. We do not want to create these situations all over the state.

A more specific comment regarding Subsection (3) is that it is not clear that Method C levels can only be used if the site qualifies as a Method C site for the particular medium. This must be clear.

2202 Section 360

Subsection 2(d) should specify that residential areas and for schools and childcare centers (or where children may be present for long periods in a day), soils with hazardous substance concentrations that exceed **Method A** soil cleanup levels must be treated or removed.

2203 Furthermore, the requirement that contaminated soils in residential areas, schools and daycare centers be treated or removed is an important requirement that must be retained. **We are not supportive of containment measures for these sites.** These are areas where exposure by children is very likely and institutional controls alone are unlikely to be successful in controlling future exposure. Public parks, commercial uses should also be included in this list as they are often in residential zones and in the case of public parks swimming, dirt digging and other recreational activities provide opportunities for greater exposure.

2204 Overall, it is important that Ecology has reorganized this section (from the last draft) to incorporate other remedy selection criteria in addition to the cost test. We believe that Ecology should have more statements in this section that make it even clearer that in no way should cost drive the cleanup decisions.

We have a few concerns regarding this section as it becomes more detailed. They include:

2205 1) In subsection 3, the cost analysis, as it is currently defined, should not be used to determine permanence. In the original MTCA rule, the language was much stronger and clearer as to what permanence should be and how to consider it. Now all of the criteria are rearranged under the disproportionate cost heading, where a small difference in cost (see #2 below) can lead to a weaker cleanup. While Ecology attempts to ensure that cost is only a one of the factors in a cleanup decision, the way the section is arranged and introduced emphasizes cost much more than in the original rule and could result in much weaker cleanup decisions.

2206 2) In subsection (3)(e) we still have a concern about changing the current cost/benefit standard from "substantial and disproportionate" to disproportionate coupled with the statement that this test is met if the difference in costs between the two alternatives "exceed" the difference in benefits. This significantly weakens the current standard and we believe it undermines the requirements in (2)(a)(i-iv) and 2(b)(i-iii).

This is one disturbing example where Ecology has made a departure from the PAC recommendations in favor of the business community. It was our understanding that the PAC agreed that the word "substantial" be removed with the understanding that "disproportionate" meant there still had to be a **significant** difference in cost before the more permanent remedy was rejected.

The proposed rule implies that if the permanent remedy costs only a penny more, it can be rejected. That is not consistent with the statutory requirement that permanent remedies be used "to the maximum extent practicable".

This statement should be altered to say:

"Costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative **significantly** exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative."

We request that is also made clear in the rule that benefits and costs include what the community considers beneficial as such as social, psychological, democratic and community values as well their future costs for health care and future cleanup costs should be a part of the analysis as well. It should be an analysis that

better reflects the long term costs to the community as opposed to the short term benefits to the company for a cheaper cleanup.

2207 Section 370

It is still not clear in this draft what the meaning of the "Expectations for cleanup action alternatives" is. It should be made clear in the introduction to this section that the department and the courts will use the expectations in this Section as a guide when evaluating remedies for compliance with this Chapter.

Add something like the following statement, similar to that in Section 545 (Private Right of Action) to the lead paragraph: "The purpose of this section is to facilitate remedial actions by providing guidance to potentially liable persons and the court on the types of remedial actions the department considers appropriate outcomes of the remedy selection process described in Sections 350 and 360."

2208 In subsection (6) Ecology must acknowledge that dilution is not appropriate for persistent bioaccumulative toxics (PBTs) such as dioxin, mercury, etc.. While the statement should read, "dilution shall not be used to demonstrate compliance..." for all contaminants , it should particularly not apply to PBTs. This also needs to be addressed in 360(2)(g).

2209 We do not think "natural attenuation" (7) should be included in the expectation section. We are concerned it will be abused by PLPs who might try to expand the definition to mean dilution. If Ecology keeps this in the expectation section it should exclude "dilution and/or dispersion."

2210 (2) The result of the cleanup should be that the site is cleaned up permanently so that future generations are not left with the legacy of pollution.

2211 Section 390

Any model remedies identified by the department should be required to be adopted by rule amendment to insure adequate public review and evaluation has been done.

In addition, additional public participation measures should be in place in this section of the rule so that a community can reject a model remedy if it is not address the community values or concerns. In other words, a model remedy should not preclude better alternatives (as the community would define) as they are developed.

2212 Section 440

How is long term defined in this section? 20, 50, 100, 200 years? Clearly the public has to be protected for the length of time the contamination remains, which is some cases will be forever. It has to be made clear in the rule that these institutional controls must be maintained for as long as the contamination exists.

2213 Independent cleanups should be prohibited from relying solely on institutional controls. Institutional controls are not permanent and they rely on extensive oversight to ensure that they remain in place. Although additional safeguards have been added in this new rule, the reality is that Ecology will not have the resources to carry out enforcement to the level that it is needed. Therefore,

these institutional controls should be discouraged as much as possible.

2214 Section 510

This section is helpful in describing to the average person what administrative options exist for remedial actions. This is often a question I get from citizens and it is helpful to have in rule.

2215 Section 515

One of the PAC recommendations was for the agency to conduct an audit of independent cleanup program. As far as I know, this has never happened. Regular audits of the program should be required by rule.

2216 The agency should define cases where independent cleanups are not appropriate. For example, independent cleanups should not be allowed, when there are concerned community members or when there are PBTs present. In addition, if there is an existing order or decree on a portion of a site and a PLP wishes to conduct an independent action on the rest of the site, an independent cleanup should be prohibited.

2217 Sections 520, 530 and 540.

Mandatory penalties should be required in orders or decrees as an incentive to meet timelines.

2218 Section 600

We do not accept Ecology's excuse that the PAC did not achieve consensus on the issue of whether independent cleanups should

be subject to public participation so it has been left out of the rule. The PAC did not recommend the grandfather clause, yet Ecology included it at the request of the business community. If the PAC hadn't discussed public participation at independent cleanups, we would have had a better chance at getting it included? This is absurd! The PAC was merely advisory and Ecology is the decision making body. It would be in violation of the law to take the recommendations of the PAC and make them rule since a rule must go through the public notice and participation requirements. This was clearly an issue raised by a number of groups in the previous comment period and had strong support, as it was mentioned in the briefing paper. Ecology provides no rational justification for its decision on this matter, except that the PAC did not reach consensus. We ask that you reconsider your position and subject independent cleanups to public participation requirements.

2219 Earlier language describing citizen advisory boards for sites was struck from this draft. We are opposed to this. These boards can be very valuable and have worked in a number of cases, including Hanford and Cascade Pole. Is it the Department's intention not to allow these boards? This is in direct conflict with the agency's commitment to public participation and we request it be put back in.

2220 Section 610

An earlier draft more clearly stated that Regional Citizen Advisory Committees could provide input on specific sites. This is now less than clear in this draft. These committees can provide the department with a valuable resource of citizen input much like a planning commission or park board does at the local government level. It should be made clear that the department

can seek the input of these committees on specific sites. We request that the language from the original draft be included that states:

"At the request of the department or citizens in the potentially affected vicinity if a site, the committee may review and comment on remedial actions proposed at a specific site." It only makes sense to use these
boards as a resource.

2221

Section 708

It should be made clear in (3)(d)(iii) that the alternative exposure scenarios described apply to the direct soil contact pathway only. Surface land use would not affect the leaching pathway (protection of ground water).

2222 (11) Probabilistic risk assessment should not be allowed here and should be eliminated in the definition as well. The PAC recommended a REVIEW of probabilistic risk assessment for FUTURE inclusion in MTCA. I have never seen this review. These methods are still in the early stages of development and need a lot more public discussion before they should be applied at sites to develop cleanup standards. These types of risk assessments are also very difficult for the public to understand and critically evaluate. All references to this type of risk assessment should be removed, until a more thorough public debate has occurred.

2223 Section 720

Moving the free product limitation on cleanup levels to subsection (7)(d) so it applies to all cleanup levels (Methods A,

B and C) makes sense. We understand Ecology has received comments from others indicating they believe that discoloration is an inappropriate criterion and that measurable free product should be required to be present before a violation of this criterion occurs. **We strongly disagree with those comments.** Water is not useable if it has a floating layer of oil on it. Ecology's Experience with surface water has shown that rainbow coloration is a common sign of petroleum contamination and it should be no different for ground water.

2224 Subsection (10) should have been retained. AKART should continue to be retained as a requirement whenever ground water has the potential to impact surface water. That is consistent with state and federal water quality law.

Earlier drafts of the rule required that an area-wide point of compliance be established only through a consent decree or order. The current proposal allows independent cleanup sites to declare use of this provision and avoid cleanup without adequate public oversight. The language also allows the department to approve of an area-wide point of compliance when providing technical assistance. The requirement that the department publish a public notice in the site register is totally inadequate. The general public does not read the site register, especially a property owner who may not even realize the ground water beneath their property has been contaminated by someone else. This provision should be revised to require that area-wide points of compliance only be allowed if they are part of an order and they should be discouraged as a matter of policy. This section is just another loophole for not meeting cleanup standards, as is the section on conditional points of compliance.

2225 Section 730

Comments on free product above apply here as well.

2226 Section 740

The Toxics Coalition maintains that sites should not be cleaned up to different standards based on land use because land use is not a constant factor. It doesn't make sense to clean sites up less in industrial areas that might one day be residential areas. Even if sites have been industrial for over one hundred years, land use patterns are changing more rapidly today and waterfront properties (often some of the most industrial, contaminated areas in our state, such as the Duamish, Hylebos, Bellingham Bay, etc...) are the most attractive for residential and commercial development. We believe that all sites should be cleaned up under the Method A standards and in the cases where PBT chemicals are present achieving cleanups as close as possible to zero or uncontaminated "background" levels should be a priority.

2227 We have read the comments from business representatives saying that the elimination of Method C soil cleanup levels in this section is inconsistent with the PAC recommendations. We strongly disagree with that interpretation. The PAC clearly recommended that Method C soil cleanup levels were to be eliminated for all but industrial properties.

2228 With regard to soil vapors and dermal language, we strongly disagree with business comments indicating those provisions here and in sections 745 and 750 are beyond the PAC recommendations. The PAC specifically recommended that other pathways be considered as part of the site-specific risk assessment discussions. This was included in the recommendations on

Section 708. In addition, these specific pathways were used as examples during the risk assessment subcommittee discussions.

2229 One concern we have with the vapor provisions here and in 745 is the requirement that diesel fuel vapors be looked at only if the soil concentration exceeds 10,000 ppm within one foot of a structure. Tying a cleanup level to future land use like this is inconsistent with PAC recommendations stating that land use is to be considered in the remedy selection process. What guarantee is there that a building will not be present on a site at some time in the future? This provision does not require institutional controls to be in-place to assure the site conditions considered at the time of the evaluation will remain in place in the future. Even if this was the case, there is no supporting data provided indicating soil borings are that accurate or even possible to install with confidence that close to foundations or sewer and water lines. Our recommendation is to make this requirement concentration based, not subject to a location requirement that could change in the future or will be impossible to verify.

2230 Terrestrial Ecological Evaluation

We urge the department to adopt the terrestrial ecological risk assessment provisions in Section 7490 to 7494. Addressing impacts to the ecosystem has long been given inadequate attention under MTCA. The PAC recognized this and recommended Ecology proceed. It is time to get on with it. Calls for further delay are disingenuous. It has been nearly 5 years since the environmental community brought this issue to the table. Ecology has fulfilled the PAC recommendation to pilot the draft rule language to the degree possible. It is time to move forward.

Thank you very much for the opportunity to provide comments.

Sincerely,

Laurie Valeriano
Policy Director

Akana, Trish Alicia

From: Luxton, Jane [JLuxton@KSLAW.com]
Sent: Friday, October 27, 2000 11:46 AM
To: 'taka461@ecy.wa.gov'
Subject: LIA: Comments on Washington Soil levels

5C7001!.DOC

<<5C7001!.DOC>> Attached are the comments of Lead Industries Association,
Inc., on proposed amendments to the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC). Please contact me if you have any difficulty opening this attachment, or would prefer it in a different format. My telephone number is 202/626-2627.
Jane Luxton

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October 27, 2000

VIA ELECTRONIC MAIL (taka461@ecy.wa.gov)

Ms. Trish Akana
Rules Coordinator
State of Washington Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, Washington 98504-7600

Re: Proposed Amendments To Model Toxics Control Act (MTCA) Cleanup Regulation (Chapter 173-340 WAC)

Dear Ms. Akana:

The following comments are submitted on behalf of Lead Industries Association, Inc. (LIA), a not-for-profit association of producers and industrial consumers of lead and lead products, some of which have facilities in the State of Washington. LIA appreciates the opportunity to submit comments on the proposed cleanup regulations under the Model Toxics Control Act. In its cover letter announcing the August 2000 proposed amendments, the Department of Ecology stated that it will respond to comments received on both the November 1999 and August 2000 proposed rule amendments after the end of this public comment period.

LIA wishes to comment on certain aspects of both proposals. LIA refers Ecology to the comments LIA submitted in January of 2000 (and inadvertently dated January 29, 1999) in response to the November 1999 proposed amendments, and we will not reiterate those comments here. In addition, LIA has outlined below its concerns with the indefensibly stringent default cleanup levels proposed for lead in soil and the problems associated with Ecology's proposal for an alternative based on reference doses.

2231 The proposal should include revised and substantially increased Method A soil cleanup levels for lead. Instead, the latest proposed version of the regulations puts forward Method A soil cleanup levels for lead that are unchanged from the previous version of the regulations. The Department has stated that it is not changing these numbers at this time, but it "intends to review and, if appropriate, update these values in a future rulemaking." Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act Cleanup

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Regulation Chapter 173-340 WAC (Preliminary Draft), October 12, 2000 at Table 3-1, note 1, Table 3-2, note 3. Given the state of the scientific knowledge, upward revisions of the lead values should be made now, not at some indefinite future date.

2232 The Method A cleanup levels are default levels to be used for routine cleanup actions (such as the cleanup of contaminated soils). A "cleanup level" is defined as the "concentration of a hazardous substance in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions."[1] LIA is especially concerned that the Method A soil cleanup levels for lead at sites with unrestricted land uses (including residential properties) and industrial properties have not been based on the latest scientific information but instead remain unchanged at 250 mg/kg (or ppm) for unrestricted sites and at 1,000 ppm for industrial properties.[2]

According to the Department of Ecology, the 250 ppm level for lead in soil at residential sites is necessary to "prevent[ ] unacceptable blood lead levels."[3] This justification is unsupported and contrary to current scientific information and U.S. EPA findings.

Lead levels in soil have not been shown to have a significant effect on blood lead levels. As noted in LIA's earlier comments to the Department, EPA found "no evidence" in two studies that soil abatement efforts reduced children's blood lead levels.[4] An article published in the *Journal of the American Medical Association (JAMA)* concluded that even if there are modest declines in blood lead levels, the reduction "would not carry substantial clinical and public health benefits."[5] Accordingly, no evidence has been provided that the 250 ppm level is needed to prevent unacceptable blood lead levels.

2233 Two federal agencies that have examined the soil lead level issue have established cleanup levels that are 20 times higher than the Department's 250 ppm standard. The U.S. EPA currently has in place a recommended soil lead abatement level for urban residential sites of 5,000 ppm (and has a proposal under review that would change this ceiling to 2,000 ppm, not

[1] WSR 00-16-135, at 366 (to be codified at WAC 173-340-200).

[2] WSR 00-16-135, at 472, 474 (to be codified at WAC 173-340-900, Tables 740-1, 745-1).

[3] WSR 00-16-135, at 473, (Table 740-1, n. j).

[4] EPA, "Three City Urban Soil Lead Abatement Demonstration Project," EPA Publication #9355.4-10FSa (Oct. 1992).

[5] Weitzman, Aschengrau, Bellinger, *et al.*, Lead-Contaminated Soil Abatement and Urban Children's Blood Lead Levels, JAMA, vol. 269, at 1647 (Apr. 7, 1993).

250 ppm).[6] The U.S. Department of Housing and Urban Development also recommends soil lead abatement at a soil lead concentration of 5,000 ppm.[7]

2234 Public health authorities have recognized the lack of evidence supporting soil lead cleanup standards more stringent than those used by the federal agencies. For example, in comments filed with EPA, the Massachusetts Department of Public Health Childhood Lead Poisoning Prevention Program stated:

> We have not found soil lead to be more than a source of background lead exposure here in Massachusetts. Dr. Michael Shannon, Director of the Pediatric Environmental Health Program at Children's Hospital in Boston, states that in treating over 3,000 lead-poisoned children, he has not seen a single case in which the lead poisoning was caused by soil. Furthermore, in his experience, exposure from soil does not elevate blood lead levels above 10 µg/dL.[8]

2235 The same scientific evidence that justifies increasing the "unrestricted land use" lead level from 250 ppm to much higher levels also supports an increase in the 1,000 ppm cleanup level for industrial properties. Because lead in soil is not a significant issue for children in the residential setting, it is even less of a concern for adults in an industrial setting. The Department's explanation that the 1,000 ppm cleanup level for industrial properties is "based on direct contact" is unclear.[9] At the very least, the Department should clarify this language to make it more meaningful, and it should also adjust this level upward to 5,000 ppm in light of the information presented above.

2236 LIA also is very concerned about the Department's proposed use of reference doses (RfD) to establish lead cleanup levels in lieu of the default values. The Model Toxics Control Act should not automatically require the use of reference doses for all substances when setting cleanup levels in situations where Method A default levels would not apply. Some substances do not have reference doses, and in some cases there is no sound scientific basis for establishing a

[6] EPA's June 3, 1998 Federal Register Notice clarifies that "the interim guidance [specifying a recommended 5,000 ppm cleanup level] will continue to serve as EPA's official policy until EPA promulgates final standards under TSCA Section 403." 63 Fed. Reg. 30302, 30307 (Jun. 3, 1998).

[7] *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, at 12-49 (HUD, June 1995).

[8] Comments filed in Docket OPPTS-62156 by Paul Hunter, Acting Director, Childhood Lead Poisoning Prevention Program, Department of Public Health, Commonwealth of Massachusetts, September 22, 1998, at 4 (*emphasis added*).

[9] WSR 00-16-135, at 474 (to be codified at WAC 173-340-900, Table 745-1, n. j).

reference dose. In the case of lead, there is no reference dose to apply, and EPA, upon whose Guidance and methodology the Department plans to rely, has concluded there is no defensible basis for establishing one.

EPA's evaluation of available lead data establishes that there is no scientific basis for establishing a lead reference dose. The entry for "lead and compounds (inorganic) on EPA's integrated risk information system ("IRIS") expressly states that:

> The Agency's RfD Work Group discussed inorganic lead (and lead compounds) at two meetings (07/08/1985 and 07/22/1985) and considered it inappropriate to develop an RfD for inorganic lead.[10]

A recent telephone conversation with an EPA official confirmed that EPA has not established an RfD since those 1985 meetings and has no plans to do so for reasons relating to the nature of lead.[11]

Because EPA has determined and recently confirmed that it is inappropriate to try and establish a reference dose for lead, the Department of Ecology should follow suit and discard the proposal to use reference doses when establishing cleanup levels for lead (and similarly situated substances). Abandoning reference doses in such situations will necessitate use of some alternative that may not be perfect but is more defensible than creating and using unscientific reference doses or leaving the misimpression that a reference dose-based option exists. As LIA noted in its previous comments, there are flaws with using USEPA's Integrated Exposure Biokinetic ("IEUBK") model for developing alternatives to the default cleanup levels, particularly if site-specific data are not used. Despite those flaws, LIA believes that using the IEUBK model would be preferable to trying to use reference doses in the case of lead and similarly situated substances. LIA asks the Department to replace this impracticable approach as applied to lead with a methodology, such as the IEUBK Model, that will be more reliable for risk assessment purposes.

Based on the comments submitted by LIA previously and those set forth above, LIA respectfully requests that the Washington Department of Ecology: (i) revise upward its current soil lead cleanup levels in both the residential and industrial settings and provide sound scientific justification for whatever levels are put forward; and (ii) abandon its use of a reference dose for lead.

[10] USEPA, IRIS, Lead and compounds (inorganic) CASRN 7439-92-1 at I.A. (*emphasis added*).

[11] Telephone communication with Karen Hogan, USEPA, Office of Pollution Prevention and Toxics, Risk Assessment Division (202-260-0288) on October 6, 2000.

Please feel free to contact one of us with any questions or comments concerning LIA's submission.

Respectfully submitted,

Jane C. Luxton
Harold M. Shaw
King & Spalding
1730 Pennsylvania Avenue, NW
Washington, DC 20006-4706
202/737-0500
Counsel for Lead Industries Association, Inc.

Jeffrey T. Miller
Executive Director
Lead Industries Association, Inc.
13 Main Street
Sparta, New Jersey 07871

Akana, Trish Alicia

From: Jennifer Topel [JTopel@thermoretec.com]
Sent: Friday, October 27, 2000 11:22 AM
To: taka461@ecy.wa.gov
Cc: Linda Baker
Subject: Comments on MTCA Revisions

Concerning the proposed ammendment regarding nonpotability determinations:

2337

Recent revisions to the MTCA regulations in WAC 173-340-720(2)(c) are unnecessarily restrictive in regards to a nonpotability demonstration. In particular, the restriction under 720(2)(c)(iv) requires that, for a nonpotable determination, it must be shown that "The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source."

This requirment essentially eliminates the ability to use surface water standards on any properties that are not immediately adjacent to the surface water body. When groundwater is not a current or future source of drinking water, and the groundwater discharges to a surface water body, it is reasonable to use surface water standards. This ensures protection of the receptor - organisms in the surface water (and humans who consume these organisms). It does not put undue burden on property owners and responsible parties to clean up to drinking water standards at locations where the water is not, and will not be used as drinking water. The provision for hydraulic connection added in the August 2000 revision undermines the brownfield effort in the Duwamish and other places across the State. The provision will decrease the number of cleanups being performed and completed in these areas. The addition of this requirement is contrary to Ecology's intent that the changes to MTCA make the business of environmental cleanups more equitable, more flexible and less expensive.
Please eliminate this language under WAC 1730340-720(2)(c) from the draft regulations as this requirement does not provide additional protection.

2238

Concerning Air Cleanup Standards

The proposed language in WAC 173-340-750(3)(b)(ii)(B) should be revised to be consistent with current practice. IRIS recommends the use of unit risk factors, not carcinogenic potency factors, in determining risk associated with air exposure. As the proposed MTCA regulations refer to IRIS and HEAST for reference in these calculations, Equation 750-2 should be updated to use the unit risk factor.

Linda Baker
Senior Hydrogeologist
ThermoRetec Consulting Corporation
1011 SW Klickitat Way, #207

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#84

Seattle, WA 98134
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Akana, Trish Alicia

From: Peter J. Mintzer [pmintzer@omwlaw.com]
Sent: Friday, October 27, 2000 11:16 AM
To: 'taka461@ecy.wa.gov'
Cc: Robert D. Markworth (E-mail); David P. Young (E-mail); William F. Joyce
Subject: Comments on Proposed MTCA Revision on behalf of Union Pacific Rai lroad Company

Dear Ms. Akana:

Please accept the following comment on the proposed MTCA amendments on behalf of our client, Union Pacific Railroad Company (UPRR).

2239

Recent proposed revisions to the MTCA regulations in WAC 173-340-720(2)(c)include the addition of a section (iv) that states requires a non-potable determination to show that "The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source."

It is unclear whether this statement is intended to restrict applicability of the non-potable status to sites that are directly adjacent to surface water. Such a restriction could place severe limitations in areas such as the Tacoma Tideflats or the Duwamish Valley where heavily industrialized properties may be desirable candidates for brownfield redevelopem, but the sites are not directly adjacent to surface water. The proposed revision seems unnecessarily restrictive in regards to a non-potability demonstration. Given this, UPRR requests that the proposed addition to 173-240-720(2)(c) be deleted or its intent clarified.

Peter J. Mintzer
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Akana, Trish Alicia

From: Kelley-Clarke, Jeff [Jeff.Kelley-Clarke@co.snohomish.wa.us]
Sent: Friday, October 27, 2000 10:29 AM
To: 'taka461@ecy.wa.gov'
Cc: Martha Burke (E-mail)
Subject: MTCA rule amendments

PolicyForumletr.doc

Attached is a letter from the Washington Solid Waste Policy Forum commenting on the proposed rule amendments to MTCA. The original letter is being signed and will be delivered by regular mail. <<PolicyForumletr.doc>>

Jeff Kelley-Clarke

Snohomish County
Solid Waste Utility Director
2930 Wetmore
Everett, WA 98201

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425.259.4945 (fax)
jeff.kelley-clarke@co.snohomish.wa.us

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Washington Solid Waste Policy Forum

October 27, 2000

Trish Akana
Timothy Nord
Curtis Dahlgren
Washington State Department of Ecology
Dept. of Ecology, Box 47600
Olympia, WA 98504-7600

Re: WAC 173-340-330(7)(a)(iii)(A)-Delisting Sites from the Register

Dear Tim and Curtis:

2240

We are writing this letter to indicate our support for clarifying the WAC to allow landfill sites to be removed from the MTCA register. The regulations governing closure, monitoring, and cleanup of landfills are very beneficial to the environment, and help assure protection of groundwater, air quality, and public health. The MTCA register plays an important role in identifying sites with continuing problems. If the rules and policies are written and interpreted such that sites cannot be removed from the register, regardless of what steps the site owner takes, no one benefits.

At a meeting held on October 12 in Ecology offices, between representatives of Ecology, City of Seattle, and Snohomish County, progress was made in defining the problem and setting forth our concerns. Our reading of the existing policy and the proposed regulation is that any modern landfill with active gas or leachate control systems which lands on the MTCA register would be stuck there permanently, since more than "passive maintenance activities" would be taking place. This appears to be the case even if those active measures had nothing to do with cleanup of the problem which instigated the listing. We believe that such a course is unreasonable and counterproductive, for the following reasons:

- MTCA listing is a significant stigma for site owners, and should be applied only where problems remain.
- Removal from the list is an incentive for corrective action; without such prospects, there is reduced incentive.
- MTCA listing may increase the level of regulatory oversight, and if the problem has been corrected, that would be inefficient for both the site owner and regulatory agencies.

We support the proposed modifications to the regulations proposed by the City of Seattle by separate communication, which consist of the following:

1) Where the MTCA cleanup includes 173-351 WAC actions that the site owner would be performing for landfill operation or closure (such as gas extraction, surface water diversion, or leachate collection and treatment), then the landfill could be delisted from the Site Register if Ecology approves local health department oversight of these on-going activities.

2) Where the MTCA cleanup does not include any 173-351 WAC actions, landfill delisting will be allowed pursuant to the MTCA WACs, including a new exception clause to be added to the end of Subsection 330(7)(a)(iii)(A) as follows:

> All construction and operation of remedial actions have been adequately completed, except for activities under Chapter 173-351 WAC related to operation or closure of solid waste landfills, and only passive maintenance activities such as monitoring, inspections and periodic repairs remain.

Please let us know as soon as possible whether the Department of Ecology supports making these changes. You may call Jeff Kelley-Clarke at 425.388.6486 to discuss our concerns.

Sincerely,

Washington Solid Waste Policy Forum

Jeff Kelley-Clarke
Snohomish County

Ron Draggoo
Douglas County

Damon Taam
City of Spokane

Jenny Bagby
City of Seattle

Mark Buscher
King County

original will be sent by U.S. Mail

DUWAMISH COALITION

TPH PROJECT OVERSIGHT GROUP

Port of Seattle, King County, City of Seattle, City of Tukwila, U.S. EPA Region 10 and the Duwamish Coalition

October 27, 2000

Thomas Fitzsimmons, Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Mr. Fitzsimmons,

Attached are the Duwamish Coalition's Total Petroleum Hydrocarbon (TPH) Project Oversight Group's (POG) consensus recommendations for the August 2, 2000 proposed amendments to the Model Toxics Control Act Cleanup Regulations. Our recommendations include a number of previously submitted comments formulated in response to the November 1999 version of the proposed amendments, that were either overlooked by your department or not adopted for other reasons. Of our 71 recommendations on the earlier draft rule, 28 were rejected, 33 were accepted, and 10 were partially accepted or have been withdrawn by the POG due to language changes in the new version of the proposed amendments. A number of our recommendations which were not incorporated into the proposed amendments involve substantive scientific and policy issues. We are resubmitting those recommendations and responding to 11 new issues raised by changes made in the August 2000 version of the proposed rule amendments.

We request that you give each of our comments serious consideration. For five years, the POG conducted a thorough, balanced review of site evaluations, regulations, and technical issues related to toxicology, laboratory methods, fate and transport of hazardous substances, human health risk analysis, and ecological risk analysis. We invested more than $850,000 of public monies and more than $1 million of donated staff time in this analysis. A list of the contributing jurisdictions and participating staff is enclosed (Attachment B). You will see that it is a comprehensive list of state, federal, and local governments, as well as an extensive number of community and private sector participants.

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In fact, the POG conducted the most extensive effort of its kind and was a unique partnership from its inception. It began with the Duwamish Coalition, which consisted of more than 250 members, including elected leadership, who met regularly for nearly three years. The work of the Coalition was broad, and the TPH Project was its top priority.

The POG, in cooperation with Ecology, undertook extensive public involvement activities through public meetings, workshops, and mailings that included the analysis and exchange of scientific documents. The large and diverse stakeholders included tribes, state and local elected officials, environmental advocates, government regulatory and other staff, environmental professionals, and many private citizens and business owners. The POG actively coordinated its work with the MTCA Policy Advisory Committee and Ecology's External Advisory Group. We conferred on a regular basis with Ecology's Science Advisory Board on difficult and sometimes contentious scientific issues.

We have been committed to using only the best science available. Earlier, under separate cover, we provided Ecology with several volumes of technical documents that underlay our recommendations.

The work of the American Society for Testing and Materials (ASTM), the Total Petroleum Hydrocarbon (TPH) National Criteria Working Group (TPHCWG) and the Massachusetts Department of Environmental Protection (MADEP) was important to the POG's initial formulation of a conceptual model for approaching the TPH framework. The POG expanded upon the existing frameworks, particularly in terms of the fate and transport of TPH in environmental media.

Special thanks are due to the Foster Wheeler Environmental Corporation, Floyd & Snider Inc., and the University of Washington, each of which provided services under contract to the POG. Thanks are due also to a large list of laboratories that donated their services for the project and to Linn Gould of Erda Environmental Services and Warren Hansen of Onsite Enterprises Inc., who served as technical reviewers and advisors. The technical advice of the U.S. Environmental Protection Agency was instrumental throughout the process; Dr. Marcia Bailey was its principal representative. State involvement included seventeen staff from Ecology, with whom we worked very closely; and and Hun Seak Park, an expert on modeling from the Pollution Liability Insurance Agency. We are most grateful for their dedication, perseverance, and expertise.

We strongly urge your adoption of *all* of the attached recommendations. If incorporated into MTCA, this TPH framework will put Washington at the national forefront of resolving the ubiquitous scientific and engineering problems inherent in evaluating petroleum contamination in the environment. The recommendations provide for the best, most flexible and scientifically advanced regulatory framework for protecting human health and the environment using tiered risk evaluations. In addition, it is our hope and expectation that our recommendations will substantially enhance state and local efforts to restore salmon runs by expediting the cleanup of TPH-contaminated sites that border surface waters.

If you have any questions about the attached comments, please contact Elizabeth Leavitt, Environmental Manager, Aviation Division, Port of Seattle. Ms. Leavitt is the POG's Technical Issues Manager. She can be reached at (206) 433-7203.

Sincerely,

Elizabeth Leavitt
Environmental Manager
Aviation Division
Port of Seattle

Thomas Newlon
Senior General Counsel
Port of Seattle

Marcia Bailey D. Env.
Environmental Scientist
Region 10, U.S. EPA
(Technical Advisor to POG)

Michael Alvine
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Metropolitan King County Council

Lucy Auster
Sr. Development Specialist
Office of Reg. Policy and
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Ben Wolters
Sr. Com. Dev. Specialist
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Tom Boydell
Principal
Seneca Consulting Group
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Linn Gould
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Warren Hansen, P.E.
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Onsite Enterprises Inc.
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Teri Floyd, Ph. D.
Principal
Floyd & Snyder Inc.
(Consultant to POG)

Jack Pace
Planner Manager
City of Tukwila

cc:

Gary Locke, Governor State of Washington	Ron Sims, Executive, Met. King Co. Council, King County	Paul Schell, Mayor, City Council, City of Seattle
Steven Mullet, Mayor, City Council, City of Tukwila	Commissioners, Mic Dinsmore, Executive Director, Port of Seattle	James Sims, Director Pollut. Liab. Ins. Agency State of Washington
Christine Gregoire Attorney General, State of Washington	Charles Findley Acting Administrator, Region 10 U.S. EPA	

Attachment A

TPH Project Oversight Group Review of Proposed Amendments to the Model Toxics Control Act Cleanup Regulation 173-340 WAC, August 2000

This document is an amended version of the TPH Oversight Group's (POG) consensus comments to the proposed amendments to MTCA dated November 1999. The August 2000 proposed amendments have been reviewed and each issue below has been scrutinized to determine whether the POG comments were rejected or accepted in the August 2000 proposed amendments. For purposes of clarity, the original comment is repeated, and the POG's interpretation of Ecology's response to each comment is provided in a boxed format. This attachment also contains 11 new issues that have emerged as a result of the August 2000 version of the proposed amendments. We encourage Ecology to consult with the POG if there are any questions or if clarification is needed.

The POG emphasizes the need for a TPH guidance document. The proposed amendments provide the backbone of the new TPH approach for evaluating and remediating petroleum contaminated sites. However, as companies and consultants have started collecting data and evaluating the new approach, many questions have been raised that cannot be dealt with adequately in a rule format and should be addressed in guidance.

Page numbers cited in the original comments refer to the November 1999 ("Salmon") version of the Proposed Amendments. The pages referenced in the boxed text reflect page numbers in the August 2000 Proposed Amendments highlighted version of the rule issued by Ecology.

224 **Issue 1A**
200, Page 10, Definitions, Aromatic hydrocarbons

The proposed definition of aromatic hydrocarbons is

> ...organic compounds that are characterized by one or more benzene rings.

It is suggested that the definition be changed to the following:

...relatively stable cyclic organic compounds containing a delocalized electronic structure. For purposes of evaluating TPH using the fractionation approach, aromatic compounds include alkyl-substituted compounds such as toluene or 2-methylnaphthalene, but do not include compounds with substitutions by other elements, such as 1,4-dichlorobenzene.

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

The proposed definition of aliphatic hydrocarbons is:

...organic compounds that are characterized by a straight, branched, or cyclic arrangement of carbon atoms.

It is suggested that this be changed to the following:

...Organic compounds primarily composed of carbon and hydrogen, including alkanes, alkenes, alkynes and cyclic organic compounds (such as cyclohexane) which do not contain delocalized electronic structures. For purposes of evaluation of TPH using the fractionation approach, aliphatics include alkyl-substituted compounds (such as 2-methyl pentane) but do not include compounds with substitutions by other elements (such as cis-1,2-dichloroethene).

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

2242 **Issue 1B**
200, Page 12, Definitions, Direct contact

The existing definition of direct contact is:

"...exposure to hazardous substances through ingestion or dermal contact."

It is suggested that this be changed from "ingestion or dermal contact" to "ingestion and/or dermal contact," since ingestion and dermal contact both must be evaluated for TPH-contaminated soil in the proposed changes to MTCA. Dermal contact must be evaluated for other substances under specified circumstances.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

2243 **Issue 2**
200, page 13, Definitions, Equivalent carbon number

The proposed definition is:

...a value assigned to a component of a petroleum mixture, empirically derived from the boiling point of the component

normalized to the boiling point of n-alkanes or the retention time of n-alkanes in a boiling point gas chromatography column.

The POG recommends substituting the word "fractions" for "components," as "components" implies that hazardous substances that may be associated with TPH are assigned EC numbers. The term "EC fractions" is consistent with the manner in which equations for determining TPH cleanup levels are presented in sections 720 and 740.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

2244 **Issue 3**
200, Page 17, Definitions, Natural biodegradation

It would be preferable to refer to "human intervention" rather than to "man's intervention" in this definition.

Comment accepted (page 19) and appropriately revised in August 2000 proposed amendments.

2245 **Issue 4**
200, page 17, Definitions, Natural Attenuation

The definition includes the statement that "natural attenuation is not an active measure."

The POG concurs with an explanation of natural attenuation given in a USEPA policy document ("Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," June 9, 1997), which states that monitored natural attenuation is not a "no action" or "walk-away" solution, but that it may be "an alternative means of remediation that may be appropriate for a limited set of site circumstances." Source control is considered to be a crucial component of remedial actions which must be taken before monitored natural attenuation can be included as part of the final remedy.

The POG recommends that the definition be entitled "Monitored natural attenuation" and that the statement "[N]atural attenuation is not an active remedial measure" be deleted from the definition. The POG views natural attenuation as an important option in remediating certain TPH-contaminated sites, such as those in the Duwamish corridor and other Brownfields areas in the state.

Comment rejected (page 18). The POG wishes to reiterate this comment. We additionally recommend that the final sentence be amended to say: "Natural attenuation *other than natural biodegradation* is not an active remedial measure."

2246 **Issue 5**
350(12)(d), page 47, Input parameters

This paragraph directs the reader to 173-340-708(10) for "input parameters" that may be modified for establishing remediation levels. The term "input parameters" is not used in 173-340-350(12)(d); rather, the term "exposure parameters" is used. "Input parameters" also is not defined in the definitions section of the rule. The POG suggests replacing the term "input parameters" with "exposure parameters" for consistency and clarity.

Comment accepted (page 54) and appropriately revised in August 2000 proposed amendments.

2247 **Issue 6**
370(6), page 59, Expectations for cleanup action alternatives

This states that, for facilities adjacent to a surface water body, Ecology "expects that dilution will rarely be the sole method for demonstrating compliance with cleanup standards." This appears to conflict with page 179, 173-340-730(6)(b), which states: "Where hazardous substances are released to the surface water as a result of ground water flows, no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels." The latter is not new language, except that the term "mixing zone" previously was "dilution zone." On page 166, 720(9)(d)(i)(C), which deals with points of compliance for sites abutting surface water, it is stated: "Use of a mixing zone under WAC 173-201A-1to demonstrate compliance with surface water cleanup levels shall not be allowed." Again, "mixing" is a new term, having been substituted for the previous word "dilution."

It is not clear to the POG whether the use of the term "dilution" in the first cited passage means the same as "mixing zone" or something different. This is particularly confusing since the use of "mixing zone" has been substituted for the prior use of "dilution zone" in the second two cited passages. The POG recommends that the meaning of the language in 173-340-370(6) be clarified, in particular as to whether it does or does not conflict with the language in 173-340-720 and -730, cited above.

Comment rejected. This sentence has been adjusted but the terms mixing zone and dilution are still used interchangeably (pp 181, 194) making the language difficult to understand. The POG reiterates the comment.

2248 **Issue 7**
440(4)(d), page 74, Institutional Controls

This now reads:

> The cleanup level is based on the assumption of land use other than residential, such as industrial or commercial.

For clarification of Ecology's intentions, the POG recommends that the sentence be modified as follows:

The cleanup level is based on any exposure parameters other than residential.

Comment altered (page 81). Section 440(4) is new. See New Issue 1D below.

2249 **Issue 8**
450(6)(a)(ii), page 81, Releases from Underground Storage Tanks

This requires that a remedial investigation and feasibility study be conducted when "[F]ree product is found". The POG recommends substituting the following language: [when] "[F]ree product removal is not achieved according to (4)(a)."

Comment withdrawn (page 90). Addition of new language satisfies POG expectations.

2250 **Issue 9**
700(5)(b), page 115, Method B Universal Method

This states that Method B is the "universal method" and can be used "at all sites." There should be a clarification that, for substances for which Method B cleanup levels cannot be calculated, but for which cleanup levels are available in Method A tables, that the Method A cleanup levels are to be used. Examples of chemicals for which Method B cleanup levels cannot be calculated are MTBE in ground water and lead in any medium. There should be a similar provision in 173-340-700(5)(c), which discusses Method C.

Comment rejected. (pp 130-131). The POG reiterates this comment.

2251 **Issue 10**
700(8)(b)(ii), page 121, Method B and Method C tiered approach

The first sentence reads as follows:

> This chapter provides for a three-tiered approach for establishing Method B and Method C cleanup levels at sites that involve a release of TPH.

It is recommended that this sentence be revised as follows (changes in italics):

> This chapter provides for a three-tiered approach for establishing Method B and Method C tiered cleanup levels *and remediation levels* at sites that involve a release of TPH."

This will clarify that the TPH tiered approach may be used to calculate cleanup and remediation levels.

Comment rejected (page 135). The POG reiterates this comment.

2252 **Issue 11**
700(8)(b)(ii)(B)(II) and (III), pp 122, Specific procedures for setting cleanup levels at petroleum contaminated sites

The POG believes that the following sentence, which is present in both subsections, does not add benefit to the discussion of procedures for establishing cleanup levels, and instead could add confusion; and therefore recommends its deletion:

> Consideration of current and future site uses may be considered in establishing remediation levels.

Comment rejected. (page 136). The POG did not include this sentence in the TPH Overview, and it was not deleted as recommended. All TPH sites, and presumably all MTCA sites are always considered in context of current and future land uses for establishing *both* cleanup levels and remediation levels. This language is out of place and should be located in Section 700. It is not appropriate to place this sentence in the description of TPH Tiers 2 and 3. The POG strongly recommends its deletion.

2253 **Issue 12**
702(16)(b), page 126, Criteria for quality of information

This paragraph states, in part, the following:

> When deciding whether to approve or require modifications to the default methods or factors specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or factors, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) Whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community; etc.

It appears that the first two uses of the term "factors" should actually refer to the term "exposure parameters," a defined term in this chapter. The third, generic use of "factors" in this paragraph is appropriate. It is recommended that the first two references to "factors" be changed to "exposure parameters."

Comment rejected (page 141). The first "factor" was changed to "assumption." The second "factor" was not changed. We do not understand Ecology's meaning of the words "factors" and

"assumptions". The term "exposure parameters" is, however, in the definitions section. The POG recommends the following language:

When deciding whether to approve or require modifications to the default methods or ~~factors~~ exposure parameters specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or ~~factors~~ exposure parameters, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community etc.

2254 **Issue 13**
708(3)(d), page 135, Reasonable maximum exposure

(a) It appears that the word "scenarios" was intended to be placed after the term "potential future site exposure" in the second sentence, but was left out. If this is the case, it is recommended that the word "scenarios" be inserted at that location.

Comment rejected (page 152). The POG reiterates this comment.

2255 (b) It is difficult to distinguish between land use and the exposure assumptions associated with a specific land use in this paragraph. It suggests that one cannot use Method A or B for land uses other than residential and industrial. The following sentences from this paragraph are an example:

> Land uses other than residential and industrial, such as agricultural, recreational, and commercial, shall not be used as the basis for a reasonable maximum exposure scenario for the purpose of establishing a cleanup level. However, these land uses may be used as the basis for an alternate reasonable maximum exposure scenario for the purpose of developing a remediation level.

The POG recommends that this language be deleted from the paragraph as unnecessary and potentially confusing to the reader.

Comment rejected. The POG reiterates this comment.

2256 **Issue 14**
708(7)(f), page 138, Reference doses

The EPA document which should be cited for development of reference doses is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

Comment rejected. The POG reiterates its comment. The sentence in the proposed amendments refers to EPA RAGS to develop RfDs (page 156). The reference is incorrect; the correct EPA document to derive toxicity values is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

2257 **Issue 15**
720(4)(b)(iii), page 158, and 720(5)(b)(iii), page 161, Free product limitation

This free product limitation language applies only to ground water cleanups under Methods B and C, as written. The POG recommends that it also apply to ground water cleanups under Method A. [Note: Additional comments pertaining to this language are included in Attachment I, Issue 16.]

Comment partially accepted. Comment withdrawn.

Background: The free product limitation was recommended for TPH by the POG, as a "safety net" to assure that ground water cleanup levels set in 720 did not result in accumulations of TPH as separate phase product. If NAPL is present at or above the cleanup level, then that cleanup level needs to be re-examined. The NAPL limitation was a way of recognizing that some type of check was needed for TPH mixtures (i.e., mineral oil) where maximum dissolved concentrations might not exceed the allowable risk levels. The POG therefore believes the demonstrations described in the recommended language below are appropriate.

Apply to Petroleum Hydrocarbons Only: The free product limitation language for ground water (page 180) has been moved from 720(4)(C)(iii) (Method B cleanup levels for potable ground water/Petroleum Mixtures – page 177) and modified. In its new location in the rule, it appears to apply to hazardous substances in addition to petroleum hydrocarbons, an enlargement of scope not recommended by the POG. Therefore, the language should be moved to 720(4)(C) and (5)(C) and limited to TPH in its application.

Ground Water Degradation from Non-TPH Sources: The POG has concerns that the language mentioning "sheen, discoloration, sludge and emulsion in the groundwater" could result in serious problems for sites where these conditions might occur due to background or naturally-occurring sources (i.e., peat deposits). The proposed wording below is amended to include "attributable to petroleum hydrocarbons."

The revised language recommended by the POG is as follows:

" (d) For total petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product accumulating in or on the ground water. Any of the following

observations of ground water at or above the cleanup level attributable to petroleum hydrocarbons may be used to demonstrate compliance with this requirement: (i) the absence of measurable (1/8-inch) product using an appropriate measuring protocol (a clear bailer, an interface probe, or other devices as approved by the department; (ii) the absence of a film, sheen, discoloration, sludge and emulsion in the ground water; (iii) other site-specific methods approved by the department. Such demonstrations must use procedures to ensure that sampling/observation points have the highest likelihood of observing NAPL relative to the groundwater point of compliance and taking into account the vertical and horizontal migration of the NAPL in the groundwater system."

Note: The measurable product thickness of 1/8 inch is a method used by a number of states in determining whether a product layer is present [personal communication: Charles San Juan, Ecology – results of a recent state-by-state survey of state environmental agencies performed by Eric Sadoyama of Hawaii through the Association of State and Territorial Solid Waste Management Officials (ASTSWMO)].

2258

Issue 16
730, pages 172-181, Surface water cleanup standards for TPH

Ecology has added considerable TPH-specific language that was not recommended by the POG. The POG recommended that, since there are no federal or state surface water criteria specific to TPH, and there are no bioconcentration factors for TPH fractions that would allow for a calculation of a surface water cleanup level, that the ground water cleanup levels for TPH in Table 720-1 (Method A) be the default cleanup level for TPH in surface water for the protection of human health.

The POG offers the following specific comments on the new TPH language in section 730:

1. Add a new paragraph, (iv), under 730(2)(b) (Method A), which reads: "For TPH, a concentration that does not exceed the TPH cleanup levels provided in Table 720-1."

Comment rejected. It is still in 730(3)(b)(iii)(C)(page 190), a paragraph which we recommended deleting. The POG reiterates the above comment and addresses it further in (2) below.

2. Delete 730(3)(b)(iii)(C) and 730(4)(b)(iii)(C). It is not possible to use Equation 720-1 for TPH since bioconcentration factors for the fractions are unavailable, and it is unnecessary to have a separate subsection for hazardous substances that may be associated with the TPH, because they are covered in 730(3)(b)(iii)(A) and (B) and 730(4)(b)(iii)(A) and (B) (surface water cleanup levels for noncarcinogens and carcinogens). The POG also is concerned that the inclusion of this equation for petroleum could be construed to infer that the cleanup level calculated using it (assuming appropriate fraction-specific BCFs are developed in the future) would be protective of human health and the environment. In fact, ecological receptors are more at risk from the presence of petroleum in surface waters than are

humans. The POG encourages Ecology to concentrate its efforts to address petroleum and surface water on ecological receptors.

Comment rejected (page 190). The POG continues to strongly recommend that Equation 730-1 (surface water cleanup level calculation for noncarcinogens) not be made applicable for petroleum hydrocarbons for the following reasons:

1) Bioconcentration factors for TPH fractions have not been established, but are necessary for use of the equation.

2) A human health-only surface water cleanup standard is both misleading and unnecessary, and potentially harmful. Even if BCFs become available, use of the equation readily could be construed to imply protectiveness of the resulting cleanup number to surface water receptors in general. Petroleum mixtures are more threatening to ecological surface water receptors than to human surface water receptors (i.e., consumers of seafood); therefore, Ecology should concentrate on the ecological receptors of petroleum discharges to surface waters. Such an effort would also protect human health.

3) State and federal statutory prohibitions on the discharge of petroleum to surface waters based on physical (not quantitative or chemical) criteria have long existed. Before promulgating an equation for the calculation of quantitative, chemical-based petroleum surface water cleanup levels, there should be some assurance on the part of Ecology that such cleanup levels would not be likely to violate the statutory prohibitions on petroleum discharges to surface waters. No such assurances exist at this time; therefore, the POG recommends that the text be revised to eliminate the reference to Equation 730-1 for petroleum, and instead to emphasize the statutory prohibitions as well as the requirement to ensure no adverse effects on the environment, the latter given at 730(3)(C)(ii). The POG agrees with the retention of the reference to the Method A ground water cleanup levels for petroleum as an adequate surface water cleanup level, since their historical use has not demonstrated that they are likely to result in violations of the statutory prohibitions on the discharge of petroleum to surface water.

2259

Issue 17
730(b)(v), page 176, Free product limitation

The free product limitation language written by Ecology for ground water cleanup levels has been incorporated into surface water cleanup levels. The POG is concerned that among other things, allowing the use of TPH solubility limits for complying with the free product limitation, instead of just physical observations of sludges, emulsions or sheens, could undermine, or give the impression of undermining, the federal and state prohibitions on petroleum releases to surface water, which rely specifically on those physical observations. The POG recommends that the following changes be made:

1. Change "petroleum products" to "TPH" or "petroleum hydrocarbons" to comport with the definitions in the rule.

Comment accepted. Deleted on pp 190-191. Moved to section 730(5)(d) page 194.

2. Delete the word "discoloration" in the second sentence, as it is an inappropriate criterion for a surface water standard.

Comment rejected. Water discoloration, as well as films and sheens, can result from natural processes as well as released contaminants. The POG believes that significant inconsistency exists in how free product is determined and/or remediated at various sites and that clarifying language will be of assistance to MTCA users. The POG recommends the following clarification to the free product limitation language in section 730(5)(d) (page 194).

(d) Free product limitation. For ~~organic hazardous substances and~~ petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product being present in or on the surface water. Physical observations of surface water at or above the cleanup level, such as the lack of a film, sheen, discoloration, sludge or emulsion attributed to the released organic petroleum hydrocarbons in the surface water or adjoining shoreline, may be used to determine compliance with this requirement.

The POG recommends this language only be applied to petroleum hydrocarbons (see similar justification for the free product limitation for ground water (Issue 15).

3. The third sentence reads: "The solubility limit for the hazardous substance may also be used to determine compliance with this requirement." Petroleum should be excluded from this provision, as the solubility limits of petroleum mixtures in the environment are difficult to estimate accurately, and it is possible that using solubility limits to demonstrate the lack of free petroleum product could result in a violation of the state and federal prohibitions concerning petroleum releases to surface water.

Comment accepted for surface water as reflected in the August 2000 proposed amendments (page 194).

4. The limitation on free product should be applicable to cleanups conducted pursuant to Method A in addition to Methods B and C.

Comment withdrawn (page 194). The Method A numbers are restrictive enough so that they should not result in formation of free product.

2260 **Issue 18**
730(6)(b), page 179, Point of compliance

The reader is directed to 173-340-720(10)(d) for requirements regarding sites where contaminated ground water flows into surface water. That subsection deals with statistical procedures. It appears that the reference should be to 173-340-720(9), which deals with points of compliance.

Comment accepted (page 194) and appropriately revised in August 2000 proposed amendments.

2261 **Issue 19**
740(2)(d)(2), page 184, Method A soil cleanup levels

Language should be included to state that sites which have cleaned up to Method A soil levels throughout the site are presumed to have addressed soil vapors. Such language was included in the December 1998 draft proposed amendments but appears to have been eliminated.

Comment rejected (page 198). The POG reiterates this comment.

2262 **Issue 20**
740(3)(b)(iii)(B), page 188, and 745(5)(b)(iii)(B) page 207

These subsections deal with soil cleanup levels under Methods B and C for carcinogens; therefore, the words "other than petroleum" should be deleted. Cleanup levels for carcinogenic substances associated with a petroleum mixture must be determined using the appropriate equations provided in these sections.

Comment accepted (page 200) and appropriately revised in August 2000 proposed amendments.

2263 **Issue 21**
740(3)(c)(iii), page 192, Modified Method B soil cleanup levels, Dermal contact

The last sentence in this paragraph states:

> When conducting this evaluation the following equations and default exposure assumptions shall be used.

It is recommended that the words "or chemical-specific" be added after "default," because the conditions of Equation 740-4 allow for the use of chemical-specific or default dermal absorption fraction values.

Comment rejected (pp 202-203). The POG reiterates this comment.

2264 **Issue 22**
740(3)(b)(iii)(C), page 190, and 745(5)(b)(iii)(C), page 209:

The POG participated in the development of the soil cleanup equations for petroleum presented in these subsections, and endorses the inclusion of dermal contact with ingestion in the calculation of cleanup levels for direct contact with soil, for both standard and modified Methods B and C.

Comment accepted (page 203) and appropriately revised in August 2000 proposed amendments.

2265 **Issue 23**
740(3)(c)(iv)(B), page 194, Modified Method B soil cleanup levels and 745(5)(b)(iv)(B), page 210, Method C industrial soil cleanup levels

An additional bullet item is recommended, as follows, in addition to the others, which delineate when soil cleanup levels can be assumed to be protective of air pathways, as follows:

> The conceptual site model indicates that vapors cannot reach receptors.

Comment rejected (page 205-206). The POG reiterates and adds the following clarification to this comment. There may be cases when a conceptual site model shows that the vapor pathway is incomplete. This is a standard risk assessment procedure that would be a helpful tool at sites where potential exposure to vapors is a consideration.

2266 **Issue 24**
740(3)(c)(iv), page 194, and 745(5)(b)(iv), page 210, Soil vapors for Methods B and C

New language proposed by Ecology for soil vapors incorporated some of the recommendations contained in the POG consensus letter of September 21, 1999. However, important portions were omitted, including the following:

1. The requirement to evaluate soil vapors when TPH containing less than 8% volatiles by weight is present in soil at levels exceeding 10,000 mg/kg and which meet certain building proximity stipulations was retained from the December 1998 draft proposed amendments. However, there now is no language explaining that, in the presence of more than 8% volatiles, soil cleanup levels will be determined on a site-specific basis. It is recommended that language addressing sites where TPH in soil exceeds 8% volatiles by weight be specifically included in the rule. [Note: It is recommended that the term "petroleum distillates" in these subsections be replaced with the term "total petroleum hydrocarbons." "Petroleum distillates" is not a defined term in the rule.]

Comment rejected (page 205). The POG reiterates this comment. The user needs to know that the vapor pathway is important when volatiles exceed 8%. The language is unclear as written now. We recommend modifying 740(3)(C)(iv)(A)(I) as follows:

(I) Petroleum Mixtures. Evaluation of soil vapors for sites where petroleum mixtures are released shall be required when the soil cleanup level is based on a condition set forth in 740(3)(C)(iv)(A) and;

(i) The volatile constituents comprise eight percent (8%) or greater of the total mixture by weight; or,

(ii) The volatile constituents comprise less than eight percent (8%) volatile constituents by weight (such as diesel range organics), a potential indoor air pathway exists, and soil cleanup levels exceed 10,000 mg/kg within one foot of: the wall of a structure; bottom slab or a structure; or, conduit that could facilitate transport to a structure.

2267 2. The POG believes that in most cases where an indoor air pathway is being assessed, that assessment would be protective of ambient air quality. Therefore, the language originally proposed by the POG (excluding the requirement to measure ambient air where indoor air is shown to be the more protective point of exposure) should be included.

Comment accepted (page 205) and appropriately revised in August 2000 proposed amendments.

2268 The POG offers the following additional comments regarding the proposed language on soil vapors:

3. The words "other than total petroleum hydrocarbons" should be inserted in parentheses after the words "When the soil cleanup level for a volatile hazardous substance is based on protection of ground water..." in the second bullet items on pages 194 and 210. This is suggested because the first bullet item is specific to the conditions under which soil vapors must be evaluated at TPH-contaminated sites.

Comment rejected (page 205). The POG reiterates this comment.

2269 4. Requirements to evaluate soil vapors should be limited to those sites (and corresponding conceptual site models) where potential vapor exposure pathway(s) are identified and the soil cleanup levels are high enough that indoor air or ambient air concentrations could pose a significant exposure. The current language does not consider whether or not actual pathways are identified, triggering an evaluation based solely on the soil cleanup level.

Comment rejected (page 205). The POG reiterates this comment.

2270 5. Measurement of the soil vapor concentrations: The wording should be changed as follows, for clarification purposes: "... using methods approved by the department, demonstrating vapors in the soil between the source and the point of compliance ~~building~~ would not result in the exceedance of ~~exceed~~ air cleanup levels at the point of compliance established under WAC 173-340-750."

Comment rejected (page 205). The POG reiterates this comment but recommends the following modification to the above: ".... Using methods approved by the department, demonstrating vapors in the soil ~~between the source and the point of compliance building would~~ not result in the exceedance of air cleanup levels at the point of compliance established under WAC 173-340-750."

2271 6.The POG recommends that (740)(3)(c)(iv) and (745)(5)(b)(iv) stipulate which soil exposure parameters may be changed which could result in "soil cleanup levels that are high enough that indoor air or ambient air could become a significant potential exposure pathway." It appears that only air-filled porosity, dilution factor, inhalation correction factor, soil GI absorption and inhalation absorption are exposure parameters which are allowed to be altered that could significantly impact soil CULs. Other parameters would be allowed only for the determination of remediation levels. It is recommended that this be made clear in the rule language.

Comment rejected (page 205). The POG reiterates this comment.

2272 **Issue 25**
740(3)(c)(iv)(A), second bullet item, page 194, and 745(5)(b)(iv)(A), second bullet item, page 210, Soil vapors for Methods B and C

The reference to site-specific risk assessment for nonpotable ground water under 173-340-720(8) does not appear to be appropriate to the subject matter. The POG suggests that this should reference 720(7).

Comment accepted and appropriately revised in the proposed August 2000 amendments.

2273 **Issue 26**
747, pages 215-226, Deriving Method B soil concentrations for ground water protection

The POG has developed suggested changes in the arrangement of how 747 is presented as well as certain specific changes in the requirements and allowances contained in the section. These are presented as Exhibit A, Recommended Language for Section 747. Following is an itemization of the major changes suggested, as they are reflected in Exhibit A:

1. Re-title Section to indicate it is applicable to both Method B and Method C. There is no reason to exclude the 4-phase model from the Standard Methods (B and C). Modify the available options under Standard and Modified methods so both the 3-phase and 4-phase models are available under each. The logical approach is to allow both models under Standard Methods B and C – used with default parameter values. Site-specific parameter values would then be allowed under Modified Methods B and C. Reorganize the text to reflect this overall approach.

Comment accepted and appropriately revised in the proposed August 2000 amendments.

2274 2. Where necessary, edit the descriptions of the models and variable definitions to make sure the reader understands they are not limited solely to TPH mixtures. The text should be clear that 4-phase models are applicable only when a substance or substances are present which have the potential to form NAPL. As written, no distinction is made between 3-phase and 4-phase models in terms of applicability (except that the 4-phase model is limited to the modified method). The description of procedures for the use of the 4-phase model should not be specific only to petroleum hydrocarbons, as it is currently presented in the proposed rule. It should be usable for sites with all manner of potentially NAPL-forming substances. The explanation of elements of the various equations in 747 should be consistent in referring to "each chemical or EC fraction, for TPH" instead of references to "NAPL components" which are confusing as to meaning.

Comment accepted and appropriately revised in the proposed August 2000 amendments.

2275 3. The description of the 3-phase model implies that it can be used for petroleum hydrocarbons. However, as Equation 747-1 is presented, there is no methodology for using TPH fractions. It is suggested that the following language be incorporated after Equation 747-1 "For TPH mixtures using the TPH fraction approach, the three-phase partitioning model should be applied such that the resulting concentrations of individual fractions and associated noncarcinogenic volatile hazardous substances (see Table 830-1) in ground water do not exceed a hazard index of 1.0 Fraction-specific soil organic carbon-water partitioning coefficients and Henry's law constants, as provided in Table 747-3, must be used." A TPH-specific equation could also be provided.

Comment rejected. The POG reiterates this comment.

2276 4. Except for Table 747-2, the subsection on residual saturation should be applicable to all potentially NAPL-forming chemicals.

Comment accepted and appropriately revised in the August 2000 proposed amendments.

2277 5. Under Modified Method B/C: Provide a list of parameters common to both the 3- and 4-phase model, with discussions of how the parameter may be derived (this is done now, but it appears in two places, once under the 3-phase model description, and once under the 4-phase description and there is some lack of consistency). A separate list can follow for parameters specific to an individual model. Be sure the user can readily understand which parameters are considered "hydrogeologic parameters".

Comment withdrawn. The POG expects that this list will be provided in pending guidance.

2278 6. The text should warn the potential user that mixtures containing chemicals with widely different solubilities may not be appropriate for the fate and transport models, and that serious errors may occur with such use.

Comment withdrawn. The POG expects that this warning will be provided in pending guidance.

2279 7. The use of Modified Methods B and C for TPH should stipulate that site-specific EC fraction data must be used as inputs to models, i.e., that retrofitting of data or assumptions of product compositions is not permissible. Correlation should be allowed, however.

Comment withdrawn. Retrofitting and correlation are discussed in the TPH overview.

2280 8. Move the prohibition of NAPL to the front of the section, so it is readily apparent and so that it does not need to be repeated in subsections.

Comment accepted and appropriately revised in August 2000 proposed amendments.

2281 9. Check the numbering of the equations and tables. Tables referred to as 747-3 and 747-4 in the text and appearing at the end of the rule are numbered as Tables 747-1 and 747-2. Equations numbered 747-2 and 747-4 are present, but no equation numbered 747-3, although it is referred to in the text (apparently as mistaken references to 747-2).

Comment accepted and appropriately revised in August 2000 proposed amendments.

2282 10. The allowance for empirical demonstrations at 747(4)(d)(I)(A) should specifically include direct measurement of ground water flow rate (Qa), if such data are available.

Comment rejected, page 230-231. The POG believes that empirical demonstrations of Qa should be allowed. It is recommended that an additional paragraph (i) be inserted ahead of the current (i) ("Calculating ground water flow volume) as follows:

(i) **Direct measurements of ground water flow volume.** Direct measurements of the volume of ground water flow (Q_a) using standard geophysical methods or other methods as may be approved by Ecology may be used.

(ii) **Calculating ground water flow volume.** The following equation shall be used, etc.....

Note that the subscripts "a" and "p" in Q_a and Q_p should be subscripted.

2283 11. Table 747-2 (footnote). The footnote indicates the screening levels are "for coarse sand and gravelly soils only." This would seem to imply that it could not be used for silts, clays, fine sands etc. This needs to be changed to indicate that it simply is instructional as to what assumptions were made in deriving the screening levels.

Comment accepted and appropriately revised in August 2000 proposed amendments.

2284 12. Language at 747(3)(b)(iii) describing Leaching Tests: Subsection (iii) should be changed to say that if leaching tests <u>using methods</u> <u>other than those prescribed in (i)(A) and (B)</u> are

used, they shall be based on methods approved by the department. As written, all methods must be approved by the department.

Comment accepted and appropriately revised in August 2000 proposed amendments.

2285 13. The subsection on residual saturation should be changed to apply to hazardous substances that can potentially form NAPL, in addition to TPH, with the exception of Table 747-2, which is specific to TPH. Suggested language for this change is included in Exhibit A.

Comment accepted and appropriately revised in August 2000 proposed amendments.

2286 **Issue 27**
750(2)(b)(ii), page 241, Method A air cleanup levels

This states the following:

> For a hazardous substance deemed an indicator hazardous substance under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background or the practical quantitation limit, subject to the limitations in this section.

This would appear to require that owners of properties where a TPH release to soil has occurred, must measure air concentrations under all circumstances, in order to make a demonstration that soil concentrations have not caused exceedances of TPH in air greater than natural background or PQLs. The POG recommends that this requirement be deleted. It is understood that it is the same language included for Method A ground water, surface water and soil cleanup requirements; however, the POG suggests that the requirement to sample air should require a different threshold than for other media.

Comment accepted (page 264). Ecology decided not to include Method A CULs for air.

2287 **Issue 28**
750(3)(b)(ii)(C), page 242, Method B air cleanup levels for petroleum mixtures, and 750(4)(b)(ii)(C), page 244, Standard Method C air cleanup levels for petroleum mixtures

These paragraphs require that air cleanup levels for petroleum be calculated using Equation 750-1, adjusting it to account for petroleum fractions and associated volatile hazardous substances. The POG recommends that these paragraphs be deleted unless reliable sampling and analysis methods exist for evaluating TPH in air. Section 830 (Analytic procedures, 173-340-830(3)(f), analytical methods for TPH in air), states that methods will be selected on a "case-by-case basis," implying that no standard analytical procedures exist or have been identified or developed. If Ecology later determines that reliable sampling and analysis

procedures exist for evaluating TPH in air, Equation 750-1 could readily be adapted for use with TPH fractions and associated volatile hazardous substances, if and when such methods become available. Retaining these paragraphs when such methods are unavailable would serve to confuse the owner as to how to comply with MTCA regulations.

Comment rejected (p 266). The POG reiterates this comment.

2288 **Issue 29**
Table 720-1, Method A Cleanup Levels for Ground Water

1. The POG does not endorse the proposed ground water cleanup levels for Diesel-Range Organics (DROs), Heavy Oils and Mineral Oil, because it believes that Ecology's proposed cleanup levels are not based on SAB- or POG-recommended methods of using a four-phase partitioning model to obtain Method A ground water cleanup levels. This subject is discussed in Exhibit B to this attachment.

Comment rejected (page 285). The POG reiterates this comment and adds the following summary of Exhibit B:

Exhibit B consists of a memo (previously shared with Ecology) setting forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments. We again encourage Ecology to carefully evaluate this issue and develop ground water cleanup levels for these type of TPH mixtures that are based, to the best extent possible, on how these materials dissolve (or do not dissolve) in the water phase.

2289 2. A footnote should be added for TPH that references 173-340-720(4)(b)(iii), the paragraph covering free product limitations for petroleum releases using Methods B and C, as it also should be applicable to Method A TPH ground water cleanups. It also should be included in 720(3), Method A cleanup levels for drinking water aquifers flowing into nearby surface water.

Comment withdrawn (page 285). This footnote is no longer necessary with the proposed Method A cleanup levels.

2290 3. Footnote x (Total Petroleum Hydrocarbons) indicates that the Method A ground water cleanup values are based on mid-range estimates of the composites of the various

petroleum products. The user is directed to Method B or C for products with significantly different compositions. This information is valuable only if the user is directed to a location where the product compositions appropriate to the Method A values is provided. Otherwise, the user would have no way of knowing whether the Method A TPH ground water numbers are appropriate for a particular site. The POG suggests that this information be provided in a table in the rule.

Comment accepted. Paragraph deleted from footnote (page 285).

2291 4. The POG disagrees with the fourth bullet item in Footnote x, which does not require analysis of ground water contaminated with mineral oil if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." Details concerning the POG's disagreement with this are given in Attachment I, Issues 19 and 25.

Comment accepted (page 286) and appropriately revised in August 2000 proposed amendments.

2292 **Issue 30**
Table 740-1, Method A Soil Cleanup Levels for Unrestricted Land Uses; and Table 745-1, Method A Soil Cleanup Levels for Industrial Properties

1. Footnote c indicates that the cleanup level in the tables is appropriate only for benzene contained in weathered gasoline releases. A Method A soil cleanup number is needed for non-weathered gasoline spills as well as for weathered gasoline. The POG evaluated this matter and determined that the use of the same 3-phase model used by Ecology for determining the cleanup level for benzene in weathered gasoline would result in the same cleanup level for benzene in fresh gasoline. This is apparently because benzene is the risk driver in both cases. The POG recommends that Footnote c be amended to delete the word "weathered" prior to "gasoline" and to delete the second sentence stating that the value may not be protective of ground water for fresh gasoline. However, the POG recommends that there be an added statement directing owners of sites where there have been releases of benzene as a "pure" or commercial-grade product (i.e., not as part of a TPH mixture) to Section 747 for the determination of soil benzene cleanup levels protective of ground water.

Comment partially accepted (page 287). Remainder of comment withdrawn.

2293 2. The POG agrees that soil cleanup levels for ethylbenzene, toluene, and xylenes were calculated correctly for pure products (not mixtures). It is not clear whether the soil cleanup levels for xylenes are based on a risk-based number (or the MCL) in ground water, or on the ground water cleanup level for xylenes given in Table 720-1. Footnote t in Tables 740-1 and 745-1 states that they are "based on protection of ground water for drinking water use..." The POG recommends that Ecology indicate in footnote t precisely what ground water concentration the cleanup levels for xylenes in soil is based on.

Comment partially accepted. The footnotes now specify that the three-phase model [747(4)]

was used. However, it is still not clear whether Ecology used Method B or the MCL to derive the target ground water concentration. This information needs to be added to the footnote. One recommended solution is to refer to the ground water CUL in Table 720-1, if this in fact is the basis for the Table 740-1 and 745-1 values.

2294 3. The POG disagrees with item (3) in Footnote q for Total Petroleum Hydrocarbons, allowing for the assumption that PCBs which might be associated with mineral oil would not exceed PCB soil cleanup levels if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." This item is discussed in detail in Attachment I, Issue 19.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

2295 4. The identification of footnotes associated with specific chemicals in Table 745-1 is in some cases inconsistent with the actual footnotes following the tables. For example, toluene is given footnote r in the table, but footnote r describes 1,1,1 trichloroethane. Toluene is described in footnote p. These inconsistencies should be corrected in the final rule amendments.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

2296 **Issue 31**
Tables 720-1, 740-1 and 745-1: Derivation of media cleanup levels for carcinogenic PAHs (cPAHs). [Note: this comment was developed with the assistance of Dr. Damon Delistraty, a Department of Ecology toxicologist in the Eastern Regional Office.]

Footnote r in Table 720-1 and Footnote m in Tables 740-1 and 745-1 explain that the cleanup levels were derived based on the cancer potency factor for benzo(a)pyrene (B(a)P) and the assumption that 7 cPAHs "are present in the sample." Discussion with Ecology representatives revealed that the cleanup levels were based on a multiplication of the Method-B derived cleanup level of B(a)P by a factor of 7. This effectively allows for a risk of 7E-6 in Method A, while the Method B cleanup levels reflect maximum cancer risks of 1E-6. In addition, the cancer potency of B(a)P was assumed to represent all of the other six cPAHs; and the mobility of B(a)P through soil was assumed to represent the other cPAHs as well.

The POG has concluded that the cPAH cleanup levels in Method A tables were derived incorrectly. Ecology has proposed in ((708)(8)(e)) to allow for the use of toxicological equivalence factors (TEFs) for the assessment of the cancer potency of cPAHs relative to B(a)P, using the TEFs published by CalEPA. The language in 708 does not limit the use of the TEF approach to Methods B and C (nor should it). Therefore, it should be available to users of Method A tables.

The POG is confident that a single cPAH cleanup number can be given in the three tables, representing the relative toxicity and mobility of the various cPAHs, while offering the owner the opportunity to evaluate his/her analytical data in a manner which is more likely to result in effective cleanup levels in soil and ground water which reflect the actual contamination at the site. This is not unlike the method proposed for TPH fractions, in which fraction-specific toxicities and (for soil cleanup levels) fraction-specific transport characteristics are accounted for to derive overall cleanup levels. Methodologies for achieving the above for ground water and soil are offered below.

2297 Ground water : The Method A cleanup level for ground water should be 0.012 ug/L B(a)P toxic equivalents (TEQ), based upon the calculation of a Method B ground water cleanup level based on B(a)P alone. This corresponds to a 1E-6 excess individual lifetime cancer risk. Because of the TEF approach to evaluating the cPAHs, they are considered an "individual" contaminant, as opposed to multiple contaminants; and therefore the maximum acceptable risk of 1E-6 is appropriate and is compliant with MTCA policy. The owner should be free to assume that all cPAHs present have TEFs of 1.0, i.e., that they are as potent as B(a)P; but if that TEQ exceeds 0.012 ug/L, the owner has the option of making use of the TEF approach to determine if the TEQ calculated in that fashion exceeds 0.012 ug/L. In that case, the site-specific TEQ would be the sum of the products of the concentration of each cPAH present in the sample and its corresponding TEF. Since none of the other cPAHs has a potency as high as that of B(a)P, the effective cleanup level (in terms of total ug/L of cPAHs) will be higher than 0.012 ug/L, but the B(a)P TEQ of 0.012 ug/L will be preserved, as will the maximum acceptable excess cancer risk level of 1E-6 for an individual carcinogen, i.e., B(a)P, in this case.

2298 Soil : The situation for soils is more complicated because of the soil to ground water leaching pathway, in addition to direct contact (i.e., incidental ingestion). According to Ecology, leaching pathway cleanup levels have been developed for 6 of the 7 cPAHs, using the 3-phase model. The cleanup levels and the CalEPA TEFs are given below:

CPAH	Leaching CUL, mg/kg	CalEPA TEF
Benzo(a)anthracene	0.086	0.1
Benzo(b)fluoranthene	0.43	0.1
Benzo(k)fluoranthene	0.21	0.1
Benzo(a)pyrene	0.23	1.0
Chrysene	0.10	0.01
Dibenzo(a,h)anthracene	0.43	0.4
Indeno(1,2,3-cd)pyrene	Insufficient information	0.1

Using the above, leaching equivalent factors (LEFs) could be derived by ratios, again with B(a)P as the reference compound (to be consistent with TEFs). These would be derived, for example, by dividing the leaching cleanup level for B(a)P by the leaching cleanup level for benzo(a)anthracene to calculate an LEF of 2.7 for benzo(a)anthracene. Next, a composite index for toxicity and leaching would be calculated by multiplying the LEF by the chemical-

specific TEF, or 2.7 x 0.1 for benzo(a)anthracene, for an effective "toxicity leaching equivalence factor" or "TLEF" of 0.27. [Note: this is not a standard term but is suggested to help explain this methodology.] No TLEF can be calculated for indeno(1,2,3-cd)pyrene because a leaching cleanup level has not been derived.

Because Ecology has determined that direct contact is the risk driver, and therefore the basis, for unrestricted soils, the cleanup level for cPAHs would be 0.14 mg/kg B(a)P TEQ, based on the Method B calculation for the ingestion of soil contaminated with B(a)P. For industrial soils, Ecology has determined that leaching is the risk driver. Therefore the Method A cleanup level would be 0.23 mg/kg B(a)P TLEQ.

In order to allow for the derivation of ground water and soil cleanup levels of cPAHs as equivalent to B(a)P, tables giving TEFs (for ground water and unrestricted soils) and TLEFs (for industrial soil) would need to be provided for the user. In addition, a default TLEF for indeno(1,2,3-cd)pyrene would need to be established by Ecology.

The POG recommends that Ecology adopt the above methodologies for establishing Method A ground water and soil cleanup levels based on B(a)P, while allowing for the owner to assess site data more reflective of Ecology's approach to toxicity and leaching. It is recognized that, in certain cases, the PQL could exceed the calculated CUL in soil and/or ground water, in which case, the PQL would be the effective CUL.

Comment accepted, but a direct reference for cPAHs was removed from Tables 720-1, 740-1, 745-1, while a value and footnote for benzo(a)pyrene was added. This change may lead Table A users to believe that one does not have to test for cPAHs other than benzo(a)pyrene. See the POG comment under New Issue 7.

2299 **Issue 32**
Table 830-1, Required Testing for Petroleum Releases

The POG concurs with the current version of Table 830-1, with the following exceptions:

1. The inclusion of PCBs with mineral oil, as discussed in Issue 19, Attachment I.

Comment rejected (page 304). The POG never agreed to the language in this footnote. It appears that Ecology accepted our request for alteration of the footnote in Tables 720-1, 740-1, and 745-1. The POG requests that footnote 14(3) be changed to comport with the language in Table 720-1(footnote "X") and Tables 740-1 and 745-1 (footnote S), fourth bullet which says:

3) it can be documented that the oil released was recently tested and did not contain PCBs.

2. Footnote (8) should be added to the cells for Naphthalenes/Gasoline Range Organics, Naphthalenes/Diesel Range Organics and Naphthalenes/Heavy Oils.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

3. In footnote (12)(b), change "when the inhalation exposure pathway may be required" to "when the inhalation exposure pathway is evaluated" for clarification purposes.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

4. In footnote (12)(c), delete the first sentence if footnote (8) is added to the Naphthalenes/Diesel Range Organics cell, as recommended in item 3), above.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

5. Include naphthalenes with "Volatile Petroleum Components" instead of with "Semivolatile Petroleum Components," because they are defined as volatiles for the purposes of evaluating petroleum in MTCA sections 740, 745 and 750.

Comment accepted (page 304). The table was appropriately amended.

6. Footnote (8) should be deleted from the cell for PCBs/Heavy Oils and substituted with a new footnote which requires PCB testing only of heavy oils known to have been historically manufactured using PCBs or historically used in processes/activities known to include PCBs. Examples include transformers, railroad transformers, mining motors, hydraulic systems, heat transfer systems, electromagnets, compressors, capacitors, switches, and miscellaneous electrical devices.

Comment rejected (page 304). Comment reiterated.

7. Change the title of the row that currently reads "TPH Analytical Methods for Use with Method A cleanup Levels" to "TPH Analytical Methods for Total TPH." Change the title of the row that currently reads "TPH Analytical Methods for Use with Methods B or C (TPH "fractions") to "TPH Analytical Methods for Use with TPH Fractions."These recommended changes are to increase the clarity of the analytical applicabilities.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

8. Delete footnote (10) from the cell representing GRO and Volatile Fuel Additives and Blending Compounds, and add an "X" to the cell. Ecology's own research has demonstrated that these hazardous substances are found in this state, and geographic location of a release is not sufficient for prediction purposes. Therefore, these should be

standard analytes when gasoline has been released. (If analyses over time show there is little or no reason for concern, this requirement could be amended/deleted.)

Comment withdrawn because it was appropriately revised.

9. Amend footnote (10) language to make clear that it applies to DRO releases only.

Comment accepted. The DRO above is a typo and should have read "GRO".

10. Add the following language to the note "Use of Table 830-1" immediately under the table: "An 'X' signifies that the analytical requirement applies to both ground water and soil samples, when those are media of concern at a site."

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

New POG Issues

The following issues have emerged as a result of revised MTCA August 2000 Proposed Amendments.

2300 **New Issue 1- Institutional Controls WAC, 173-340-440**, (page 81-82)

Issue 1A Section 440(1) Purpose (page 81)

The POG requests clarification on the last sentence of the first paragraph which reads: "Institutional controls include:....."
We interpret this language to mean one or more of the items are institutional controls. To prevent the user from thinking that all of the named institutional controls are required, we recommend adding to the sentence to read:

"Institutional controls include one or more of the following:"

2301 **Issue 1B, Section 440(1)(e) (page 81)**

The POG recommends deleting the following:

"Financial assurances (see subsection (11) of this section.)."

Financial assurances are not institutional controls. Rather, they can be used as mechanisms to ensure that institutional controls will be maintained during the appropriate time frame. Since 440 (11) is titled and discusses financial assurances for institutional controls, deleting the language in 440(1)(e) will not change the mechanisms or requirements for financial assurances. Whereas keeping the subsection (e) in the proposed regulations creates a logical circularity that confuses the reader. For example, the question naturally arises "How can a financial assurance be used to implement a financial assurance?

2302 **Issue 1C. Section 440(4) Circumstances required. (page 81)**

The POG recommends modifying part of the language in the first sentence to read:

"Institutional controls shall be required for the property ~~to assure both the continued protection of human health and the environment and the integrity of an interim action or cleanup action~~ in the following circumstances."

The POG recommends adding "for the property" because there is a required MTCA-specified process [720(8)(d)(i)(G), 720(8)(d)(iii)(D), 600] whereby other affected property owners must be notified and provided with the opportunity to participate and comment on the decision-making process. The recommended change to incorporate the term "property" is an important one, in that if institutional controls were required for all properties within a "site," the new approaches for defining points of compliance provided for in the MTCA amendments [i.e., 720(8)] would not be workable. Deletion of the language "to assure both the continued protection of human health

and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

Deletion of the language "to assure both the continued protection of human health and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

2303 **Issue 1D, Section 440(d)**

The following language has been inserted into this section:

> "A ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."

The language in 440(4)(d) creates potentially unnecessary requirements for institutional controls for sites where a ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level. Institutional controls and/or deed controls should not automatically be triggered simply because a site exists in an area of ground water nonpotability. Not all ground water cleanup levels must be based on potable criteria. For example, some may be based on the protection of surface water. In all cases, when cleanup levels are approved by the department have been met, no institutional controls should be required. As written, it would require institutional controls at many sites (such as along the Duwamish River and around Harbor Island), even when cleanup levels have been achieved. Therefore, the POG recommends that this sentence be clarified to say:

> "A ground water cleanup level is established using a site-specific risk assessment that includes institutional controls as part of the scenario under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."

This is a very important section. The POG recommendation should not be considered lightly or overlooked by Ecology. It is not adequate to say that the language of 440(4)(d) has been moved form another section of the law. In placing this language of 440(4)(d) in this section, it should be revised as recommended by the POG. It must be made to make logical sense in the totality of the new section on Institutional Controls.

2304 **Issue 1E, Section 440(4)(e)**

Part (e) should be changed as follows:

> "..a conditional point of compliance is established as the basis for measuring compliance at the property ~~site~~."

The POG recommends changing "site" to "property" to comport with our recommendation in

Issue 1C, above. Otherwise, this requirement would impose a deed restriction on every property participating in an area-wide point-of-compliance or every property deemed to be within a site. This paragraph would otherwise limit implementation of area-wide cleanups in areas such as the Duwamish.

2305 **Issue 1F, Section 440(10)**

Local government notification: In the first sentence of this paragraph, the POG recommends that Ecology change the words "with land use planning authority" to read "with both land use planning and permit issuance authority." In larger government organizations, such as the City of Seattle, land use planning and permitting are in different departmentsp, and the database for tracking such things as institutional controls is actually kept with the permit issuance department.

2306 **Issue 1G, Section 440(11)**

The POG asks for clarification. The phrase "all costs associated with the operation and maintenance of the cleanup action" created some confusion among POG members. What is intended here by Ecology? The POG recommends that financial assurances come into play at the time that cleanup actions are completed, in that it is our understanding that this section - applies to the integrity of any engineered and institutional controls implemented in connection with the cleanup action.

2307 **Issue 1H, Section 440(11)(b)**

The POG recommends that Ecology delete the word "similar" that appears before the words "financial hardship" at the end of this paragraph.

2308 **New Issue 2. Section 730(2)(b)(iii)** (page 188)

This subsection reads as follows:

> "For a hazardous substance deemed an indicator hazardous substance for surface water under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantitation limit, subject to the limitations in this chapter."

It has come to the POG's attention that, in response to the above language, at least some consultants and Ecology site managers are preparing tables which contain all detected chemicals at a site , with the assumption that they must all be cleaned up to Background or the PQL if no ARAR or risk-based CUL exists. Some TPH examples are: isopropyltoluene, n-butylbenzene, n-propylbenzene, trimethylbenzene, 4-methylphenol, and phenanthrene. The

POG believes that Ecology did not intend to impose a requirement to cleanup all chemicals without ARARs or risk-based cleanup levels to background concentrations or PQLs, but rather that the wording of the regulation is not sufficiently clear, so that some people can interpret it to in fact make such a requirement.

The POG therefore recommends the following modifications to the language, for clarification purposes:

> Section 708(2), (page 151) - Selection of indicator hazardous substances (IHS) should be moved to Section 700(5), Methods for setting cleanup levels. This is important because the selection of IHS is a necessary component of Method B and C evaluations, not just risk to assessment procedures.

Section 708(2)(a) language should be modified to say:

> "When defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, ~~the department may eliminate from~~ further consideration of hazardous substances may be eliminated when they: 1) do not have toxicity values as defined in 708(7) or 708(8) unless they are deemed by the department to be toxic and, in addition, either bioaccumulative, persistent or highly mobile in environmental media; or 2) contribute a small percentage of the overall threat to human health and the environment.

Section 708(b) language should be modified as follows:

> ~~"If the department considers this approach appropriate for a particular site,~~ The factors evaluated when eliminating individual hazardous substances from further consideration shall include:..."

2309 **New Issue 3. Section 708(7)(f)**

The way that the language in Section 708(7)(f) is written, it appears that when an RfD is missing, the user must ("shall") calculate an RfD. The POG recommends changing the language from "shall" to "may" and inserting an important comma, as follows: "... may be established on a case by case basis, using the methods described in "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993 available on the internet at http://www.epa/gov/iris/rfd.htm." This change will clarify that developing an RfD is optional, but that if an RfD is developed, the cited document must be used.

2310 **New Issue 4, Section 700(8)(a)**, page 134.

A new paragraph on terrestrial ecological receptors was added to the TPH Overview under

(8)(a).

> "For soil contamination, the soil cleanup level must not result in any significant adverse effects on the protection and propagation of terrestrial ecological receptors. This determination must be made in accordance with the requirements and procedures specified in WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under ....."

The POG believes that the first sentence adds confusion rather than clarification to this subsection. The POG recommends deleting the first two sentences of subsection 700(8)(a) and replacing this language with the language from the 1999 proposed amendments:

> "The potential impact of TPH on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494."

It is acceptable to retain the rest of the new language in subsection (8)(a).

2311 **New Issue 5, Section 740 (3)(a)(iii)(C) and Section 745(3)(a)(iii)(C) Soil Vapors** (pp. 202 and 218)

This new section is confusing because it conflicts with the soil vapors language in 740(3)(c)(iv) (page 205). Subsection (3)(a)(iii)(C) does not allow (A) Applicability. We do not believe that this was Ecology's intent. For clarity, the POG recommends that the entire subsection 740(3)(c)(iv) would be more appropriately located in 740(3)(a)(iii)(C). Then in Section 740(3)(c)(iv), soil vapor users can be referred to the earlier subsection. (This recommendation applies to Section 745 as well.)

2312 **New Issue 6, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3** (page 218)

The currently proposed language in equations 720-3, 740-3 and 745-3 reads:

> "F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the four phase partitioning approach model under WAC 173-340-747(6)."

The POG recommends modifying the language above to say:

> "F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the ~~four phase partitioning approach model under WAC 173-340-747(6)~~.the soil-to-groundwater partitioning approaches defined in (WAC 173-340-747(4) or 173-340-747(6)."

2313 **New Issue 7, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3** (page 218)

The currently proposed language reads:

> "n = The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1)"

POG members are receiving analytical data from the labs in a format that displays EPH concentrations, VPH concentrations, and the volatile organic compound concentrations (as indicators) below. The definition of n above suggests that to compute the Hazard Index, one must sum the EPH plus the VPH plus the indicators. However, ethylbenzene and xylenes in the C8-C10 range would be double counted, potentially overestimating the HI. The POG understands that defining n is complex. We request Ecology's clarification and assurance that the definition of n above does NOT restrict the user from subtracting double counted chemicals. This definition of n and the manipulation of these risk equations underscores the need for TPH guidance.

2314 **New Issue 8, Tables 720-1, 740-1, 745-1**

Ecology has deleted PAHs(carcinogens) from these tables and replaced it with Benzo(a)pyrene. The POG believes that deleting cPAHs from these tables will lead users to believe that they do not have to test for cPAHs. The POG recommends retaining cPAHs in all three tables and under the cleanup level, place a note saying "See Benzo(a)pyrene."

2315 **New Issue 9, Tables 740-1 and 745-1, Method A Cleanup Levels**

The POG would like to express its concern regarding the new benzene soil cleanup level of 0.03 mg/kg, which has been decreased from 0.1 mg/kg. We understand that both the 3 phase and 4 phase partitioning models were used to generate this concentration (intended to be protective of groundwater). We are concerned that smaller businesses that cannot afford more sophisticated evaluations and techniques for addressing benzene in soils will be exposed to undue hardship with this decreased Method A cleanup level, if in fact the currently proposed level is unnecessarily low. The POG believes that there are several mechanisms, unaccounted for in the partitioning models, which may cause increased degradation and adsorption of benzene in soils and that with time this Method A cleanup value will prove to be significantly overprotective. We strongly encourage Ecology to develop a database with empirical data demonstrating the relationship between benzene in soils and in groundwater, so that the soil cleanup level can be adjusted in the near future, if so warranted.

2316 **New Issue 10, Table 720-1**

The POG recommends that footnote bb for Xylenes be amended to say:

> "Cleanup level based on xylene not exceeding the maximum allowed cleanup level in

this table for total petroleum hydrocarbons and on prevention of adverse aesthetic characteristics."

2317 **New Issue 11, Method A Adjustments to Reflect Changes in RfD's**

The RfDs for calculating TPH cleanup levels may change in the future. An example of this is the recent "retirement" of the EPA risk assessment issue papers recommending provisional noncancer toxicity values for inhalation and ingestion of benzene. EPA's Superfund Technical Support Center now recommends the use of the values presented in the document entitled "Toxicological Review of Benzene (Noncancer Effects)," NCEA-S-0455, dated September 1998 (the document may be read and/or downloaded at http://www.epa.gov/ncea/benztox.htm.). The currently recommended values are 1E-3 mg/kg-day (RfD) and 9E-3 mg/m3 (RfC). However, the document is under review, and values different from these may be posted to the IRIS database in the future.

The POG requests that Ecology commit to proposing amendments to Method A tables or releasing a policy statement with revised Method A cleanup levels when changes to toxicity values for petroleum fractions or individual petroleum-related chemicals are changed by EPA or under WAC 173-340-708(7)(g) or (8)(f) such that significant changes to Method A cleanup levels would result.

2318

EXHIBIT 1

To: Brownfields/TPH Project Oversight Group
From: Warren Hansen – Onsite Enterprises
Re: Proposed MTCA ground water cleanup levels for diesel range organics, heavy oil and mineral oil.

Introduction

This memo puts forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments.

Methodology as included in proposed MTCA amendments

The four-phase model described in Section 747 predicts that the concentration of DRO dissolved in ground water under the Method A conceptual site model assumptions and TPH-saturated soil conditions is 107 ug/L. The composition of the dissolved DRO fractions at 107 ug/L represents a hazard index (HI) of 0.22. Up to this point, there is no disagreement on the assumptions and the use of the 4-phase model. However, to estimate the ground water concentration representing the balance of the allowable HI (i.e., 1.0 minus 0.22, or 0.78), Ecology essentially assumed that the composition of the fractions in the additional (remaining) DRO is the same as that of the solubilized fractions. This results in an additional ground water concentration of 379 ug/L, for a total of 486 ug/L, (rounded up to 500 ug/L, the proposed cleanup level).

Recommended Methodology

The recommended method put forth here is a hybrid between the solubility and whole-product approaches to estimating the composition of DROs and mineral oil in ground water. This method posits that the equivalent carbon fractions comprising the additional DRO are better represented in the accepted Method A conceptual site model (leaching from the vadose zone to groundwater) as undissolved components moving into the groundwater. Remaining TPH (that is, the balance of the TPH comprising the remaining hazard index) is best

represented by the same relative equivalent carbon fraction concentrations contained in the original (parent) product. For diesel, the concentration corresponding to the remaining HI of 0.78 is 546 ug/L, resulting in a more scientifically justifiable DRO ground water cleanup level of 107 + 546 = 653 ug/L (which can be rounded up to 700 ug/L or down to 650 ug/L, as a matter of policy).

For Mineral Oil, Ecology's approach to deriving the currently-proposed cleanup level of 1,000 ug/L is similar to that used for diesel. In the May 18, 1999 memo From Steve Robb to the MTCA Science Advisory Board, the allowable (dissolved) mineral oil concentration in ground water (using the same method describe for DRO's above) at a hazard index of 1.0 and saturated soil conditions is 465 ug/L (Note: Ecology later relied on two-phase partitioning experiments to propose a CUL of 1,000 ug/L). Use of the method recommended herein results in a cleanup level of approximately 1,500 ug/L for mineral oil.

DIESEL-RANGE ORGANICS	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	107	107	0.22
Remaining allowable concentration- assumes chemically similar to whole product	--	546	0.78
Remaining allowable concentration – assumes chemically similar to solubilized fractions	379	--	0.78
TOTAL	486*	653	Ecology Method: 1.0 Optional Method: 1.0

* Value based on original diesel fraction estimates by Ecology. Ecology subsequently decided to base the 500 ug/L cleanup level in the recently Proposed Amendments (November 1999) on the results of 2-phase partitioning experiments (Memo from P. Kmet to MTCA Science Advisory Board, December 20, 1999).

MINERAL OIL	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	18	18	0.04
Remaining allowable concentration- assumes chemically similar to whole product	--	1440	0.96
Remaining allowable concentration -- assumes chemically similar to solubilized fractions	447	--	0.96
TOTAL	465*	1458	Ecology Method: 1.0 Optional Method: 1.0

* Value based on original mineral oil fraction estimates by Ecology. Ecology subsequently decided to propose an alternate cleanup level of 1000 ug/L in the recently Proposed Amendments (November 1999), based on soluble fractions laboratory test data provided by Puget Sound Energy (P. Kmet, ibid).

Cleanup levels using the compositions of diesel fuel and mineral oil employed by Ecology and Puget Sound Energy in their partitioning experiments (P. Kmet, ibid, Table 1) were also calculated using the proposed method. For Diesel fuel, the HI was exceeded by the soluble fractions, and this was attributed to the detected concentrations of BTEX in the samples. According to calculations by the Pollution Liability Insurance Agency (PLIA) if benzene is present, that compound would then control or "drive" the cleanup. In such cases, the corresponding TPH cleanup level for groundwater (assuming benzene is addressed separately) could be over 700 ug/L. Table 830-1 of the Proposed Amendments requires testing for benzene in groundwater when diesel contamination is suspected. Again, Ecology's proposed DRO cleanup level is overly conservative.

Summary

The recommended approach to calculating ground water cleanup levels for DROs and mineral oil presented in this memo is more scientifically justifiable than the method used for the proposed MTCA amendments, because it adheres to the leaching conceptual site model recommended to Ecology by the Science Advisory Board. The use of two-phase (product/groundwater) partitioning is not scientifically justifiable and results in overly conservative cleanup levels, as it in effect presumes the presence of NAPL on the water table. Yet the Proposed Amendments prohibit groundwater petroleum cleanup levels from exceeding a "concentration that would result in free product being present in or on the ground water" (WAC 173-340-720(4)(b)(iii)). The method A cleanup levels for diesel-range organics and mineral oil

using the recommended method would be 700 (or 650) and 1,500 ug/L, respectively. Because of the much higher solubility of gasoline range organics, the optional method presented here is not recommended for calculating ground water cleanup levels for that petroleum category. I suggest the POG consider recommending this approach for DROs and mineral oil in its next round of recommendations to Ecology. The POG reiterates this comment.

ATTACHMENT B

List of Contributors to the Brownfields/TPH Project

(The following list of individuals contributed to the project through peer review, critique, technical suggestions and consulting services. Their inclusion here does not necessarily indicate agreement with the POG's recommendations.)

Local Government Contributors:

1. Jack Pace, Planning Manager, City of Tukwila
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6. Judy Riley, Manager, Design and Const., Metro Transit, King County
7. Ben Wolters, Sr. Com. Dev. Spec., Office of Economic Development, City of Seattle
8. Thomas Boydell, Principal, Seneca Consulting Group/representing the City of Seattle (formerly with City of Seattle)
9. Chuck Depew, Deputy Director, Office of Econ. Dev. City of Seattle
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11. Bennie Barnes, State Intergovernmental Relations Coordinator, City of Seattle
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Akana, Trish Alicia

From: Thielen, Jerry
Sent: Friday, October 27, 2000 3:46 PM
To: Akana, Trish Alicia
Subject: FW: Draft Comments on Proposed amendments to Ch 173-340 WAC

-----Original Message-----
From: Heaton, Bill [mailto:Bill.Heaton@METROKC.GOV]
Sent: Friday, October 27, 2000 3:46 PM
To: 'jthi461@ecy.wa.gov'
Subject: Draft Comments on Proposed amendments to Ch 173-340 WAC

Jerry:
As discussed, attached are comments on proposed changes to MTCA. We are anxious to see this process come to closure and have the amendments completed. Thanks for the opportunity to comment.

Bill Heaton
Solid Waste Coordinator
Environmental Health Division
Public Health Seattle & King County
(206) 296-4785
<<Comments on MTCA1_.doc>>

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Comments on Proposed amendments to Chapter 173-340 WAC
Model Toxics Control Act Regulations

General Comments

2319 The mission of the Environmental Health Division of Public Health - Seattle & King County (PHSKC) is to identify and sustain environmental conditions which promote healthy people and healthy communities in Seattle and King County. Therefore, PHSKC supports the spirit of the revisions that the Washington State Department of Ecology (Department) has made to the Model Toxics Control Act regulations (MTCA). Additionally, PHSKC has provided investigation and assessment services to the Department in the past and expects to continue services under grant. The changes and additions to the Method A cleanup levels are science based and defensible. For example, to the Method A cleanup level for benzene, toluene, ethylbenzene and xylenes in soil are protective of human health at construction sites so common in King County. For water, the changes to the groundwater cleanup levels that replace the100 times soil cleanup levels with partitioning models are more protective of drinking water for the same contaminants. PHSKC

2320 supports multiple options for cleanup in the hopes that they will spur action at the more complex sites. However, there is a concern about costs becoming too strong a consideration in cleanup decisions. Therefore, in any section that discusses disproportionate costs please return the descriptor "substantial" so that costs must be both substantial and disproportionate to affect cleanup decisions.

Specific Comments

2321 173-340-310 (4)
The continued ability of the Department to rely on another government agency for initial investigations allows PHSKC to continue to perform these investigations. Under grants from the Department, PHSKC has been successfully completing initial investigations and wishes to continue.

2322 173-340-320
Under grants from the Department, PHSKC has been successfully completing site hazard assessments. Please include language similar to that in 173-340-310(4) to document that ability.

2323 173-340-330 (7)
PHSKC supports a separate standard for removal from the hazardous sites list if the cleanup action does not include containment. However, sites where the selected cleanup action includes containment with active maintenance activities, should remain on the list as indicated.

2324 173-340-350 (8)(c)(ii)(B)(iii)
To the phrase "so clearly disproportionate" please add the word substantial so that the phrase reads "so clearly substantial and disproportionate"

2325 173-340-360 (3)(e) & (f)
Please add the word substantial in front of cost to read "disproportionate and substantial cost analysis".

2326 173-340-360 (f)(vii)
The sentence; "Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns." is unclear. Please clarify.

2327 173-340-440 (11)
In independent cleanups that use restrictive covenants, the person conducting the cleanup shall be responsible for these notifications. Recently, independent cleanups in the South Park area have not complied with the requirements. Please add some language to address lack of compliance on independent cleanups.

2328 173-340-600
Under grants from the Department, PHSKC has been successfully completing site hazard assessments. Please include language similar to that in 173-340-310(4) to document that ability.

2329 173-340-708 (12)
PHSKC supports the department in only using probabilistic risk assessment methods on an informational basis only. The federal use of probabilistic risk assessment has only lengthened legal and technical arguments without providing any key information. Please do not use such method to replace cleanup standards and remediation levels derived using deterministic method now successfully in use.

2330 173-340-720
PHSKC supports the changes in the groundwater cleanup standards.

2331 173-340-730
PHSKC supports the changes in the groundwater cleanup standards.

2332 173-340-740
PHSKC supports the changes in the groundwater cleanup standards.

2333 173-340-747
PHSKC supports the addition of "Deriving soil concentrations for groundwater protection".

2334 173-340-750
PHSKC supports the changes in the cleanup standard to protect air quality.

Akana, Trish Alicia

From: Newlands, Marcia [mnewlands@hewm.com]
Sent: Friday, October 27, 2000 3:41 PM
To: Trish Akana (E-mail)
Cc: Donald L. Schwendiman (E-mail); Dana B. Dolloff (E-mail); Roy Hummell (E-mail)
Subject: MTCA Comment Letter from Rayonier, Inc.

Rayonier 102000 MTCA Comment L...

Rayonier 12000 MTCA Comments.r..

I am emailing the attached comment letter to you at the request of Don Schwendiman, Regional Counsel for Rayonier, Inc. Also attached is a copy of the comments filed by Rayonier in January 2000.

<<Rayonier 102000 MTCA Comment LL.rtf>> <<Rayonier 12000 MTCA Comments.rtf>>

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Heller Ehrman White & McAuliffe LLP

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October 29, 2000

Via e-mail (taka461@ecy.wa.gov)

Ms. Trish Akana
Rules Coordinator
Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Rayonier Comments on Proposed Revisions to Chapter 173-340 WAC - Model Toxics Control Act Regulation

Dear Ms. Akana:

Rayonier appreciates the opportunity to provide additional comments to the Department of Ecology on the proposed amendment to the Model Toxics Control Act (MTCA). As you are aware, Rayonier submitted comments on January 18, 2000, on the November 1999 draft version of the proposed MTCA regulation. Although Rayonier held high hopes at that time that the "new MTCA" would be a substantial improvement over the current version, Rayonier is disappointed with the draft version of the rule that was published in the Washington State Register August 16, 2000. Based on Rayonier's review of the August draft regulation, as well as a review of the comments submitted to Ecology in January 2000, Rayonier is concerned that Ecology has not incorporated, or potentially even considered, the bulk of comments submitted by the public. With these concerns in mind, Rayonier submits the following comments:

2335

A. The Department of Ecology has failed to consider and revise the November, 1999 draft rule based on public comments.

The draft MTCA regulation published in the Washington State Register August 16, 2000, is strikingly similar to the draft version published by Ecology in the Washington State Register in November 1999. In spite of more than fifty sets of comments from industry, associations, and individuals, there is a remarkable absence of revisions to the August 2000 version of the draft regulation. Rather than reiterate Rayonier's comments submitted to Ecology on January 18, 2000, Rayonier has attached those comments to this letter, and incorporates them wholly within. As Rayonier stated in its prior submission, Rayonier, along with many of the others filing comments, is concerned that the draft regulation fails to effectuate the recommendations of the MTCA Policy Advisory Committee. Instead, as Rayonier noted in its January 18, 2000, submission, the rule appears to be more

complex, less realistic, more conservative, and ultimately slower and more expensive than the current regulation.

Rayonier urges Ecology to reconsider Rayonier's prior comments, as well as the other comments submitted by the public in January 2000, and to revise the MTCA regulation accordingly.

2336

B. Compliance with the 1995 Regulatory Reform Act.

In 1995, when the Legislature enacted Chapter 403, Laws of 1995, known as the Regulatory Reform Act of 1995, the Legislature stated its intent that Washington's regulatory system "ensure that the citizens and environment of the state receive the highest level of protection, in an effective and efficient manner, without stifling legitimate activities and responsible economic growth." It was the Legislature's concern that the state's regulatory system "not impose excessive, unreasonable, or unnecessary obligations; to do so," the Legislature found, would serve "only to discredit government, make enforcement of essential regulations more difficult, and detrimentally affect the economy of the state and the well being of [its] citizens."

With those goals in mind, the Legislature directed the state's agencies, including the Department of Ecology, before adopting a rule, to determine that it was the "least burdensome alternative for those required to comply with it" while still achieving the general goals and specific objectives of the agency. In determining whether the rule under consideration was the "least burdensome alternative," the agency was directed to consider alternative versions of the rule, to undertake a cost-benefit analysis of the impact of the rule, and to complete an analysis showing that the proposed rule actually met the goals and objectives of the agency. RCW 35.05.328.

As part of the draft amendment to the MTCA regulation, the Department of Ecology has issued a preliminary draft of a document entitled, "Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC," prepared by the Department, and dated October 12, 2000. Rayonier is encouraged to see that Ecology has undertaken the analysis required in RCW 34.05.328(c). However, it is the analysis in subsection (d) to the Regulatory Reform Act with which Rayonier is most concerned: a determination that, after considering alternative versions of the rule, the rule being adopted is the least burdensome alternative for those required to comply with it. The cost-benefit analysis is only one part of the least burdensome alternative analysis.

When does Ecology plan to complete its analysis, and what versions of the rule will be considered as alternative versions? Rayonier is aware of only two other versions of the MTCA rule that might be under consideration: the existing MTCA regulation, and an

alternative prepared by the AWB which was submitted to Ecology during negotiations in the summer of 1998. It is Rayonier's position that a consideration of these two alternative versions of the rule will demonstrate that the current draft rule proposed for adoption by Ecology is not the least burdensome alternative.

Rayonier finds that the Legislature's concerns as stated in the Regulatory Reform Act are well-founded with respect to the revised MTCA regulation: The rule will stifle legitimate activities and economic growth by imposing excessive, unreasonable, and unnecessary obligations on the regulated community, making enforcement of the regulation more difficult and ultimately detrimentally affecting the economy of the state.

2337

C. Ecological Risk Assessment

The new ecological risk assessment section proposed for inclusion represents a great deal of work and innovative thought on the topics that will undoubtedly lead to a defensible and understandable approach to ecological risk assessment within the State of Washington. However, we believe the proposed rule as written will prove to be incomplete in addressing most of the key issues that will arise on sites with ecological risk concerns in the near future, and thus the regulations are better suited as an interim and final policy before being made into a rule. Our primary concerns focus on the following:

2338

1. The proposed rule does not adequately address, or allow for the characterization of sites based on habitat quality.

Within MTCA, the proposed land use of a site determines the cleanup goals when evaluating the exposure and potential risks to human health. There is no reason why a similar approach should not be used for determining environmental impacts. The simplistic approach to screening a site based on the size of the site and the presence of pavement does not lead to a useful or accurate evaluation if organisms are actually likely to use a site for any significant activity, or allow for any exposure modifications without performing a complete, detailed site-specific risk assessment. Habitat quality, land use, and the overall management of lands by city, county, and state governments need to be included as part of the screening to consider if ecological concerns for individual organisms are of importance for the management goals of a given property.

2339

2. The guidance focuses on evaluating specific organisms, and not on managing populations.

Unless a species is threatened or endangered, wildlife management goals throughout the country and the State of Washington reflect the concept of sustaining ecosystems and viable wildlife populations. This concept is noted in the North American Wildlife Policy (1973), the recent US EPA guidance on ecological risk assessment, and several peer-reviewed

publications by Glen Suter, the US EPA lead for ecological risk assessment in their Office of Research and Development. Methods for extrapolation of individual organism effects to populations and the subsequent use of the population information to assist in remedial decisions during the feasibility study has been well thought through by EPA at this time and we would respectfully suggest consultation with EPA and inclusion of these methods in this effort.

2340 3. **The screening approaches will do little to assist sites over a ¼ acre in size to move rapidly through the process.**

The State of Washington has published two documents on background concentrations: one referring to the concentrations of metals in soils throughout the state, and one on concentrations of dioxins in fertilizers and soils throughout the state. Comparison of the background levels noted in these documents with the concentrations suggested for use in assessing the ecological risks of a site under the simplified procedure, or those values suggested by the rule for screening the chemicals of concern in a site-specific study indicate the values suggested are too conservative to be of much use. For example, dioxin is proposed for screening at 5 ppt as a sum total. The average concentration of dioxin in the soils for the State of Washington would appear to exceed this value.

Summary

In summary, Rayonier remains hopeful that Ecology will take the time and devote the staff hours to carefully consider these and other comments submitted on the August 2000 version of the proposed MTCA regulation, as well as those submitted on the November 1999 version. It is incumbent upon Ecology to consider the concerns voiced in the public comments and the impact of failing to make many of the recommended revisions. Rayonier also looks forward to reviewing Ecology's analysis demonstrating that the final rule adopted is the least burdensome alternative.

Thank you again for the opportunity to comment. If you wish to discuss any of these comments further, or if you have any questions, please contact me at (206) 248-4133.

Very truly yours,

Donald L. Schwendiman
Regional Counsel

HellerEhrman
ATTORNEYS

Attachments

HellerEhrman
ATTORNEYS

bcc: Dana Dolloff
Roy Hummell
Marcia Newlands

C:\TEMP\Rayonier 102000 MTCA Comment LL.rtf
10/29/00 12:35 PM (13399.0045)

COMMENTS ON PROPOSED AMENDMENTS TO THE MODEL TOXICS CONTROL ACT CLEANUP REGULATIONS, CHAPTER 173-340 WAC

SUBMITTED BY:
RAYONIER INCORPORATED

January 18, 2000

Rayonier, Inc. hereby submits its comments on the Department of Ecology's ("Ecology") proposed revisions to the Model Toxics Control Act cleanup regulations, Chapter 173-340 WAC. While Rayonier generally supports Ecology's stated intention to revise these regulations to make them more equitable, flexible, understandable, and cost-effective, the proposed regulations in many cases do not achieve these stated intentions. Rather, many sections of the regulations have become more complicated, less realistic, and will likely make cleanups less expeditious and more expensive. Furthermore, the regulations frequently diverge from recommendations made by the MTCA Policy Advisory Committee (PAC). Even where the regulations include PAC recommendations, the regulations later eviscerate those changes through other revisions (e.g., use of institutional controls are conditioned on no other "technically possible" remedy).

I. General Comments

A. Cost-Effectiveness

In its Fact Sheet issued in November 1999 with the release of the draft rule, Ecology stated that, among other goals, the amended rule would make MTCA less expensive. That is a goal that Rayonier wholly supports, as experience has shown that there were often more expeditious and less expensive ways to implement a remediation than were permitted under the prior regulation. Rayonier is concerned, however, that the amended regulation does not meet this admirable goal.

For example, the rule specifically directs that the hierarchy of treatment technologies be removed as a stand-alone criteria and be used instead as a guide to long-term effectiveness and as a checklist to evaluate remedial options. Ecology has done so by removing current WAC 173-340-360(4)(a). However, Ecology has then reintroduced the concept throughout the rule by giving priority to the selection of treatment technologies over alternative methods for remediation. If all practicable methods of treatment must be used before a risk-based standard can be applied, irrespective of the relative risk presented by each approach, where is the benefit of eliminating the treatment hierarchy? The anticipated cost savings have been effectively eliminated.

B. "Technically Possible"

Rayonier strongly disagrees with the use of the standard of "technical possibility" rather than "technical practicability". The effect is to eliminate the use of the disproportionate cost analysis as a tool of remedy selection. Almost every cleanup alternative is technically possible, but when subjected to disproportionate cost analysis, not technically practicable. For example, the PAC supported the expanded use of institutional controls as remedial alternatives, so long as they were judged by the same remedy selection standards as other alternatives. However, WAC 173-340-440(5) mandates that, where it is technically possible to use a more permanent remedy at a site, a PLP may not rely primarily on institutional controls and monitoring. Effectively, the costs savings that would be realized by using institutional controls, where the risk would be adequately addressed by their use, are eliminated by the use of technical possibility as the litmus test.

The PAC report supported the use of a disproportionate cost analysis to weigh the costs and benefits in determining "permanent to the maximum extent practicable," as well as the use of cost as one of the criteria for selecting a remedy. The disproportionate cost analysis by definition requires that a risk analysis be incorporated to determine the relative protectiveness of the various cleanup alternatives. However, by giving treatment and other more permanent remedies a higher priority, the cost benefits to be gained by using a disproportionate cost analysis are effectively eliminated. Similarly, the cost savings to be realized from the use of institutional controls, technically practicable alternatives, and engineered controls evaporate.

C. Risk-Based Remediation

The linchpin of the "new MTCA" was to be the use of site-specific risk assessment. The rule would be more flexible in allowing risk assessments to be used to develop remediation levels. Remediation levels could be used in lieu of cleanup levels in the remedy selection process. Remediation decisions could be made on the basis of Methods B and C cleanup/remediation levels that incorporated site-specific information, so long as these alternative levels were supported by a reasonable maximum exposure (RME) scenario. The PAC specifically allowed the use of alternative exposure scenarios, where appropriate, for commercial properties, recreational properties, urban residential properties, and agricultural properties, where landscaping, buildings, and pavement would cover much or all of the site.

The rule, as amended, fails to comply with these recommendations. Through omissions and revisions throughout the rule, Ecology has eroded the intent of the PAC by eliminating or eroding the ability of a PLP to use risk to evaluate a cleanup level or cleanup alternative realistically. For example, the owners of current industrial property that is not in use may choose to remediate the property and reuse it or market it as commercial property. There is no residential use or zoning in the area. Human health and

the environment will be sufficiently protected by a remediation level that is higher than the "unrestricted" use would otherwise allow, but more protective than an industrial level would provide, based on a reasonable maximum exposure scenario for the future use of the site. In this case, however, the only land use options that remain in the rule are "unrestricted," which is the equivalent of residential, and "industrial," which does not include commercial, agricultural, or recreational. Alternative RMEs are not provided for. The site owners will spend unnecessary funds to meet a cleanup/remediation level that is more protective than a risk-based analysis would require.

The failure to integrate a risk-based approach into the amended rule is also apparent in the institutional control provisions. Where a risk analysis would permit the use of institutional controls, without more, as was specifically recommended by the PAC, the rule disallows this approach "where it is technically possible to implement a cleanup action that uses a more permanent cleanup action for all or a portion of the site." WAC 173-340-440(5). Where hazardous substances could remain on site to attenuate naturally, for example, and the only mechanism needed to protect human health and the environment is a fence to control access during the process, what is the need for a more costly, but no more protective, "technically possible" cleanup alternative? This is not a more flexible, cost-effective regulation.

D. Cleanup Levels

Rayonier's experience with MTCA has shown that some cleanup levels are not appropriate given the realities of risk at a particular site. It appeared to be the intent of the PAC to address exactly these situations when it directed that Ecology permit the development of remediation levels. The rule, however, contains several provisions that result in cleanup levels that are more conservative than those currently in use, without any apparent justifiable scientific basis for the changes in many cases.

In the soil-to-groundwater section, WAC 173-340-747, the stakeholders in the PAC process had argued for the development of alternate approaches to calculate a cleanup level where groundwater may be impacted by releases in soil. The 100 times (100X) approach was not universally applicable. Rather than amending this section, Ecology has eliminated the 100X approach and designed some very complex and potentially costly formulae designed to reach new cleanup levels. The results of those calculations can be seen in the revised Method A tables for soil. The potential impact of this revision is enormous, particularly where, elsewhere in the rule, Ecology has determined that the default scenario for groundwater will be, in almost all cases, a drinking water scenario. The combined effect of these two changes is to unnecessarily lower the cleanup levels. Has Ecology analyzed whether there is really any greater risk posed by the higher numbers? Or have they been revised simply for the sake of unnecessary added protectiveness?

Another issue raised by some of these revised formulae and tables is whether Ecology subjected itself to the test for "new scientific information" and "criteria for quality of information" found in the revised rule? See WAC 173-340-702(15) & (16). Unless there has been a stakeholder review of any new science incorporated into this rule, it is possible that Ecology has already violated its own regulation. If Ecology is relying solely on the review provided by the POG and the SAB, Ecology should make the information provided to and by these entities available to the public.

E. Probabilistic Risk Assessments

The definition of "probabilistic risk assessment" in WAC 173-340-200 should be amended to allow consideration of distributions for dose-response relationships where Ecology determines adequate scientific evidence is available to characterize the uncertainty in a dose-response evaluation. MTCA applies to numerous chemicals. Our scientific knowledge of the toxic characteristics of these chemicals varies significantly. For some chemicals, the scientific evidence and information supporting the evaluation of toxicity is greater than the evidence supporting exposure parameters such as soil ingestion. In such instances, it does not seem scientifically valid or logical to exclude the dose response relationship from the probabilistic analysis. Additionally, recent EPA guidance allows for the development of more site-specific cancer slope factors using techniques other than the multi-linear stage model. Moreover, it is inappropriate to set substantive requirements in the definitions section. Such restrictions should be placed elsewhere in the regulations. Finally, this definition should be amended to clarify that probabilistic risk assessments are applicable to both human health assessments and environmental risk assessments.

WAC 173-340-708(11) relegates probabilistic risk assessments to "informational" because Ecology has not yet developed protocols or policies for such assessments. Ecology failure to keep its policies and technical expertise current is no reason to reject the use of probabilistic risk assessments. Evaluating the uncertainty of a risk estimate has not only been deemed as acceptable scientifically, but is now required by EPA and recommended by the National Research Council. Probabilistic techniques, such as Monte Carlo analysis, are acceptable means of quantifying uncertainty and have been used and reviewed by EPA for several years now. Furthermore, Monte Carlo analysis is an acceptable statistical technique which dates back more than 15 years and is used throughout the country in various disciplines besides risk assessments, such as financial forecasting, stock analyses, and traffic design. The state of Washington uses the statistical technique for many purposes as well. It is not justified to marginalize well developed, broadly acceptable, and scientifically defensible statistical technique until Ecology "adequately describes" a protocol. We suggest the text incorporate the use of probabilistic techniques following the 1998 EPA guidance and focus its use on characterizing uncertainty until further guidance and department familiarity can be attained, but not limit its use as informational only. Making such a designation is likely

to negate the use and availability of a statistical techniques that can provide valuable insight for decisions at hazardous waste sites.

F. Groundwater & Drinking Water Aquifer

Rayonier agrees with the principle that groundwater should not be classified as a drinking water source if the groundwater is not a drinking water source or not likely to become a drinking water source. Rayonier disagrees however with the overly-restrictive test for determining whether groundwater is likely to be a drinking water source. WAC 173-340-720(2)(b). Groundwater can be an unlikely source of drinking water for numerous reason, not just those identified in the regulations. For example, a future statute or regulation may prohibit withdrawing groundwater as drinking water. The regulation should be revised to allow groundwater to be excluded based on other appropriate factors that make the groundwater an unlikely drinking water source.

G. Institutional Controls

While the proposed regulations pay lip service to institutional controls as part of cleanup actions, the regulations effectively prohibit use of institutional controls in WAC 173-340-350(9)(e)(ii) and WAC 173-340-440(5) by not allowing institutional controls "where is it technically possible to implement a cleanup action alternative that uses a more permanent cleanup action." Given that "technically possible" does not address cost, virtually every site where institutional controls are reasonable alternatives will also have other alternatives that are "technically possible" if price is no impediment. For example, a fence or deed restriction may be perfectly adequate to protect human exposure to contamination. However, the proposed regulations would not allow such a control if the contamination could be removed, even if it cost a billion dollars to do so.

The absurdity of this regulation become apparent when applied to landfills. Any landfill that requires some cleanup under MTCA could not rely on institutional controls because the entire landfill could be completely dug up and hauled away, even if the cost were exorbitant. While an appropriate institutional control would be a fence, deed restriction, and cover, these would be inappropriate given that other cleanup alternatives, such as complete excavation, would be "technically possible."

Moreover, this requirement will effectively prohibit natural attenuation as a viable remediation alternative. Natural attenuation can be a reasonable method for addressing contamination, and it is often coupled with some form of institutional control to prevent exposure during the attenuation period. If institutional controls are not allowed if another alternative is "technically possible", then natural attenuation cannot be considered because it could not be coupled with the institutional control.

H. Financial Assurance

The financial assurance requirements, WAC 173-340-440(11), are too vague and open-ended to be implemented. They state that financial assurance is required to "cover all costs associated with the operation and maintenance of the cleanup action, including institutional controls, compliance monitoring, and corrective action" without providing any basis for determining what that amount is. How will Ecology determine financial assurance for corrective action if the corrective action is not known? How far out into the future must a PLP project costs? If a gas station owner cleans up an oil spill and paves over the residual contamination, must the gas station owner keep financial assurance in place in perpetuity to repair the pavement in the event that it becomes cracked 100 years from now? Likewise, if a PLP places a building over residual contamination (thereby preventing further exposure), must the PLP maintain enough financial assurance to replace the building in the unlikely event it collapses? How does the PLP estimate the financial assurance amount with all the contingencies that may or may not occur? For certain institutional controls, such as deed restrictions or zoning laws, it is impossible to make any estimate of the amount of financial assurance that would be required.

Furthermore, Rayonier seriously questions whether Ecology has the authority – statutory or constitutional – to require a PLP to provide financial assurance. While financial assurance is often included in consent decrees and agreed orders, these obligations are part of an agreement reached between the PLP and Ecology. Likewise, if a company wants to site a facility, financial assurance can be required. In contrast, Ecology cannot simply order a PLP to provide financial assurance as part of a cleanup. (For example, we are not aware that Ecology includes financial assurance when it issues an enforcement order.) A financial assurance mechanism is tantamount to requiring a company to tie up its assets or incur ongoing financial obligations every year. Ecology cannot require such commitments unilaterally.

I. Point of Compliance/No Allowance for Dilution Zones

The proposed regulations perpetuate a requirement that groundwater flowing into surface waters must achieve surface water quality standards at a "conditional point of compliance that is located within surface waters as close as technically possible to the point or points where ground water flows into the surface water." E.g., WAC 173-340-720(9)(d)(i). The refusal to allow for some level of mixing is not reasonable, practical, or scientifically supportable. First, the proposed regulations would allow dilution zones for hazardous substances flowing into surface waters, except for groundwater to surface water flows. WAC 173-340-730(6). There is no apparent rationale for allowing a dilution zone in one instance and not in another when the only difference is whether the water flows into surface waters above or below ground.

Second, this requirement makes no sense in terms of protecting human health or the environment. If groundwater cleanup levels are set based on surface water standards,

then those cleanup levels should recognize the context and purpose of the surface water standards and the concept of mixing zones. It is inappropriate to premise a groundwater cleanup level on a surface water quality standard that is intended to be met after some degree of mixing in the surface waters. For example, a chronic water quality criteria developed for the protection of fish does not assume that the fish will reside its entire life at the exact spot where groundwater flows into surface water. Rather, it is assumed any exposure from pollutants will occur after some degree of mixing in the stream.

Third, the lack of dilution zones will lead to absurd results. Consider, for example, a site with groundwater that exceeds surface water quality standards. Cleanup of the groundwater would be required regardless of the total amount of hazardous substances flowing into the surface waters and the total flow of the receiving surface water. Groundwater flowing at a rate of one ounce per day into the Columbia River would have to be cleaned up if it exceeded the surface water quality standard at the groundwater surface water interface. (Given that the sampling would occur "as close as technically possible" to the point of entry, there is no telling how close Ecology would require the sampling to occur.) The total loading of the substance would be trivial and any further reductions would not reduce risks to human health and the environment.

J. Conditional Points of Compliance

WAC 173-340-720(9)(c) conflicts with (9)(d)(ii) in that it prohibits conditional points of compliance beyond the property boundary. Given that (9)(d)(ii) explains the circumstances in which off-property points of compliance are allowed, section (9)(c) should not include the limitation on points of compliance not exceeding the property boundary.

In WAC 173-340-720(9)(d)(ii), Ecology unlawfully delegates cleanup decision authority to downgradient landowners in setting conditional points of compliance. While notification of downgradient landowners is reasonable, Ecology cannot delegate its responsibility in determining what is necessary to protect human health and the environment. As such, the Department of Ecology must retain its authority to regulate the groundwater quality, not delegate it to downgradient property owners.

K. Citizen Technical Advisor.

In WAC 173-340-550, Ecology has added to its list of recoverable remedial action costs the costs of paying a citizen technical advisor. There is no basis in MTCA for Ecology to recover the costs of such an advisor as remedial action costs. While Ecology has the authority to recover "remedial action costs," those costs do not include providing technical assistance to third parties. MTCA defines "remedial action" as

> any action or expenditure consistent with the purposes of this chapter to identify, eliminate, or minimize any threat or potential threat posed by

> hazardous substances to human health or the environment including any investigative and monitoring activities with respect to any release or threatened release of a hazardous substance and any health assessments or health effects studies conducted in order to determine the risk or potential risk to human health.

RCW 70.105D.020(21). This definition cannot possibly be read to include the costs of providing technical assistance to persons who do not have direct responsibility for "identifying, eliminating, or minimizing any threat or potential threat posed by hazardous substances to human health or the environment." While Rayonier does not object to Ecology providing technical assistance to interested members of the public, the costs of doing so cannot be recovered from PLPs under MTCA. All references to recovery of "citizen technical advisor" costs as "remedial action costs" must be deleted from the regulations.

L. Applicability of New Cleanup Levels

WAC 173-340-702(12) states that Ecology will apply the cleanup levels that are in effect at the time a cleanup action plan is issued for a remedial action carried out under an Ecology order or decree. While Rayonier agrees with the principle of grandfathering, the grandfathering protection should extend further back in time to the point when the PLP and Ecology enter into an agreement to undertake the RI/FS. Where a site is under active remedial investigation, or an RI/FS workplan is under development, the PLP is operating under the standards of the current regulation. If the standard that is applied to review of the RI/FS and to development of the cleanup action plan is different than that used in carrying out the RI/FS, the ramifications for the project are many. The timing may have to be extended to allow for the development of new plans, or for additional investigations and sampling. The cost of these additional measures will be an added burden to a PLP. There are likely to be other effects as a result of this change mid-project. Rayonier believes a better solution would be to apply the standards that are in effect at the time the remedial investigation workplan is developed, or when the consent order or decree is signed to conduct the RI/FS.

M. Natural Attenuation

In WAC 173-340-200, the definition of "Natural Attenuation" specifies soil and groundwater. Natural attenuation as a process also occurs in surface water, sediments, and air. The definition should include all environmental media.

N. Background Levels

In WAC 173-340-750, the "air" cleanup levels section, the regulations should allow for consideration of background air concentrations at sites where local urban background concentrations of ambient air exceed natural background concentrations. In

such instances, cleanup levels would be impossible to achieve for a specific property owner because the local urban background would continually recontaminate the air to a level exceeding a risk-based concentration.

O. Bioconcentration Factors

WAC 173-340-730(3)(c) states that adjustments to reference dose, cancer potency factor, and bioconcentration factor are site-specific. These factors are not site-specific, but chemical specific. Site-specific factors that should be discussed in this section are the fish consumption rate and the fish diet fraction.

P. Use of Risk Assessments.

WAC 173-340-708(1) states site-specific risk assessments will be evaluated only if they do not result in a significant delay in cleanup. While consideration of cost and schedule is necessary, equally if not more important to some sites are the development and presentation of alternative cleanup values to support and justify appropriate cleanup actions. Ecology should clarify this language to reflect that approval of alternate methods and values will be based on several variables which include available data, proposed methodology, and community concerns, as well as schedule.

Q. Acute Toxicity

We suggest providing an example time frame for the definition of Ecology means by "Acute Toxicity", WAC 173-340-200. As stated, it simply notes short-term, a relative value that can be interpreted as less than 14 days for bioassays, or several months in a carcinogenic evaluation.

II. Comments on Specific Cleanup Standards

A. Cleanup Standards for Indicator Hazardous Substances

WAC 173-340-720(3)(b)(iii) and several other sections require cleanup of indicator hazardous substances to natural background or the practical quantitation limit for constituents that are not in the Method A Tables or have no value in applicable state and federal law. This requirement is inappropriate and unnecessary. Method B calculations can be developed specifically for sites as needed. Such calculations will provide conservative cleanup for chemicals that are not listed on the method A Tables and conform with the intent of making prudently conservative decisions based on the best available information. Simply requiring a PQL in the absence of promulgated regulatory values contradicts the use of a risk-based approach.

B. Naphthalenes

Table 720-1 sets cleanup levels for naphthalenes based on a summing of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. There is no toxicological data to justify summing these constituents of for Method A cleanup levels. These constituents cannot be summed simply because each contains "naphthalene" in the name.

C. Heavy Oils

Table 720-1 should not set Method A cleanup levels for heavy oils on the assumption that heavy oils are similar in composition to diesel oil. Heavy oils, such as lubricating fluids, often have a composition more similar to mineral oil than diesel fuel. In addition, there are a number of practical considerations that will make it difficult to utilize a Method A level of 0.5 mg/L for heavy oils, such as the ability to achieve a 0.5 mg/l PQL due to interferences.

D. Xylenes

It is not scientifically justified to limit the Method A cleanup levels in Table 720-1 for xylenes based on aesthetics and the presence of TPH. The occurrence of xylenes in groundwater is not always related to petroleum. There is no toxicological justification for setting a cleanup level at 1 mg/l. We suggest a level consistent with the MCL.

E. Use of TEQs

WAC 173-340-720(4)(c)(iii) allows use of TEQs for assessing potential carcinogenic risk. The toxicity equivalency factor procedures for dioxins, dibenzofurans, and polycyclic aromatic hydrocarbons are accepted by EPA, and most states as a scientifically acceptable approach. TEQs should be considered the standard procedure rather than an alternative approach for the "modified Method B and C".

F. Leaching Tests

The leaching tests presented in WAC 173-340-747 (3)(b)(i)(A) & (B) are not appropriate for determining how materials will react under site conditions. These test were developed for use in evaluating disposal options, not evaluating site-specific conditions. As such, the tests are designed to extract as much contaminant as possible from a sample. Because of the nature of these tests, they will provide no useful information regarding site specific conditions, and thus be of little scientific use for making prudent cleanup decisions protective of "real world" conditions.

G. Multiple Hazardous Substances

Many sections state cleanup levels (WAC 173-340-700(5)(b) & (c), WAC 173-340-705(4); WAC 173-340-706(4)) for individual hazardous substances must be adjusted

downward to account for additive health effects when multiple hazardous substances are present. Because the amendments use and define the words "must" and "shall" as mandatory requirements, this language implies such cleanup levels will always be adjusted downward in the presence of multiple hazardous substances. This is overly conservative and often results in cleanup levels that are below ambient conditions, not possible to attain, or not necessary. Furthermore, adjustment of the levels downward is not always required to attain a target risk level of 1 x 10-5 . The cleanup levels for non-carcinogens only need to be adjusted downward when the cumulative hazard quotient for compounds with similar toxic effects exceeds 1. Cleanup, levels for carcinogens only need to be adjusted downward when the cumulative cancer risk exceeds 1 x 10-5. EPA recognizes in their screening guidance, that although multiple chemicals exist on many sites, only a small percentage may actually contribute significantly to the total risk. For example, if you have three carcinogens with cancer risks of 4 x 10-6, 9 x 10-8, and 1 x 10-6, no downward adjustment would be needed of the individual cleanup level in order to attain a 1 x 10-5 target risk level. We suggest the proposed language be clarified to allow for downward adjustment to allow instances where downward adjustment of cleanup levels is not mandatory.

III. Typographical Errors

Although there are undoubtedly some others that Rayonier has not identified, there are a number of typographical errors in the proposed regulations.

- WAC 173-340–720(6)(b). It is unclear whether the factors considered under – 720(6)(b) must all be met or just one must be met. The confusion arises because of inconsistent use of "and" and "or" within the list of factors to be considered.

- WAC 173-340-7492(2)(c)(ii) – The referenced Table 7 is missing.

- WAC 173-340-700(5)(a) - The first sentence provides a faulty reference. The section refers the reader to section WAC 173-340-130, but the section moved to WAC 173-340-120 definitions.

- WAC 173-340-730(3)(b)(iii), Equations 730-1 and 730-2 - Bioconcentration factors are not unitless. Bioconcentration factors are noted as the concentration of a chemical in fish tissue (mg/kg tissue) divided by its concentration in water (mg/L water). Consequently, BCFs are expressed in units of (L/kg).

- Equations 740-3, others - The definitions for the equation include "GI" (gastrointestinal absorption conversion factor), but this is not included in the actual equation. The GI factor should be included.

IV. Conclusion

Ecology has more work to do before the revised MTCA regulation meets the goals and directives of the MTCA PAC Report. The revisions do not lead to a "fairer, easier to understand, more flexible, less ambiguous and less expensive" program. Environmental cleanups in this state will not benefit from this revised rule. There are parts that are clearly an improvement, but there are still major errors and omissions in the language and in the applicability of the rule as a whole. Rayonier encourages Ecology to work with the stakeholders to redraft significant portions of the proposed regulation before putting it into effect. The regulation is not ready for release.

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Akana, Trish Alicia

From: Newlands, Marcia [mnewlands@hewm.com]
Sent: Friday, October 27, 2000 3:15 PM
To: 'taka461@ecy.wa.gov'
Subject: MTCA Comment Letter from Heller Ehrman

Heller MTCA
omments 102000.rt

Please see the attached letter. Thank you.

<<Heller MTCA Comments 102000.rtf>>

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Heller Ehrman White & McAuliffe LLP

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Page 1 of 1

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October 29, 2000

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16004-0060

Trish Akana (taka461@ecy.wa.gov)
Rules Coordinator
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Comments on Proposed Revision to the MTCA Regulation

Dear Ms. Akana:

Heller Ehrman is submitting the following comments on the draft proposed revision to the Model Toxics Control Act (MTCA) Regulation, Chapter 173-340 WAC, issued on the Washington State Register on August 12, 2000. Heller Ehrman has previously provided Ecology comments on prior draft version of the regulation. We request that Ecology reconsider those comments at this time as it appears Ecology has failed to revise prior versions of the rule after considering those comments. In the alternative, Heller anticipates that Ecology will prepare a responsiveness document that addresses all previously submitted comments from the public.

In addition, the following comments are submitted as new comments for Ecology's consideration. They are comments prepared by the firm's environmental analyst, Lincoln Loehr, on the proposed cleanup levels for groundwater and surface water.

Comments re MTCA Rule Revisions

2341 173-340-720(7)(a) pertains to total site risk adjustments to cleanup levels for groundwater. It says:

> (a) Total site risk adjustments. Groundwater cleanup levels for individual hazardous substances developed in accordance with subsections (4), (5) or (6) of this section, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one (1) and the

> total excess cancer risk would exceed one in one hundred thousand (1×10^{-5}). These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one (1) and the total excess cancer risk shall not exceed one in one hundred thousand (1×10^{-5}).

The problem with the above approach occurs when a single naturally-occurring substance, such as arsenic, already exists at a level with a greater hypothetical risk level than one in one hundred thousand (1×10^{-5}).[1] In that case, there can be no theoretical cancer risk increase allowed from any other substance. This may be partly remedied by modifying the second sentence in the section to read:

> These adjustments need to be made only if, without these adjustments, the hazard index would exceed one (1) <u>solely from human causes</u> and the total excess cancer risk <u>solely from human causes</u> would exceed one in one hundred thousand (1×10^{-5}).

Absent the above qualifier, groundwater, or groundwater flowing to surface waters, must meet impossibly high cleanup standards, which will produce little or no significant additional benefit.

2342 173-340-720(8)(e) pertains to monitoring wells and surface water compliance. It describes the consideration or estimation of natural attenuation between the monitoring well and the point or points where ground water flows into the surface water in evaluating whether compliance has been achieved.

The section needs to recognize as well those factors relevant to natural attenuation in the surface water. For example:

[1] Consider that the Method B CLARC II tables from Ecology identify 10-6 risk levels for arsenic in groundwater of 0.0583 ug/l. Furthermore, the USGS has determined that 80% of the public water-supply systems using groundwater in the western states exceed 1 ug/l, 60% exceed 2 ug/l, more than 40% exceed 5 ug/l and more than 20% exceed 10 ug/l. It is readily apparent that natural arsenic in groundwater will almost always be sufficient to trigger this requirement.

- Some substances may stay bound to sediments, and may not contribute to surface water concentrations. If this would not lead to a sediment problem either, then this consideration should be of use.

- Some substances may be volatile organics, which may linger for decades in groundwater for lack of any means to volatize and escape, but will behave much differently in surface waters. In surface waters, volatile organics do not linger, but escape to the atmosphere. This attenuation is real and should be recognized.

- Some groundwater flows may be trivial compared to the flows and volumes of the receiving waters, yet the MTCA regulation is not set up to consider that. Rather, the regulation focuses on concentrations, or means to develop concentrations as limits, and then treats all situations the same. A groundwater flow of one quart per year into Lake Washington is treated as if it causes the lake to exceed a water quality standard when in fact its effect is trivial. This focus on concentration, without concern for the mass release rate, treats the above example no differently than a flow of millions of gallons a day to an effluent-dominated receiving water body.

Some of these factors are indirectly recognized if a conditional point of compliance in the surface water is used, but they also need to be allowed where a perimeter well is used.

2343 173-340-720(9)(d)(i)(A) pertains to data analysis procedures for evaluating compliance with groundwater cleanup standards. It requires that the upper one-sided 95% confidence level on the true mean groundwater concentration be less than the groundwater cleanup level. This is useful because it recognizes that some values may exceed without causing a violation. However, 173-340-720-(9)(e)(i) mandates that no single sample be greater than 2 times the groundwater cleanup level, and 173-340-720(9)(e)(ii) requires that less than 10 % of the samples exceed the groundwater cleanup level during a representative sample period.

These sections help to illustrate the problem with any application of surface water arsenic human health standards as cleanup standards for any groundwater that flows to surface water. Groundwater naturally flows to surface water all the time, and just about everywhere. Natural groundwater arsenic concentrations commonly exceed 1, 5, and even 10 ug/l.[2] The applicable surface water standard generally applied to

[2] See, USGS. 2000. *A Retrospective Analysis on the Occurrence of Arsenic in Ground-Water Resources of the United States and Limitations in Drinking-Water-Supply Characterizations.* Water-Resources Investigations Report 99-4279.

freshwater is 0.018 ppb and to salt water is 0.14 ppb. The natural levels in the surface waters exceed the surface water standards but are generally below the groundwater concentrations. The purpose of this comment is to illustrate the unworkability of using the surface water human health standards for arsenic as a cleanup standard for groundwater, or for surface water as well.

The alternative is to specify in the MTCA regulation that 5 ug/l, measured in the surface water, is the appropriate cleanup standard for arsenic when it is not used for drinking water in the ground and it flows to a surface water.

2344 173-340-730(5)(a) pertains to total site risk adjustments to cleanup levels for surface waters. It says:

> (a) Total site risk adjustments. Surface water cleanup levels for individual hazardous substances developed in accordance with subsections (3) and (4) of this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one (1) and the total excess cancer risk would exceed one in one hundred thousand (1×10^{-5}). These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one (1) and the total excess cancer risk shall not exceed one in one hundred thousand (1×10^{-5}).

The problem with the above approach arises when a single naturally-occurring substance, such as arsenic, already exists at a level with a greater hypothetical risk level than one in one hundred thousand (1×10^{-5}).[3] In that case, there can be no

[3] Consider that the National Toxics Rule has imposed two surface water human health standards on Washington, each set at the theoretical one in a million risk level. These are 0.14 ppb to protect those people consuming organisms that live in the water, and 0.018 ppb to protect those people consuming both water and the organisms that live in the water. The lower number would commonly be applied in freshwater while the higher number would be applied in salt water. Fresh surface water concentrations of arsenic in Washington typically run 0.1 to 1 ppb and salt water typically runs 1 to 2 ppb. Groundwater in Washington often may run as high as 5 to 10 ppb, and groundwater flows to surface water all the time.

theoretical cancer risk increase allowed from any other substance. This may be partly remedied by modifying the second sentence in the section to read:

> These adjustments need to be made only if, without these adjustments, the hazard index would exceed one (1) solely from human causes and the total excess cancer risk solely from human causes would exceed one in one hundred thousand (1×10^{-5}).

Absent the above qualifier, surface water, or groundwater flowing to surface water, must meet impossibly high cleanup standards, which will produce little or no significant benefit. Typically, for groundwater flowing to surface water, the MTCA regulation imposes requirements that ignore dilution and rates of loadings and therefore fail to recognize or relate to actual exposures. Concentration means everything, and contribution nothing.

2345 WAC 173-340-730(7) pertains to compliance monitoring. A new subsection (e) should be added as follows, with the existing subsections (e) and (f) changing to (f) and (g).

> (e) For cleanup levels based on human health standards, the true mean concentration shall be used to evaluate compliance. This is applicable to groundwater flowing to surface water as well.

Thank you for the opportunity to provide comments. If you have any questions, please contact me at (206) 389-6102, or Mr. Loehr at (206) 389-6219.

Very truly yours,

Marcia Newlands

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HellerEhrman
ATTORNEYS

bcc: Mike Thorp
Tom Martin
Lincoln Loehr

Akana, Trish Alicia

From: Martin, Tom [TMartin@ASARCO.com]
Sent: Friday, October 27, 2000 7:35 PM
To: 'Akana, Trish'
Subject: MTCA Rule Amendment Comments

Please accept the attached letter as our comments.

Regards,

Thomas E. Martin
ASARCO Incorporated
Tacoma, WA

<<Asarco revised MTCA comments 102000.rtf>>
This transmission is for the intended addressee only and is confidential information. If you have received this transmission in error, please delete it and notify the sender. The contents of this E-mail are the opinion of the writer only and are not endorsed by ASARCO Inc. unless expressly stated otherwise.

#91

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October 29, 2000

Trish Akana, Rules Coordinator
Department of Ecology
Toxics Cleanup Program
300 Desmond Drive
Lacey, WA 98503

Re: Proposed Amendment to the Model Toxics Control Act Regulation

Dear Ms. Akana:

ASARCO Incorporated ("Asarco") is submitting the following comments on the proposed revisions to the Model Toxic Controls Act (MTCA) Regulation, Chapter 173-340 WAC, published in the Washington State Register on August 16, 2000.

2346 **1. Comments submitted January 18, 2000**

It is apparent from a review of the August 16, 2000, version of the proposed MTCA regulation that Ecology has not incorporated the bulk of the comments received by the Department on the November 1999 MTCA proposed rule amendment. Although there were a few minor revisions to the rule prior to publication of the August 2000 draft, the majority of concerns raised by those filing comments were either ignored by Ecology or rejected. Asarco understands that this may have been the result of the volume of submittals, making it difficult for Ecology to consider all of the comments. To date. Ecology has not prepared its response to comments received at prior publications of the draft rule. Asarco anticipates that Ecology will incorporate more of the comments filed addressing the November 1999 version in the final rule following this round of comments or, in the alternative, Ecology will provide an adequate response to why they have not been incorporated.

In order to facilitate Ecology's consideration of its prior comments, Asarco is attaching to and incorporating herein its letter to the Department of Ecology dated January 18, 2000. Asarco requests that Ecology reconsider Asarco's prior comments, as well as those of the several dozen other commentors, as part of this round of comments.

2347 2. **Failure to comply with 1995 Regulatory Reform Act**

The Regulatory Reform Act, RCW 34.05.328, passed by the Legislature in 1995, specifies requirements that must be followed by a state agency prior to adopting a significant legislative rule. Specifically, an agency is directed to conduct an analysis consisting of

several steps. First, the agency must state in detail the goals and objectives of the statute that the rule implements. RCW 343.05.328(a). The agency must next determine that the rule is needed to achieve those goals and objectives, as well as analyze any alternatives to the rulemaking and any consequences of not adopting the rule at issue. RCW 34.05.328(b). Additionally, the agency must undertake a cost benefit analysis of the proposed rule, making a determination that the probable benefits of the rule are greater than its probable costs. RCW 34.05.328(c). Then, after undertaking the analyses described above, the agency must make a determination, after considering alternative versions of the rule, that the rule being adopted is the least burdensome alternative for those who are required to comply with the rule.

On October 12, 2000, the Department of Ecology issued a preliminary draft of its "Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC." Without addressing any shortcomings of that analysis, Asarco would like to point out that the analyses required to be undertaken by RCW 34.05.328(a)-(d), considering alternate versions of the rule and adopting the least burdensome alternative, has not been undertaken. To the extent such an analysis has been undertaken, the results have not been shared with the public. Has Ecology determined that the proposed MTCA regulation is not a significant legislative rule? If so, on what basis? If not, where is the analysis required by the legislature?

This analysis is particularly pertinent as it relates to the draft MTCA regulation. Most of those filing comments on the November 1999 draft expressed their concern with the complexity and cost of the proposed rule, and how it will affect hazardous waste cleanups in the state. The rule was intended, in part, to avoid the imposition of "excessive, unreasonable, or unnecessary obligations" on the public. The January 200 comments focused on the fact that the rule imposed exactly such obligations. With these comments in mind, Asarco is particularly surprised that Ecology has failed to undertake the analysis required by RCW 34.05.328. It is Asarco's understanding that there are least two versions available to Ecology to consider as "alternative versions of the rule:" the existing rule, and a version submitted by AWB to Ecology during negotiations in the summer of 1998.

2348

3. Areas of widespread contamination

Asarco was unable to locate any language in the proposed draft amendment to the MTCA regulation that addresses Priority Issue # 9 from the MTCA Policy Advisory Committee (PAC) report. In its report, the PAC recommended several changes to be implemented by Ecology to address cleanup, redevelopment, and reuse of brown fields, agricultural properties, and areas of widespread contamination. It is becoming apparent that, unless Ecology is able to adequately address these issues consistent with the PAC recommendation, Ecology might find itself and the state faced with enormous cleanup bills over the next decade, or longer. Asarco believes it is imperative the Ecology work with other

interested parties to address realistic solutions for widespread contamination. Whether that be through the development of model remedies in cooperation with an external work group, or through revisions to the rule that encourage remediation and redevelopment remains to be determined. In the interim, Ecology has not complied with the PAC directives.

2349

4. Remediation levels

Although Asarco addressed this issue in its January 18, 2000 comments, this is an area of such importance to both Asarco and the regulated community in general that Asarco wishes to re-emphasize its concern with Ecology's handling of the concept of remediation levels. As you recall, the PAC recognized that the concept of "remediation levels" was already part of Ecology's remedy implementation "tool bag." The PAC endorsed the continuation of the approach and recognized that remediation levels would be an alternative part of a cleanup action plan that could include cleanup levels, institutional controls, remediation levels, and other methods to protect human health and the environment at a site.

The draft rule requires that a cleanup action using remediation levels "must meet each of the minimum requirements specified in WAC 173-340-360, including the requirement that all cleanup actions must comply with cleanup standards. Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance." WAC 173-340-355(2). However, elsewhere the rule recognizes that "remediation levels are used...at sites where achieving cleanup levels at the point of compliance is not practicable." WAC 173-340-355(1). Remediation levels were intended to provide options for a cleanup action where methods other than meeting cleanup levels throughout the site would be available to ensure a protective cleanup. Ecology must reconcile these contradictory portions of the rule without eviscerating the PAC's intent in supporting the concept of a remediation level.

5. Other concerns

Asarco has additional specific concerns with other areas of the rule, many of which are being raised or have been raised by other comments, which are highlighted below.

2360

- Under what conditions can a PLP use a combination of Method A and Method B cleanup levels at a site?

2351

- Does Ecology recognize that many sites will require a Tier 3 ecological evaluation and, as a result, habitat will likely be destroyed in implementing cleanups?

2352

- How does Ecology propose to address widespread use of pesticides and herbicides and their lasting effects in soil?

2353 • Similarly, how does Ecology plan to address areas of widespread, low-level contamination reasonably, both urban and rural (see discussion above)?

2354 • Why is Method C not available for soils at "unrestricted " sites? This is particularly important if Ecology is to address areawide contamination successfully.

2355 • How did Ecology arrive at a point of compliance for soils 15 feet below grade? What scientific basis exists for this determination? Practically, this is unreasonably burdensome and not based in the realities of the construction business. Asarco questions whether the cost-benefit analysis of this portion of the rule was conducted appropriately.

Conclusion

Once again, Asarco urges Ecology to review the comments submitted by the public in January, 2000, as well as those submitted in response to the August 16, 2000 draft MTCA regulation. Asarco's earlier comments are attached hereto. Asarco appreciates the opportunity to comment once again on the proposed draft regulation and looks forward to Ecology's incorporation of these and other comments and proposed revisions in its final version of the rule. Please contact me at 253-756-0203 if you have questions or need additional information.

Very truly yours,

Thomas E. Martin

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Washington state's
chamber of commerce

October 27, 2000

Trish Akana, Rules Coordinator
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Washington Department of Ecology
P.O. Box 47600 Olympia, WA 98504-7600

RE: August 16, 2000 Proposed Amendments to MTCA, Chapter 173-340 WAC

Dear Ms. Akana,

The Association of Washington Business (AWB) appreciates the opportunity to comment on proposed amendments to Chapter 173-340 WAC, Model Toxics Control Act (MTCA) cleanup regulation, Chapter 173-322 WAC, Remedial Action Grant regulation, and Chapter 173-321 WAC, Public Participation Grants regulation as proposed by the Department August 16, 2000.

General Comments

AWB appreciates the efforts of Ecology to incorporate changes suggested on earlier drafts. While the August 2000 proposed rule does offer many substantive changes to what Ecology proposed in November 1999, no measurable improvements to this latest draft were made to better accomplish the goals established in 1996 by the MTCA Policy Advisory Committee (PAC). As such, AWB's comments on the MTCA rule proposed in August, re-emphasizes previously stated concerns AWB has made on earlier drafts.

Regarding substantive comments on proposed rule language, AWB supports comments by the Western States Petroleum Association, Washington Oil Marketers Association, Weyerhaeuser, Boeing, Kennedy/Jenks Consultants, Fluor Hanford Incorporated and the many stakeholders which represented business interests throughout the rule-making process.

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MTCA Policy Advisory Committee

In 1995, the Legislature passed Engrossed Substitute House Bill (ESHB) 1810, which directed Ecology to establish the MTCA Policy Advisory Committee (PAC). The committee was comprised of a broad range of interests including the Legislature, Ecology, agriculture, large and small businesses, environmental organizations, and local and state governments. The PAC was tasked with establishing goals and recommendations for new MTCA

regulations. Those goals, which were part of the PAC's 1996 report to the Legislature, included making the rule:

"fairer, easier to understand, more flexible, less ambiguous, and less expensive."

Ecology restated these goals in the form of a MTCA Fact Sheet in November 1999. While the members of the AWB MTCA Task Force commend Ecology for their efforts and hard work relative to revising MTCA, we believe that the proposed rule falls considerable short of attaining the goals established by the MTCA PAC.

Specific Comments on Proposed Rule

2357 AWB believes that the proposed MTCA rule is *not* fair.

1. The increased costs associated with the new requirements and cleanup levels are not associated with an improvement in the environment.
2. The increased costs associated with the new requirements and cleanup levels are not associated with a reduction in risk or further protection of human health.
3. The proposed rule contains many risk assessment and risk management tools that will make cleanups more complex and confusing.

2358 AWB believes that the proposed MTCA rule is *not* easier to understand.

1. The requirements of the rule are confusing even to those who are familiar with the current MTCA rule. Ecology has replaced the current soil-to-groundwater standards formula with two possible methods – both of which are confusing and difficult to implement.

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2. Ecology states in the Small Business Economic Impact Statement (SBEIS) that the new risk assessment and risk management methods "are more complex and technical," which was not the intent or directive of the PAC.

2360 AWB believes that the proposed MTCA rule is *not* more flexible.

1. ESHB 1810 required that cleanup standards to be based on scientific evidence, human exposure levels, and not be based on "redundant conservative assumptions." Furthermore, the MTCA PAC recommendations included an increased use of site-specific risk assessments.

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2. The proposed rule erroneously bases cleanups of groundwater to drinking water standards. This standard is not appropriate for many sites and adds an unreasonable and restrictive burden where increased flexibility is needed.

2362 AWB believes that the proposed MTCA rule is *not* less ambiguous.

1. The proposed rule is vague and lacks instruction on how to complete a disproportionate cost analysis.

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2. The terrestrial ecological evaluation provisions add uncertainty and confusion for ecological risk assessments.

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AWB believes that the proposed MTCA rule is *not* less expensive.

1. Ecology states in the SBEIS that certain small businesses can expect an increase in costs of 20%. Ecology further concludes that the proposed rule will " virtually always" increase cleanup costs for "any business responsible for cleaning up even a small portion of a small area of low toxicity contamination."

2. Ecology states in the SBEIS that "small businesses are more likely to face disproportionately higher costs than large businesses."

2365 As indicated above, many AWB members believe that the new rule is actually worse and will make cleanups more difficult than the current MTCA rule. Therefore,

AWB requests that the Department postpone the MTCA rule-making process until discussions between interested stakeholders results in rule language that accomplishes or at the very least, comes closer to achieving the above stated goals of the MTCA PAC.

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Significant Legislative Rule Requirements

AWB believes that Ecology has failed to meet requirements of RCW 34.05.328, including:

1. Determining that the probable benefits of the proposed rule exceed their probable costs, taking into account both the qualitative and quantitative benefits and costs and MTCA's specific directives.

The preliminary cost-benefit analysis provided by the Department does not determine whether the benefits of the proposed amendments are greater than the probable costs. Instead, the analysis estimates the cost-benefit of model sites, which may lead to subjective judgements of Ecology staff.

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2. Considering alternative versions of the rule to determine the rule adopted is the least burdensome alternative for those required to comply with it's provisions, while achieving MTCA's general goals and specific objectives.

The AWB MTCA Task Force produced a draft version of a MTCA rule in 1998 and submitted it to Ecology for their review. The draft incorporated the goals of the MTCA PAC and was developed by consensus. AWB believes this version of the MTCA rule would

better serve the regulated community and requests that Ecology consider it as a least burdensome alternative. A copy of the AWB draft has been included by AWB members during the public comment period for your consideration.

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Small Business Economic Statement

In accordance to the Regulatory Fairness Act (RFA), RCW 19.85, Ecology is required to prepare a Small Business Economic Impact Statement (SBEIS) if the proposed rule will impose more than minor costs on businesses. Ecology has determined that the proposed MTCA rule does impose more than minor costs to businesses. The RFA obligates Ecology to (1) reduce the costs imposed by the rule on small businesses; (2) list in detail the requirements imposed by the proposed rule; (3) state the costs incurred by businesses in order to comply with the rule; (4) state potential lost sales or revenue; (5) compare costs on small and large businesses; (6) state how the Department will involve small businesses in the development of the rule; and (8) list affected industries.

In preparing the SBEIS, Ecology has not met the requirements of the RFA pertaining to the following areas:

1. Methods the Department lists that supposedly reduce costs to businesses including model remedies, site-specific risk assessment, the area-wide point of compliance provision and other methods are not likely to be implemented at many sites due to their complexity.

2. Ecology has not adequately considered methods of cost reductions for businesses.

3. The SBEIS does not include many costs to businesses such as increased labor, supplies, equipment, and administrative costs required by statute.

4. Many requirements such as soil cleanup levels and new minimum testing requirements have not been identified as significantly increasing costs to businesses.

5. Ecology has not adequately compared the costs associated with the rule on large and small businesses.

6. The SBEIS does not list how Ecology will involve small business in future rule-making procedures as required by statute.

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Environmental Impact Statement

The State Environmental Policy (SEPA), RCW 43.21C requires that an Environmental Impact Statement (EIS) be submitted for all "major actions significantly affecting the quality of the environment." The statute further requires that the EIS list "alternatives to the proposed action." The Draft EIS submitted by Ecology is deficient is two key areas:

1. The EIS inadequately identifies only two plausible alternatives: (1) No Action Alternative (existing MTCA rule unchanged); and (2) Proposed Action Alternative, (adoption of the proposed rule amendments).

2. The EIS completely ignores two alternatives: (1) Implementing the PAC recommendations which AWB supported; and (2) implementation of the Project Oversight Group's recommendations for petroleum cleanups.

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Negotiated Rule-Making Process

The process of re-writing MTCA began after Ecology and the Legislature received the PAC's recommendations in December 1996. Ecology began holding meetings with stakeholders and in March 1997, the Department issued the following statement in the Rule Authorization Document:

> " All of the Policy Advisory Committee's recommendations to the Legislature and Ecology focus on making the business of cleanups fairer, easier to understand, more flexible with less ambiguity, and less expensive. The Committee has recommended important changes to the cleanup rules that are used to carry out the law. Ecology is committed to carrying out the recommendations of the Committee that resulted from the 18-month study. We believe the changes will create a better Model Toxics Control Act thereby resulting in a cleaner environment."

Ecology stated at the first meeting of the External Advisory Workgroup that "the goal is to reach consensus on the terms of a proposed rule which is presented for public review and comment." By the end of 1997 however, it was clear that Ecology was not interested in developing rule language through a consensus approach – choosing instead to exclude stakeholders from participating in the rule-making process, including the External Advisory Workgroup.

Due to Ecology's departure from the negotiated rule-making process, the Department received numerous negative comments on its February 1998 draft. While we appreciated discussions between Ecology and stakeholders, which resumed in the later part of 1998, the Department again decided to write the rule without stakeholder's input and chose not to consider substantive comments from many stakeholders, including AWB. Between December 1998 and when the current proposal was filed in November 1999, Ecology did not participate in negotiated rule-making and did not present stakeholders with any opportunities to review proposed substantive language revisions made by the Department. Our specific concerns with the way in which Ecology conducted itself in the negotiated rule-making process are as follows:

1. The current proposed rule is mostly language developed by Ecology rather than from the consensus approach the Department agreed to.

2. Despite being based on recommendations by the PAC, Ecology rejected the majority of the comprehensive discussion draft developed by AWB without discussions between stakeholders.

3. The countless hours and efforts of the many stakeholders involved in the MTCA rule-making process and in the negotiations with Ecology, did not produce a MTCA rule that represents those efforts. The current proposed draft exemplifies this fact in that Ecology has not included a substantial amount of suggested language from those stakeholders, nor does the proposed rule accomplish the goals of the MTCA PAC.

Conclusion

RCW 34.05.328 requires an agency to (1) determine that the probable benefits of the rule are greater than its probable costs; (2) consider alternative versions of the rule; and (3) assure the adopted rule is the least burdensome alternative for those required to comply with it's provisions. AWB believes that Ecology has failed to meet the requirements of this statute.

AWB further believes that Ecology has failed to streamline the process of site cleanups, and as previously stated the Department has not implemented the requirements of ESHB 1810 and the recommendations of the MTCA PAC. AWB contends that Ecology staff is capable of developing a MTCA rule that better serves the residents of the state of Washington, the environment and the regulated community that must abide by the standards within the MTCA rule. AWB requests that the Department consider the draft MTCA rule as submitted to Ecology by the AWB MTCA Task Force in 1998 as a least burdensome alternative.

Thank you for considering AWB's comments on the proposed MTCA rule.

Sincerely,

Grant Nelson
Director, Environmental Policy

Port of Seattle

October 27, 2000

Department of Ecology (Toxics Cleanup Program)
ATTN: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA 98504-7600

Re: Port of Seattle Comments on MTCA Rule Amendments

Dear Trish:

Attached are the Port of Seattle's comments on the latest version of the MTCA Rule Amendments. I want to highlight two aspects of the comments in particular. First are the comments related to point of compliance, particularly area-wide point of compliance. The clarifications and minor changes we have requested in that portion of our comments are essential to facilitating the cleanup of large urban industrial areas. The approach worked out in our EAG work group discussions must be faithfully reflected in the regulations themselves and in their implementation to ensure that these cleanups will move forward. The Port is currently involved with a project in the BINMIC area of Seattle funded by an EPA brownfields grant that will be addressing area-wide cleanups. Without these clarifications, we fear that our BINMIC efforts will be for naught. This would be a loss to the community of a significant opportunity for environmental improvement.

The second aspect of the comments I want to highlight is our support for the work of the TPH Project Oversight Group ("POG"). Many of our comments are closely related to POG comments because of our mutual concerns for encouraging successful cleanup of brownfields. As an entity that included primarily regulatory representatives and was brought together under a memorandum of agreement with Ecology and an EPA Brownfields grant specifically to address certain issues, we feel strongly that the POG comments should be adopted into the rule. We have been quite disappointed in the past that Ecology has, on its own, chosen to only selective use POG recommendations despite the level of sophistication and commitment of that group. In a rule as complicated as this one, Ecology's picking and choosing of POG recommendations has, in the past, resulted in confusion and unintended or unforseen consequences that do not facilitate cleanups.

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We also hope that Ecology will address the Port's comments with detailed attention, as we have invested a significant effort in their development. We look forward to receiving Ecology's specific written responses to each of our comments.

If you have any questions concerning these comments, please call me at (206) 728-3731. Thank you for your efforts.

Very truly yours,

Tom Newlon

Thomas A. Newlon
Senior Port Counsel

Cc: Elizabeth Leavitt
Warren Hansen
Linn Gould

2455 (memo)

PRESTON GATES & ELLIS LLP
ATTORNEYS

MEMORANDUM

To: Thomas A. Newlon
Port of Seattle

From: Brian K. Knox

Date: October 27, 2000

Subject: MTCA Rules' Requirement that "AKART" be Provided for Groundwater Flows that Enter Surface Water

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Introduction

The current MTCA Regulations provide for a conditional point of compliance in surface water for sites where affected groundwater enters surface water. A condition of establishing such a point of compliance is that the "[g]round water discharges shall be provided with *all known available and reasonable methods of treatment* prior to release into surface waters . . ." WAC 173-340-720(6)(d)(ii) (emphasis added). "All known available and reasonable methods of treatment" – often referred to as AKART – is a term for technology-based treatment requirements for water discharges under Washington's water quality laws and regulations.

This categorical requirement of AKART is unusual within the MTCA rules. Rather than specifying individual standards that must be applied to cleanup actions, MTCA typically uses a flexible mechanism to apply any requirements that are either "legally applicable" or "relevant and appropriate." Over the years, the categorical AKART requirement has created confusion for MTCA cleanup decisions. The MTCA Policy Advisory Committee recommended in 1996 that it be clarified and eliminated if allowed by law. *Final Report of the Model Toxics Control Act Policy Advisory Committee* (Dec. 15, 1996), p. 35.

Ecology's recently proposed revisions to the MTCA Regulations propose modifications to the AKART requirement, but do not eliminate it. Proposed Changes to the Model Toxics Control Act Cleanup Regulations (Wash. Dept. of Ecology, Dec. 16, 1998) (proposed WAC 173-340-720(10)(d)(i)(D)).

You asked us to analyze the AKART requirement as it relates to MTCA's other provisions and as it applies in the cleanup setting, and to comment on the proposed changes to the AKART section in light of those relationships.

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Summary

Because AKART is normally applied to intentional, ongoing discharges of wastewater, it serves awkwardly (if at all) as a means of requiring "treatment" of naturally-occurring flows between groundwater and surface water. Worse, the AKART requirement conflicts with the application of MTCA's complex remedy selection criteria.

Fortunately, nothing would be lost if the AKART requirement were eliminated from the MTCA Regulation. By law, all MTCA cleanups must comply with all standards that are either legally applicable or relevant and appropriate to the site in question. If AKART is "applicable" or "relevant and appropriate" for a particular cleanup site, AKART will be applied, with or without the mandate in WAC 173-340-720(6)(d)(ii). In cases where AKART is not appropriate, it should not be mandated by rule.

Analysis

I. AKART is ill-adapted for application to naturally-occurring flows of groundwater to surface water.

Anyone proposing to discharge wastewater into Washington's waters must first obtain a permit. Such permits require, among other things, that the discharger determine and provide "all known, available, and reasonable methods of treatment." *See* RCW 90.54.020; 90.48.010; 90.54.020(3)(b). AKART is a technology-based approach used to control the adverse effects of pollutants in wastewater effluent. *See Permit Writer's Manual: Procedures for Writing Wastewater Discharge Permits,* p. IV-31 (Washington Dept. of Ecology No. 92-109) (July 1994) (hereinafter, *"Permit Manual).* AKART is preventative in nature, and is intended to prevent water pollution that would otherwise result from ongoing discharges.

In practice, permit applicants determine AKART for their effluent by hiring an engineer to survey appropriate technologies. *Permit Manual, p.* IV-31. Because AKART involves both a technology and and economic component, the engineer analyzes the effectiveness of available forms of treatment technologies, and determines whether they would be economical. *See Permit Manual,* p. IV-31.

Under the state's water quality laws, AKART would not typically apply to the flow of groundwater to surface water. Instead, AKART is applied to control the effluent from discrete, manmade conveyances such as pipes, wastewater outfalls, and drainage ditches. All such conveyances are point sources of wastewater. *See, e.g.,* WAC 173-220-020 ("No pollutants shall be discharged to any surface water of the state from a point source . . ."); WAC 173-220-030(18) ("'Point source' means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. . .").

The naturally-occurring connections that occur between groundwater and surface water are a different matter. Whereas "point sources" that are subject to AKART include "discrete fissures," groundwater flows to surface water are anything but discrete.[1] Unlike pipes or ditches, they are not constructed by or otherwise controlled by people. They are naturally occurring and are characterized by their lack of discrete form. In practice, if the groundwater which flows to surface water becomes contaminated, people do not apply for, nor does Ecology normally require, permits to authorize the groundwater to enter the surface water.

The practical problems encountered in trying to apply AKART to groundwater flows derive in part from the differences in purpose between the water quality laws and MTCA. The water quality laws are preventative in nature, and are intended to preserve the quality of the state's waters. They are designed to prevent harm from happening over time, by placing conditions and controls on authorized, ongoing discharges. MTCA, by contrast, seeks to address the harmful affects of accidental and unintended discharges. *See* WAC 173-340-100 (MTCA rules intended primarily to address the releases of hazardous substances caused by past activities). Such releases are in most cases unintended and accidental, or they occurred before the harmful effects of the discharge were understood. MTCA serves a different overall goal than the water quality laws, so it is not surprising that the categorical requirement that AKART is anomalous in the cleanup setting.

The very poor fit between AKART and most groundwater to surface water discharges is one of the reasons that MTCA's categorical AKART requirement has caused so much confusion. AKART is simply the wrong tool to apply categorically to naturally-occurring flows from groundwater to surface water.

II. The categorical requirement of providing AKART for groundwater to surface water migrations conflicts with MTCA's decision-making standards for cleanups.

MTCA's current AKART requirement also creates conflict with the substantive provisions which form the heart of the MTCA Cleanup Regulation. MTCA relies upon a system of complex, inter-related standards to balance the various factors bearing on cleanups, including technology, permanence of remedy and cost. A categorical requirement that AKART be applied interferes with the flexible analysis and the complicated balancing function that the MTCA provisions normally provide.

For example, MTCA has specific standards addressing the use of cleanup technologies. WAC 173-340-360(4). In the MTCA context, application of AKART causes a problem because

[1] It may be possible to have a groundwater discharge that would also be a point source, for example, if a below-ground collection pipe were to gather groundwater and direct it to a surface water body. AKART might be applicable to such a conveyance. As discussed in Section III of this memorandum, however, AKART would be applied to such a feature as an ARAR in any event, with or without the categorical requirement for AKART currently dictated by WAC 173-340-720(6)(d)(ii).

AKART is itself a technology-based standard. Having two separate technology standards which address technology in different ways leads inevitably to inconsistent decisions.

MTCA also specifies that MTCA cleanups "use permanent solutions to the maximum extent practicable." WAC 173-340-360(3) & (5). Indeed, an entire subsection of the MTCA Rules defines exactly how the permanence requirement must be met. WAC 173-340-360(5). The current regulation's inflexible requirement that AKART be applied sets up potential conflicts with MTCA's permanent solution requirements. In a given case, a treatment technology could be identified that constitutes AKART, but it may be inconsistent with the MTCA criteria for a permanent solution. The current MTCA Regulations do not say which of the two should override.

Finally, AKART and MTCA clash as to how costs are factored in. Both MTCA and AKART have specific formulations for dealing with cost issues. Not surprisingly, they are different. MTCA provides that permanent solutions be used to "the maximum extent practicable." WAC 173-340-360(5)(a). AKART requires that known and available technologies be used if "reasonable." *See, e.g., Permit Manual,* pp. IV- 46 – 84 (38-page section on how to determine "reasonableness" for purposes of AKART.) If a particular technology is "reasonable" under AKART, but not "practicable" under MTCA, what is a site manager to do? Site managers cannot manage to two different decision criteria. They cannot reach consistent decisions if they have to apply inconsistent and conflicting standards. By setting forth a separate standard that clashes with MTCA's criteria for technology, permanence, and cost, the MTCA AKART requirement confuses cleanup decisions.

III. The confusion caused by the categorical AKART requirement of WAC 173-340-720(6)(d)(ii) could be easily avoided, because even without the categorical AKART requirement, existing MTCA regulations would require AKART in appropriate cases as either a "legally applicable" or "relevant and appropriate" requirement.

MTCA cleanups must, by law, comply with all substantive legal standards provided by laws and regulations other than MTCA. RCW 70.105D.030(2)(e); WAC 173-340-710(1)(a). This is one of MTCA's fundamental requirements.

Such requirements are applied in MTCA cleanups either as "legally applicable" standards or as "relevant and appropriate standards." WAC 173-340-710(1)(a). Using these criteria, MTCA reaches out to identify and apply not just the required provisions from other environmental laws, but also those that, while not formally required, are appropriate to a particular site's circumstances. "Applicable" and "relevant and appropriate" standards are known as "ARARs".

As part of the MTCA process, ARARs must be identified for each site. WAC 173-340-710(1)(b). ARARs are derived by means of a case-by-case analysis, accomplished by using the

specific set of facts involved at the cleanup site. *See* WAC 173-340-710(3) (analysis of ARARs geared toward determining appropriateness "to the particular site").

AKART could be required with respect to a given cleanup either as legally applicable or relevant and appropriate. Whether AKART should be so required, however, depends on the particular facts. ARARs for water quality would depend on the answer to such questions as, "Does this site involve a point source from which pollutants are discharged to the waters of the state?" The current MTCA requirement for AKART, however, answers the question before it can be asked, requiring AKART by rule without regard to the site's particular circumstances. Once again, the categorical requirement to apply AKART runs head-on into a fundamental MTCA requirement, in this instance, the use of a case-by-case analysis to determine applicable or relevant and appropriate standards.

IV. The recently proposed changes to MTCA's AKART requirement fail to solve the underlying problem, and would confuse the meaning of AKART in other settings.

As discussed above, the current version of WAC 173-340-720(6)(d)(ii) creates three problems:

- ξ ***first,*** it forces application of AKART to a type of discharge to which it is not adapted;
- ξ ***second,*** it introduces a second (and different) set of decision criteria into the remedy selection process, which in some cases can conflict with the MTCA's existing criteria; and
- ξ ***third,*** it is redundant in requiring AKART, because AKART would be incorporated as an ARAR in appropriate cases.

The proposed changes to the Regulation attempt to address only the first problem. They do so by re-defining AKART for the specific purpose of the section of the Regulation. The proposal would add the language underscored below:

> Ground water discharges shall be provided with all known available and reasonable methods of treatment prior to release into surface waters. <u>For the purposes of this chapter only, selection of a cleanup action that is permanent to the maximum extent practicable under this chapter and that uses at least ground water containment measures to eliminate or minimize releases to the surface water shall be considered to have met this requirement. This is not intended to preclude persons conducting cleanups from demonstrating that other remedies meet AKART.</u>

Proposed Changes to the Model Toxics Control Act Cleanup Regulations (Wash. Dept. of Ecology, Dec. 16, 1998) (Proposed section 173-340-720(10)(d)(i)(D)).

This approach would only compound the confusion, however. AKART is itself a complex concept in water quality laws and regulations. There are judicial and administrative decisions interpreting it, and the *Permit Manual* devotes an entire subchapter (IV.3) to its meaning and application. It makes no sense to adopt such a broad, pre-established concept from other regulatory programs only to redefine it for purposes of MTCA. Having a "MTCA version" of AKART would likely result in confusing the concept of AKART for water programs and MTCA alike.

As discussed above, there is no reason to have a special AKART requirement within MTCA's implementing regulations. Where the confusion could be solved by eliminating the section entirely, there is nothing to be gained by creating a special definition of AKART.

Conclusion

To enable site managers to apply the AKART requirement consistently, and in accordance with MTCA's overall remedial purposes, the categorical requirement of AKART should be deleted. Site managers are always empowered, indeed required, to specify AKART as an ARAR based on their case-by-case analysis of a particular site.

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ATTACHMENT I

PORT OF SEATTLE COMMENTS ON THE PROPOSED AMENDMENTS TO MTCA AS REFLECTED IN THE AUGUST 2000 "HIGHLIGHTED CHANGES" VERSION OF THE RULE.

October 27, 2000

The Port of Seattle has provided written comments and input to the MTCA revision process in four previous memoranda:

Subject	Date	Author(s)
Comments on Draft MTCA Regulations	February 1, 1999	Thomas A. Newlon
Port of Seattle Comments Concerning Proposed MTCA Rule (12/14/98 draft)	February 12, 1999	Elizabeth Leavitt Thomas A. Newlon
Additional Port of Seattle Comments on MTCA Draft Rule	April 2, 1999	Thomas A. Newlon
Evaluation of Responses to the Port of Seattle Comments on the December 1998 Draft Proposed Amendments to MTCA (Attachment I) and New Comments (Attachment II)	January 17, 2000	Thomas A. Newlon

At this late date a number of previous comments remain unaddressed. For this reason, we have organized our comments as follows:

I. **Focused and New Issues (page 2)** – While all comments in this and previous memoranda are important, we believed it would be useful to organize certain comments under "focused" issues. These encompass previously-identified issues and comments that may have been "lost in the shuffle". This section also discusses new issues previously unidentified in our earlier comments.

II. **Other Comments Not Addressed (page 8)** - These are numbered in accordance with our original numbering system used in our earlier comment memoranda. They include those remaining issues not touched upon in (I) above. Several of the comments in this and the previous section make reference to comments developed by the TPH Project Oversight Group (POG). We are attaching the POG comments (Exhibit A) for reference.

III. **Comments Addressed (page 20)** - These earlier comments are included at the end in order to preserve a complete record. We thank Ecology for incorporating these earlier comments.

Where possible, we have included additional explanation in the event our earlier comments were not clear or readily understandable. We encourage Ecology to contact Tom Newlon, Warren Hansen (of Onsite Enterprises) or Linn Gould (of ERDA Environmental) if you need questions answered or clarifications concerning these comments. This memorandum includes all previous comments, except as otherwise noted, and may serve as the basis for Ecology's response.

I. FOCUSED AND NEW ISSUES

The following focused and new issues are addressed in this section:

1. **Point of Compliance**
2. **AKART**
3. **Institutional Controls**
4. **Dilution, Natural Attenuation, Biodegradation and "Active Remedial Measures"**
5. **Interim Actions**
6. **TPH Overview**
7. **Requirements for Confirmatory Soil Sampling**
8. **Recontamination by Area Background and "Technically Possible Concentrations"**
9. **Site Definition**
10. **Nonpotability and Site Proximity to Surface Water**

[Page numbers and rule citations in this section refer to the "Document Highlighting Changes to the 1999 Proposed Rule Amendments – Ecology, August 2000]

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1. POINT OF COMPLIANCE

Background and General Comments

During the PAC deliberations, point of compliance issues were identified as key components of a package of changes designed to stimulate brownfields cleanups. *See* PAC Report at 34, 37. Ecology was instructed to allow for points of compliance beyond property boundaries to facilitate areawide cleanups, and to allow for offsite and groundwater/surface water interface points of compliance in situations that were specified in some detail in the PAC Report and deliberations.

The provisions of 720(8)(d)(ii) related to "sites near, but not abutting, surface water" are faithfully reproduced from our small group discussions and agreement on this topic. The PAC's desire was to allow for off-property points of compliance as a mechanism to help out with difficulties that arise most frequently in urban/industrial areas with small parcels and ubiquitous low-grade groundwater and soil contamination. These are the areas that can be profitably cleaned up and restored to productive use if the rules do not throw up too many obstacles. In our earlier comments, we provided Ecology with a copy of an article on encouraging brownfields cleanups that is germane to this topic. We again refer Ecology to that article for background on why over-constraining off-property points of compliance will result in fewer cleanups and less protection for human health and the environment (due to the cleanups that did not occur).

The compromise language in the current draft is quite sensible in that it allows two or more parcels to be combined (with the full agreement of the property owners) and treated in the remedy selection process as if they were one. It does not allow for further spread of contamination between its current extent and a more distant point of compliance, so there should be no concern that it provides a "license to pollute." A mechanism such as that provided for in – 720(10)(d)(ii) is absolutely essential if the pace of cleanups is to quicken in areas such as the Duwamish Industrial Corridor and the Ballard/Interbay Northend Manufacturing and Industrial

Center which have a large number of small property owners. Without the ability to aggregate properties for cleanup decision making, cleanup in these areas will continue at its current moribund pace.

Note also that the Section on Institutional Control (Section 440; Issue 3) could be interpreted in a manner that would conflict with the carefully crafted approach on conditional points of compliance for surface water and for area-wide points of compliance. The corrections and clarifications described under Issue 3 below are necessary to ensure that cleanups employing these tools are not stymied in a manner that would be inconsistent with PAC direction to Ecology.

A final comment related to sites near surface water: the downgradient property owner is not permitting additional spread of contamination (which is prohibited by the regulation). His property is *already* contaminated. He is giving permission for the remedial decision making process to treat his or her property in an aggregated fashion with one or more upgradient properties in determining cleanup measures to ensure that standards are met at the point of compliance.

2372 **Specific Point of Compliance Comments**

(a). Page 182 720(8)(d)(iii) – **Area-wide conditional point of compliance**

For this part of the rule, the Port seeks clarification in Ecology's response to these comments. Please confirm the following:

(1) The use of the area-wide point of compliance applies to multiple sources of contamination and co-mingled plumes. The fundamental requirements established by the PAC for an area-wide point of compliance designation are contamination from more than one source and commingling of the contamination such that the releases cannot be cleaned up separately.

(2) The use of the area-wide point of compliance does not require identification of sources of contamination not encompassed by the "site" or properties included in the area-wide agreement. Once multiple sources and co-mingling have been identified, the party seeking to establish and use an area-wide point of compliance needs to determine the cleanup measures he will implement to attain compliance at the area-wide point of compliance. He need not perform an RI/FS on the entire area, or identify additional sources of contamination other than that needed to establish that an area-wide problem exists. To require that property owner to identify sources or otherwise characterize the nature and extent of contamination throughout the entire area would be the death knell of area-wide cleanup approaches of the type being pioneered in the Duwamish and BINMIC areas of Seattle. These approaches have been partially funded through EPA Brownfields grants and have included the cooperation and collaboration of Ecology staff. Much discussion of these approaches was carried on in the EAG small group sessions. In those deliberations we agreed that once an area-wide determination is made, all properties need not be cleaned up at once in order for a subset of properties (or a single property) in the area to make use of an area-wide point of compliance.

(3) There may be multiple sites within the area covered by the area-wide point of compliance. This is consistent with an approach that allows for incremental cleanups in urban areas with area-wide contamination problems. To do otherwise (i.e., to consider the entire area one and only one site for all purposes) would completely stymie brownfields cleanups that seek to use an area-wide point of compliance, and be contrary to the PAC's desire to facilitate use of that tool.

(4) The plan discussed in (iii)(B) for implementation of cleanup action need not be a Cleanup Action Plan for all properties that might potentially make use of the area-wide point of compliance. Consistent with our above comments, this plan can relate just to the property seeking to make use of the area-wide point of compliance (that is, a C.A.P. for that property). Similarly, the description of "necessary access" provisions relates to off-property access needed by the property owner seeking to make use of the area-wide point of compliance (e.g., for monitoring, or for cleanup of hotspots that go beyond that property's boundary and must be addressed to meet requirements at the point of compliance).

2373 Pages 20 and 268 – Section 200 (Definitions) and 750(6) – **Point of Compliance.**

This definition on page 20 indicates that a conditional point of compliance is only available for ground water. First of all, this language is out of place and does not belong in the "definitions" section. It should be deleted. Any limitations that Ecology is placing on conditional point of compliance belong in the discussions of point of compliance for each particular medium (i.e., for air and soil where soil is the subject of a containment action).

We disagree with the statement that a conditional point of compliance is only available for ground water, as it should also be available, on a case-by-case basis, for all other media as well.

2374 Page 194 – Section 730(6): Add: "(c) Conditional Point(s) of Compliance at other locations within the surface water may be established on a site-specific basis, as approved by the Department."

2375 Page 268 – Section 750(6): change to:
"(6) Points of Compliance. Cleanup levels established under this section shall be attained:
(a) in the ambient air throughout the site, or
(b) at the site perimeter, if approved by the Department on a site-specific basis."

2376

2. AKART

Background and General Comments

AKART, if used at all in MTCA, should be limited to remedy selection. As reflected in our previous comments, we believe the PAC sought to simplify the remedy selection process by limiting, "to the extent allowed by law," the instances in which an AKART analysis must be included in addition to the basic remedy selection analysis of –360. The draft regulation continues to reflect an unnecessary inclusion of an AKART analysis, contrary to PAC intentions and a clear PAC directive. A more detailed discussion follows.

The draft regulation includes a requirement that a conditional point of compliance is not available unless a demonstration is made that "all practicable methods of treatment are . . . used in the site cleanup." -720(8)(c). This is a remedy selection requirement that has somehow found its way into a section defining conditional point of compliance. This process of sprinkling remedy selection dictates here and there in the regulation outside of the remedy selection provisions is one that Ecology cannot seem to let go of. It is a backhanded way of dealing with policy issues that should be dealt with up front in remedy selection. There is no need for the addition of this language, as the remedy selection provisions make it clear that selected remedies must be protective of human health and the environment and must be permanent to the maximum extent practicable. Achieving these requirements will generally mean that practicable treatment methods will be employed. So at best, the requirement is extraneous and redundant. At worst it will have the effect of causing substantial confusion, and will in some instances require an analysis in addition to the remedy selection analysis already required. This is exactly the type of complication that in reality will add nothing to the protectiveness of the MTCA program and, when added in with other complicating requirements of its ilk, has the potential of turning off the voluntary cleanup tap at some sites. Language in the rule referring to AKART in the cleanup sections should be deleted as recommended under the specific AKART comments below.

The only regulatory justification we have heard for maintaining AKART as a requirement is that an Assistant Attorney General (who does not routinely work in the MTCA arena) determined that AKART is an ARAR. While this question was been before the PAC and the EAG, we repeatedly asked for a written analysis from the Attorney General's office on the subject. We make this request again in these comments; recommending that Ecology obtain this written determination and attach it to their responses.

To date, we are left with an oral report of an AAG's opinion which was rendered about two years ago and nearly *three years* after the MTCA reform process was started. We still have seen nothing in writing. Lacking any kind of analysis on this issue, we earlier asked Preston Gates and Ellis to provide analysis of the question. That analysis was conveyed with our earlier comments. It confirms the view many of us have long expressed on this question: even if AKART is indeed an ARAR in some or even most instances, it is not of necessity an ARAR in *every* instance where discharges to surface water occur. Therefore, its inclusion in the regulation as an absolute requirement is not consistent with the PAC recommendations that its use be limited to the extent allowed by law. Even if you conclude that AKART is an ARAR in every instance you can think of, that would not mandate its inclusion in the regulation. Ecology has not included in the regulation every other substantive requirement that applies in remedy selection as an ARAR, and not including AKART directly in the regulation would be no means obviate the need the provide the analysis when it is an applicable or relevant and appropriate requirement.

2377

Specific AKART Comments:

(a) Page 147 – (706)(1)(a): Use of Method C and AKART.

The language states that "For surface water, ground water and air, Method C cleanup levels may be established where the person conducting the cleanup action can demonstrate that such levels comply with applicable state and federal laws, that all practicable methods of treatment are used, that institutional controls are implemented in accordance with WAC 173-340-440, and etc..." The words "that all practicable method of treatment are used" should be deleted.

2378 (b) Page 180 – (720)(8)(c): **AKART required for Conditional Point of Compliance.**

As recommended in previous comments, the last sentence in (720)(8)(c) connecting AKART with the conditional point of compliance should be deleted. As reflected in the general discussion above, when AKART is determined to be an ARAR at a specific site, its use is acceptable as part of the remedy selection process is appropriate. It should not be required elsewhere in the regulations.

2379 (c) Page 181 – 720(8)(d)(i)(D): AKART for Ground Water Discharges:

This paragraph should be deleted. Note that this paragraph [and all other requirements under (d)(i)] is referenced again under 720(8)(d)(ii) for "Sites near, but not abutting, surface water." It is particularly important that this requirement be deleted for both types of sites (abutting AND near surface water).

2380 (d) Page 192 – 730(4)(a) – Method C Surface Water Cleanup Levels/Applicability:

Delete the phrase "that all practicable methods of treatment have been used..." Derivation of a Method C surface water cleanup level using chemical specific and/or site-specific data should not automatically invoke AKART.

2381 **3. INSTITUTIONAL CONTROLS**

Background: The Port is concerned that the language on page 81, Section 440 of the draft rule regarding Institutional Controls is too inclusive, and that site managers may interpret the language to mean that all institutional controls are required for each site qualifying for such measures. Furthermore, under 440(4) (Circumstances Required), the language appears to
2382 impose institutional controls on every site using a conditional point of compliance. We would like a clarification that in the context of an area-wide point of compliance, this is applicable only to the party seeking to make use of the area-wide point of compliance to receive some form of signoff from Ecology (e.g., no-further-action letter, agreed order, consent decree). In other words, all property owners within the entire area would not need to individually implement one or more institutional controls before any single property owner in the area could receive an n.f.a, agreed order, or consent decree employing an area-wide point of compliance. To require institutional controls on all properties in the area before any one property could move through the process would clearly violate PAC intentions regarding area-wide cleanups, so clarification is needed in the responsiveness summary to avoid future interpretations that would eviscerate area-wide cleanup approaches. To rectify the other problems identified above, the Port recommends the following specific language changes:

2383 Page 81 (440)(1) – **Institutional Controls.**

Change: "Institutional controls include:" to: "Institutional controls may include, but are not limited to:"

2384 Financial assurances should not be included in the institutional controls list as they are not an institutional control *per se*. We agree with the POG on the recommended language change for financial assurances.

2385 Page 56 (360)(2)(e)(i) – **Institutional Controls.**

This language also implies that institutional controls and financial assurances will be required in all instances. We seek clarification that financial assurances should only be required as needed on a site-by-site basis. The "and" in this sentence should be changed to "or".

2386 Page 83 (440)(8)(c) – **Format**

The added sentence, "A potentially liable person must make a good faith effort to obtain a restrictive covenant before using other legal or administrative mechanism" needs to be deleted. This sentence can be in direct conflict with (8)(a), the first sentence in (9), and the new language in (720) (8) (d) (ii) for a number of situations and is not needed as an administrative tool for Ecology.

2387

4. DILUTION, NATURAL ATTENUATION, BIODEGRADATION AND "ACTIVE REMEDIAL MEASURES".

As the rule currently stands, there are many opportunities for misunderstanding what is/is not considered an "active measure" and the constraints placed upon natural attenuation and dilution. The Port is seeking clarification that biodegradation, although considered one of many natural attenuation processes, is an allowable "active measure" and is not excluded as a useful remedial measure. Furthermore, and very problematic for Duwamish-area properties, is the prohibition upon dilution as a sole method for demonstrating compliance.

2388 (a) Page 18, Section 200, Definition of "Natural Attenuation".
The Port recommends changing the last sentence in this definition to: "Natural attenuation other than biodegradation is not an active remedial measure. We also concur with the recommendations made by the POG in Issue 4 (Definitions, Natural Attenuation) (see Exhibit A).

2389 (b) Page 63, 173-340-370, (6) – Expectations for cleanup action alternatives:

> (6) The department expects that, for facilities adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and ground water discharges in excess of cleanup levels. The Department expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances."

This language is troubling, since it implies that even if a facility adjacent to a surface water body is demonstrating compliance with cleanup levels at the point of discharge to surface waters, it must still employ some type of active treatment measure. Dilution of contaminants occurs naturally as part of groundwater transport from upland locations to shoreline areas and is an appropriate factor in meeting cleanup levels. Ecology needs to confirm in their response to this comment that this language refers to "active" or "intentional" dilution of ground water contaminants (i.e., aquifer flooding) for purposes of meeting cleanup levels. Alternately or additionally, the language in 173-340-370 (6) should be changed to:

> (6) The department expects that, for facilities adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and ground water discharges in excess of cleanup levels. The Department expects that intentional or active dilution of surface runoff or ground water will not be the sole method for demonstrating compliance with cleanup standards in these instances."

2390 Page 194, 173-340-730(6), Ecology needs to confirm in written response to these comments that the mixing zone referred to in paragraphs (a) and (b) of this section is in the receiving water body offshore of the upland area where groundwater exists (i.e., it does not refer to any mixing that may occur shoreward or upgradient of the surface water/sediment interface). The definition of "mixing zone in 173-201A-020 is as follows:

"Mixing zone" means that portion of a water body adjacent to an effluent outfall where mixing results in the dilution of the effluent with the receiving water. Water quality criteria may be exceeded in a mixing zone as conditioned and provided for in WAC 173-201A-100.

and appears to confirm this assumption.

2391

5. INTERIM ACTIONS

5) Page 79, 173-340-430(1) - **Interim Actions:**

> "An interim action is distinguished from a cleanup action in that an interim action only partially addresses the cleanup of a site"

This definition is not accurate in that the interim actions do not necessarily "only partially address" site cleanup. A full RI/FS may show that the chosen interim actions result in addressing the total cleanup of the site. The provision should not give the impression that interim actions *always* necessitate further cleanup once further site evaluation is completed. 430(4)(b) states that "Interim actions shall be followed by additional remedial actions unless compliance with cleanup standards has been confirmed at the site." However, this needs to be made clear in the statement of Purpose for this section. Therefore, revise the first paragraph in 430(1) to:

"(1) Purpose. An interim action is distinguished from a cleanup action in that it may only partially address the cleanup of a site. [Note: at some sites, an interim action may be sufficient to be the final cleanup action if it is subsequently shown that it achieved the required cleanup or remediation level and all other administrative requirements are met.] An interim action is:"

2392 **6. TPH OVERVIEW**

Pages 134-137 [700(8)] – Specific procedures for setting cleanup levels at petroleum contaminated sites.

The Port endorses the TPH Project Oversight Group (POG) Comments regarding the TPH Overview included in the attached POG comments (Issue11 – Exhibit A)

2393 **7. REQUIREMENTS FOR CONFIRMATORY SOIL SAMPLING (New Issue)**

Page 208 740(7)(b) - **Compliance Monitoring (Soil)**

A new sentence has been added to this section which is counter-productive to establishing compliance. The Port is aware of several sites where this language does not make sense because the cleanup of soil (typically for volatiles) is being conducted beneath structures to protect groundwater and/or ambient air. In such cases, Section 747(3)(f) Empirical Demonstrations provides an option for making actual measurements of the potentially affected media (i.e., other than direct sampling of soil). Thus, the first sentence should be modified to read: "When soil cleanup levels have been established at a site based on <u>direct contact</u>, sampling etc. "

Furthermore, the following sentence should be added at the end of this section or as a new section: "When soil levels have been established at a site based on protection of groundwater or ambient air, then compliance with this requirement may be demonstrated by monitoring the media to be protected, i.e., groundwater and/or ambient air, rather than directly measuring soil concentrations. "

2394 **8. RECONTAMINATION BY AREA BACKGROUND AND "TECHNICALLY POSSIBLE CONCENTRATIONS" (New Issue)**

Page 60, 360(4)(d) and (e): The last sentence of both of these paragraphs reads as follows:

"In these cases the remedial action shall be considered an interim action until cleanup levels are attained."

The Port believes this language places an unnecessary constraint on cleanup actions. The purpose of subsection 360(4) is to determine whether a cleanup action provides for a reasonable restoration time frame; not to impose further limitations upon remedial actions. It is likely that many sites in areas of elevated background concentrations, or having concentrations "below technically possible concentrations" (i.e., Duwamish/Harbor Island areas) would be unable to achieve any type of near-term closure if this constraint were imposed. The rule needs to be sufficiently flexible to allow for sites where these conditions exist to achieve closure through the employment of one or more institutional controls as provided for in 173-340-440. The language in 360(4)(d) and (e) should have the following added to the end of each paragraph:

"...until cleanup levels are attained or institutional controls as provided for in 173-240-440 to address remaining site concentrations above cleanup levels."

Furthermore, the requirement to consider remedial actions as interim actions where cleanup levels determined under Method C are below "technically possible concentrations" (360)(4)(e) is overly restrictive. This should not be the case where the cost of the most practicable permanent cleanup action (including meeting "technically possible concentrations") is clearly disproportionate [see 173-340-350(8)(c)(ii) – Permanent alternatives]. Paragraph (360)(4)(e) should be amended as follows:

"(e) where cleanup levels determined under Method C in WAC 173-340-706 are below technically possible concentrations, concentrations that are technically possible to achieve without disproportionate cost shall be met within a reasonable time frame etc...."

2395

9. SITE DEFINITION (New Issue)

The definitions of site, facility, and property have become muddied over time and increasingly illogical. This is especially a problem in sections of the rule addressing points of compliance where the Ecology used sites and properties inconsistently with other sections.

The following changes are recommended for clarity:

1. Leave the definition for "Facility" as it stands in the current MTCA; do not change it as proposed. This leaves the definition at least close to the CERLCA definition.
2. Change the "Site" definition to read "Site means a facility where a release or threatened release of a hazardous substance has occurred that poses a threat to human health or the environment, plus those areas beyond that facility where the hazardous substance has come to be located."
3. Change the titles in Section 720 (8) (d) (i) and (8)(d)(ii) to use the word "facility" rather than "sites." This change captures the idea that individual facilities can include those that are either abutting surface water, or near (but not abutting) surface water. In contrast, a site may include both types of facilities.
4. It is not necessary to change "property that may be the source of the contamination" to facility through this section as the intent is sufficiently clear as written.

2396

10. NONPOTABILITY AND SITE PROXIMITY TO SURFACE WATER

The Port seeks clarification regarding the new language in 173-340-720(2)(d) to be sure it is not unnecessarily restrictive in regard to a nonpotability demonstration. In particular, the language in 720(2)(d)(ii) and (iv) require that there be "known or projected points of entry of the ground water into the surface water", and that "The groundwater is sufficiently hydraulically connected to the [nonpotable] surface water that the groundwater is not practicable to use as a drinking water

source."

These requirements could potentially eliminate the ability to use surface water standards on any properties that are not immediately adjacent to the surface water body, as direct observations and/or proof of "points of entry" or "sufficient hydraulic connections" may be extremely difficult to make for these types of sites. This could result in severe limitations on the brownfields cleanup efforts in areas like the Duwamish and BINMIC, resulting in fewer cleanups being completed in these areas.

The Port therefore seeks clarification in written response to these comments that, where a site is within an area (e.g., the Duwamish) where the highest beneficial use of shallow groundwater is discharge to surface water, the requirements for site-specific demonstrations under 720(2)(d)(ii) and (iv) can be waived (i.e. are do not need to be demonstrated for each and every site within the area-wide designation). This approach is in agreement with the general goals and findings of the Duwamish Coalition's Duwamish Industrial Area Hydrogeologic Pathways Project (sponsored by the City of Seattle's Office of Economic Development and King County's Office of Budget and Strategic Planning).

II. OTHER COMMENTS NOT ADDRESSED

The identification and discussion of additional outstanding issues presented by the Port of Seattle (Port) to the Department of Ecology based on the December 1998 draft proposed amendments to MTCA are included below. Following each comment is text contained in a single-line-bordered box describing how Ecology initially addressed the comment in the final proposed amendments, dated November 1999. Note: Page numbers in boxed text refer to page numbers in the Proposed Amendments as published in the November 1999 Publication ECY 99-606 (salmon-colored cover).

Additional comments contained in double-line-bordered boxes describe how Ecology has or has not further addressed comments in the August 2000 draft proposed MTCA amendments. Page numbers in these comments refer to Ecology's "Document Highlighting Changes to the 1999 Proposed Rule Amendments".

2397 2) 173-340-360 **Selection of cleanup actions** (5) Commercial gas stations
The formula here is inconsistent with POG decisions and the TPH tiered/fractionated approach. The equation is incorrect: Dermal is not incorporated and there is no one RfD for petroleum. It would be best to have this equation removed and reference the petroleum equations in sections 740, and 745. It might be best to leave the conditions/expectations here and also cite the exposure parameters that can be changed to calculate this cleanup level (ABW, FOC, DUR, SIR).

Comment 2 Addressed. Rule still needs to be clearer about exposure parameters that can/cannot be changed based on standard/modified approaches.

August 2000: Status unchanged. Clarification of exposure parameters that can/cannot be changed is still needed. This would be helpful in guidance.

2398 7) 173-340-700 **Cleanup standard overview**
(5)(b) Discussion of standard B and modified B as tiers.
It would be very helpful if Ecology could provide a table in the rule that explains the differences between cleanup levels and remediation levels as well as standard and modified methods. A preliminary table is attached and is currently entitled "Exposure and fate and transport parameters that can be changed in deriving cleanup levels and remediation levels". See Attachment A.

Comment 7 mostly addressed. Language describing exposure parameters and those that may be changed has been added to Section 708 (10) on page 160. However, the recommended table was not incorporated and the Port still believes that the use of a table to clarify allowed changes for the different standard and modified methods would help Ecology meet its obligation to make the rule understandable an more usable by the regulated community.

August 2000: Table not incorporated (minor issue). Table should at least be included in guidance.

2399 8) 173-340-700 (5) – **What methods can be used to set cleanup levels?**
The user does not necessarily have to develop a CSM when using Method A. Method A only requires an identification of involved media. Other methods may require a full CSM development. This distinction should be made.
(b) – states that Method B is the standard method for determining cleanup levels. Method A could also be considered a "standard" method (or routine?). Method B should be described as a procedure for calculating a cleanup level (rather than looking up a cleanup level).

Comment 8 not addressed: The Port recognizes that a conceptual model may be needed for Method A to the extent that one must determine which media to evaluate (soil, ground water, etc.) However, it still needs to be made clear that a detailed CSM is not needed for Method A. Language should be added under (b) so the user understands that Method B (and C) cleanup levels must be calculated (i.e., they are not "look-up" values) in contrast to Method A.

August 2000: Comment still not fully addressed. Ecology needs to confirm that a detailed CSM is not needed for Method A in their response to this comment. Guidance (much needed for the successful implementation of the new rule) should include a discussion of how a CSM is developed for each Method.

2400 11) 173-340-704 – **Beginning under WAC 704 –**
States that Method A may be used to establish cleanup levels at sites undergoing routine cleanup actions as defined in WAC 173-340-200. It is unclear why the use of a particular Method for establishing a cleanup level should be limited to all the conditions set forth under the definition of "Routine Cleanup Action" on page 13 (Section 200).
Recommendation: Improve the definition (mainly the 2nd bullet which relates the acceptability of Method A to the type of cleanup action!), and/or indicate when Method A *should* be excluded: for exposure pathways or unique receptors not considered when setting the Method A CULs.

Comment 11 mostly addressed. An improved definition of "routine cleanup action" has been included in Section 200 (page 111). However, neither the definition nor the language in Section 704 list excluded exposure pathways or examples of unique receptors (other than terrestrial ecological)

August 2000: Status is unchanged (page 143). A list of exposure pathways and examples of unique receptors can be included in guidance.

2401 12) 173-340-708 **Human Health Risk Assessment Procedures**
HEAST is no longer an acceptable reference for toxicity values. We suggest that Ecology delete the references to HEAST from the rule. See also page 84 of the draft rule.

Comment not addressed. References to HEAST still appear on pages 158 and 159.

August 2000: Comment still not addressed. References to HEAST remain (pages 156 and 157). See the Attached POG Comments: Issue 14.

2402 14 173-340-708 **Human Health Risk Assessment Procedures**
(3) RL's vs CULs. This section is confusing. Consider separating the two sections to explain what parameters can be used for CULs and what can be used for RLs. See Attachment A for this presented as a table. See comments on RLs above.

Comment 14 partially addressed. Additional language has been provided on page 160 (10)(b) explaining exposure parameters for (i) cleanup levels and (ii) remediation levels. However, the recommended table was not included and this would be extremely useful.

August 2000: Table not incorporated (minor issue). Table should at least be included in guidance.

2403 15) 173-340-708 **Human Health Risk Assessment Procedures**
(7)(f) references EPA guidance documents for deriving toxicity values. This language should be broadened to allow use of TPH RfDs developed by the POG and Ecology.

Comment 15 not addressed. Ecology needs to advise the user as to the appropriate source or RfDs for TPH.

August 2000: Comment not addressed. This language essentially unchanged. See attached POG Comments (Issue 14 and New Issue 11 – Exhibit A).

2404 18) 173-340-720
"The values for ethylbenzene, MTBE, naphthalene, toluene, TPH and xylene are based on Policy Oversight Group (POG) preliminary recommendations for petroleum cleanup levels" Xylene value is an issue. POG remains silent on Ecology's decision to change xylene number to 1,000 ug/L as opposed to the MCL. Ecology also needs to provide basis for carcinogenic PAHs cleanup level and provide a definition of carcinogenic PAHs in Section 200.

Comment 18 partially addressed. The reference to POG recommendations has been deleted. However, the POG continues to provide Ecology with several comments on the Content of Table 720-1 that are endorsed by the Port. These include the need to provide cleanup values for chemicals listed in Table 830-1.

August 2000: See POG Comments on Table 720-1 (Issue 29 – Exhibit A).

2405 20) 173-340-720 **Ground Water Cleanup Standards**
Bottom of page - "it must be demonstrated that biological degradation of the calculated petroleum concentration would not result in exceedances of the maximum contaminant levels in Chapter 245-290 WAC, such as iron and manganese".
While this is a worthy goal, it will end up being a procedural nightmare for site owners and Ecology. To place it into the rule will shut down petroleum cleanups. The reasons are:
1) Iron and manganese are naturally higher during natural attenuation processes during petroleum degradation.
2) Washington State has naturally high Mn and Fe concentrations in ground water above the MCL.

Comment 20 not addressed. Port continues to encourage Ecology to consider the implications of making these blanket requirements without considering site-specific conditions.

August 2000: Comment partially addressed. Although not indicated in the highlighted text, the reference to iron and manganese has been deleted (page 174). However, language still needs to be added regarding high natural background concentrations (i.e., those exceeding MCLs) and that this type of situation would not require and adjustment of cleanup levels. Add the following language to the end or Paragraph 720(4)(b)(iii)(C): "not otherwise demonstrated to be resulting from naturally high background concentrations."

2406 21) 173-340-720 Ground Water Cleanup Standards (5)(b)(iii) **"Nonaqueous phase liquid limitation."**
For **organic hazardous substances** and petroleum products, the cleanup level shall not exceed a concentration that would result in nonaqueous phase liquid being present in or on the ground water."
The phrase "at the point of compliance" should be added to the above sentence.

Comment 21 not addressed (page 167). This is an extremely important issue to the Port and regulated community. There was never any intention to extend a comprehensive requirement to eliminate NAPL throughout the site. The NAPL limitation has always been considered "hand-in-hand" with the derivation of the cleanup level; and as such must only be met at the point of compliance. This distinction is extremely important and needs to be made clearly in the rule language.

August 2000: Although the phrase "at the point of compliance" has not been added, this is unlikely to be an issue once Ecology incorporates the POG's comment on the Free Product Limitation (Issue 15 – Exhibit A). The Port therefore endorses the POG's comment.

2407 22) 173-340-720(5)(b)(iii) – **upper left:**
The POG agreed that prohibitions should be reworded such that "the cleanup level" must be sufficiently stringent so as not to allow NAPL. This has been done. However, the prohibition should be clarified by stating that "measurable or recoverable" NAPL should not be present in or on the ground water "at the point of compliance." This would clarify

that trace amounts such as a sheen in a bailer are not intended to be addressed by this provision.

Comment 22 not addressed (page 167). The recent proposed language [page 167, (iii)] still refers to "a lack of a film, sheen, or discoloration of the groundwater... [as a means of determining] compliance with this requirement." The Port believes it is the absence of a measurable or recoverable NAPL layer that better indicates compliance, as the other listed characteristics can result from a variety of sources other than elevated petroleum groundwater concentrations in the saturated zone.

August 2000: Comment still not addressed. While the Port recognizes the difficulties posed by trying to define what constitutes "NAPL in or on the groundwater", it still believes the existing definition is too inclusive and will result in mis-interpretation by both Ecology site managers and those responsible for site cleanup. The presence of films, sheens and discoloration can often be attributed to the presence of naturally occurring decaying organic material or other background conditions (i.e., iron) that can discolor groundwater. Such conditions may not be related to the presence, or former presence, of released petroleum hydrocarbons and could result in an inappropriate determination of non-compliance. According to Cohen & Mercer (DNAPL Site Investigation 1993), interface probes can, under ideal conditions, detect NAPL layers that are as thin as 0.01 ft. (approximately 1/8 inch). Detection paste methods "may [also] provide NAPL thickness measurements that are accurate to within 0.01 ft under favorable conditions." The same reference also defines "free-phase NAPL" as an "immiscible liquid existing in the subsurface with a positive pressure such that it can flow into a well..." This criterion could also be considered when determining whether free product is present at a site.
The Port endorses the POG's comment on this issue (Issue 15 – Exhibit A) and recommends Ecology add the criterion of the ability of NAPL to flow into a well as an additional alternate demonstration of presence/absence of free product.

2408 26) 173-340-730(1) – 3rd paragraph on page:
"Where no value is available from published standards, natural background or the practical quantitation limit is used for the cleanup level." This sentence is overly restrictive and represents an unwarranted change in Ecology practice with respect to Method A's applicability to surface water.

Comment 26 not addressed (page 174). Although the language has been changed somewhat [" for a hazardous substance deemed an indicator hazardous substance for surface water under WAC 173-340-708(2) and or which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantitation limit, subject to the limitations I this chapter."]; the language is still overly restrictive and represents a change in Ecology's practice. This requirement should be deleted.

August 2000: Comment still not addressed. Language appears in 730(2)(C)(iii) (page 188). The Port reiterates its comment. See POG Comments (New Issue 2 – Exhibit A).

2409 28) 173-340-740 **Unrestricted land use soil cleanup standards**
Equation 740-2. This soil cleanup level uses exposure parameters that represent a child exposure scenario for carcinogenic effects. This error was made in the current MTCA and should be modified to reflect standard procedures.

Comment 28 not addressed. The same exposure parameters are included in the proposed language as they appear in earlier versions of the rule.

August 2000: Comment still not addressed. The language (page 200) remains unchanged. This error should be corrected so that the equation agrees with EPA Risk Assessment Guidance (RAGs) and practices.

2410 41) 173-340-747 **Deriving soil concentrations for ground water protection,** (4) and (5): What is the non-aqueous phase liquid (NAPL) four-phase partitioning model?
This section provides too much detail in a manner that is too prescriptive. Four-phase model parameters may change, and new modeling methods may be developed. The rule should simply reference the four-phase model as an acceptable tool to be used for TPH (and other organics with Ecology approval). The model involves the use of a spreadsheet (vs calculator) so it makes no sense to place all the equations in the rule. In addition, the equations may change as the model continues to be improved. Finally, the model does not help one develop soil concentrations for ground water protection in the strictest sense. Instead, one inputs a TPH soil concentration (from one's site) and the output is a groundwater value. This value is then compared to an acceptable ground water number. It is an iterative process. One continues to use the spreadsheet until the user finds a TPH soil number that is protective of ground water.
This section should be reduced, with the bulk of the detail saved for guidance. This section should specify the necessary parameters, default values and set the rules for how default values can be modified.

Comment 41 partially addressed. The Port recognizes Ecology's need to provide details regarding the four-phase model. However, Section 747 as presented in the Proposed Amendments is still difficult to understand or apply. The Port endorses the POG's comments and proposed revisions to Section 747 which address a number of these concerns.

August 2000: Although the detail regarding the four-phase model has been retained, Ecology has significantly revised Section 747 and improved its overall organization. The Port endorses those POG comments on Section 747 still requiring attention (See attached POG Comments, Issue 26 – Exhibit A)

2411 43) 173-340-747 **Deriving soil concentrations for ground water protection,** (9) **What is residual saturation?**
This section still does not meet the POG's intent and can be misleading. The logical flow of this process needs to be re-arranged so that it reflects POG consensus. The section should start with introductory language that clearly states when this applies. If Method A CULs have been attained, for example, this should not be an issue. The rule says that if NAPL accumulates on ground water, it must be cleaned up to the extent practicable. The

POG's concern was related to the fact that with the fractionated approach, TPH cleanup levels of 100,000 mg/kg can be calculated. It was the POG's intent to prevent that concentration if it resulted in the accumulation of free product on ground water. This section leads one to believe that in order to prove that NAPL will not form on ground water, one must pass either Table 747-2 or conduct a site-specific measurement or an empirical demonstration. This places a burden of testing on any TPH soil concentration greater than the screening levels in 747-2. This is not what the POG intended. Again, aside from the no NAPL in ground water provision, there is no provision in MTCA that disallows NAPL accumulation in soils. Thus, it is important to explain the intent of this section in (a). It may also be important to provide more clarity in (ii) that there are simple tools available to determine if NAPL is on ground water. For example, if there is a well, is there NAPL in the well? If there is no well, is there a buffer zone between saturated soil and ground water?

Comment 43 partially addressed. Section (5)(a) still needs to include language that 1) excludes Method A, and b) describes the intent reflected in the Port's original comment. The language also needs to emphasize that the Table 747-2 values are screening levels only and are based on "worst-case" coarse sand and gravelly soils and should not be viewed as mandatory cleanup levels.

August 2000: comment partially addressed. Although the language regarding residual saturation has been reorganized in 747(10) (pages 239-241) and more flexibility has been provided to demonstrate compliance (i.e., evaluation of a buffer zone or absence of NAPL in ground water), the exclusion for Method A is still not incorporated. This must be specified. Also, it should be stated that the provisions in 747(10) must be met at the applicable point of compliance, as NAPL accumulation (or presence) is acceptable under certain point of compliance frameworks. Please make the following additions to 747(10)(a):

Add the phrase "at the point of compliance" to the end of the first sentence in paragraph (a).

Add the following to the end of the paragraph: "[Note: Method A soil cleanup levels are established to be at or below the default residual saturation screening levels for petroleum hydrocarbons described in this section. Method A soil cleanup levels are therefore excluded from the further demonstrations free product will not accumulate on or in ground water.]"

2412 45) 173-340-750 **Cleanup Standards to Protect Air Quality**
(b)(ii) "For sites with additional hazardous substances which are deemed indicator hazardous substances under WAC 173-340-708-2 for which there is no value available, cleanup levels for these additional hazardous substances shall be established at the PQL or natural background concentration, subject to the limitations in this chapter." Under the old MTCA, if a sample is detected but no cleanup value exists, the chemical is ignored. The new language implies that anything that is detected needs to be cleaned up to either the cleanup value or the PQL. This may pose a rather significant burden on site owners for air cleanup levels.

Comment 45 not addressed. The language in 750(2)(b)(ii) still refers to natural background and the PQL. This should be deleted.

August 2000: The language in 750(5)(c) (page 268) (and, as now noted and corrected, in the November 1999 version) was modified to state that cleanup levels "shall not be set at levels below the PQL or natural background." This language also appears in sections 720(7)(c) (page 179), 730(5)(c) (page 194), and 740(5)(c) (page 207). Presumably, this change leaves the option for setting cleanup levels higher than PQL or natural background, but this would be extremely difficult (if not impossible) if no basis for a higher cleanup level exists. The reference in the new language to Section 707 is confusing, as no section is present in the new rule. Section 709 only describes the methods for defining background concentrations. In summary, the modified language now leaves the user confused as to the overall applicability of natural background and PQL to establishing cleanup levels and requirements. Our original recommendation stands: the refences to natural background and PQL should be deleted.

2413 48) Table 740-1 **Method A Soil Cleanup Levels for Unrestricted Land Uses**

BTEX, and naphthalene compounds were derived using the 3 phase partitioning approach resulting in lower cleanup levels than the old MTCA Method A. Many people feel that these lowered cleanup concentrations may be impractical to achieve and will cause undue hardship to site owners who use Method A exclusively. The whole purpose of developing the 3 phase partitioning approach was because the calculation of soil ingestion cleanup levels under Method B and C would result in soil concentrations that might contaminate ground water for soluble chemicals. However, there is no evidence that the existing Method A soil numbers are contaminating groundwater. Given this lack of field experience showing that Method A is not protective of ground water, it does not make sense to apply the 3 phase approach to Method A. The approach's default values are extremely conservative and make the Method A cleanup levels impracticably low. However, in Methods B and C, where one has the flexibility to use site specific parameters, the 3 phase partitioning approach is a more logical choice.
The POG had recommended that a survey be conducted to evaluate whether the existing soil concentrations in Method A were causing ground water cleanup level exceedances. The POG still believes it is appropriate to complete this survey before promulgating 3 phase partitioning cleanup values in Method A.
The POG had no input into the lowered PCB cleanup concentration. Footnote p - where is Equation 740-6?

Comment 48 partially addressed. The Port still has reservations regarding the need to significantly decrease the Method A cleanup levels for soil. The following are comments developed by the POG on Tables 740 and 745 and are endorsed by the Port:

1. Footnote c indicates that the cleanup level in the tables is appropriate only for benzene contained in weathered gasoline releases. A Method A soil cleanup number is needed for non-weathered gasoline spills as well as for weathered gasoline. The POG evaluated this matter and determined that the use of the same 3-phase model used by Ecology for

determining the cleanup level for benzene in weathered gasoline would result in the same cleanup level for benzene in fresh gasoline. This is apparently because benzene is the risk driver in both cases. The POG recommends that Footnote c be amended to delete the word "weathered" prior to "gasoline" and to delete the second sentence stating that the value may not be protective of ground water for fresh gasoline. However, the POG recommends that there be an added statement directing owners of sites where there have been releases of benzene as a "pure" or commercial-grade product (i.e., not as part of a TPH mixture) to Section 747 for the determination of soil benzene cleanup levels protective of ground water.

August 2000: The Method A CUL for Benzene in soil has been lowered to 0.03 mg/kg. In view of the difficulties and inordinately higher costs that will be encountered in meeting this cleanup level at TPH sites throughout the state, the Port encourages Ecology to reconsider setting the Method A cleanup level based solely on the models in Section 747 of the rule. Ecology has developed a database for TPH sites where benzene is present in both soil and groundwater and should re-examine and expand this information base (as well as information on site-specific Kd's) to determine whether a higher cleanup level is justified that is still protective. This "special treatment" is warranted for benzene due to its tendency to rapidly weather and partitioning behavior that may vary from that predicted by the conservative models.

2. The POG agrees that soil cleanup levels for ethylbenzene, toluene, and xylenes were calculated correctly for pure products (not mixtures). It is not clear whether the soil cleanup levels for xylenes are based on a risk-based number (or the MCL) in ground water, or on the ground water cleanup level for xylenes given in Table 720-1. Footnote t in Tables 740-1 and 745-1 states that they are "based on protection of ground water for drinking water use..." The POG recommends that Ecology indicate in footnote t precisely what ground water concentration the cleanup levels for xylenes in soil is based on.

August 2000: The footnotes toTables 740-1 and 745-1 now indicate that the Method A soil cleanup levels for xylenes (as well as toluene and ethylbenzene) are derived "based on protection of ground water for drinking water use, using the procedures describe in WAC 173-340-747(4)." However, for xylenes in Table 720-1 (pages 285-286), the footnote bb indicates the ground water cleanup level is "based on xylene not exceeding the maximum allowed cleanup level for total petroleum hydrocarbons and on prevention of adverse aesthetic characteristics.." Ecology needs to clarify that the "maximum allowed cleanup level for total petroleum hydrocarbons" is the value in table 720-1, and not some published "MCL" for TPH.

2414 50) Table 830-1: **Required testing for Petroleum releases**
This table could use some clarification.

6. Footnote (8) should be deleted from the cell for PCBs/Heavy Oils and substituted with a new footnote which requires PCB testing only of heavy oils known to have been historically manufactured using PCBs or historically used in processes/activities known to include PCBs. Examples include transformers, railroad transformers, mining motors, hydraulic systems, heat

transfer systems, electromagnets, compressors, capacitors, switches, and miscellaneous electrical devices.
August 2000: Comment not addressed. Need to include footnote (14) for heavy oils (DROs)

2415 **Issue: Section 7490-7494. Terrestrial ecological evaluation. Ease of understanding of the section.**

The Port understands that Section 7490 is in pilot form and that final rulemaking for this section will not be included in the currently-proposed rule. We endorse a pilot process and find it important that the introduction to 7490 explain PAC intentions. The pilot rule will give Ecology and PLPs ample time to test the current structure of the rule on their sites and propose modifications and clarification as problems arise.

Paul Agid/POS, Doug Hotchkiss/POS and Linn Gould/Erda met with Nigel Blakley on February 11, 1999 to ask questions and discuss the applicability of Section 749 to some Port sites. The following comments are formulated based on that meeting.

Structure of the rule

In general, the Port endorses the concept of a tiered process for ecological evaluations. Ideally, we would like the terrestrial ecological tiered process to look more like the TPH tiered process, which moves from Tier 1 to 3 as a site becomes progressively more complex and site-specific (700(8)). It appears that the eco Tiers 1 and 2 do not increase in site specificity as the site conditions become more complex, which is where our confusion lies. In fact, it is difficult to discern the difference between the off ramps in Tier 1 and Tier 2 because the questions seem to be of equal ranking or priority. Eco Tiers 1 and 2 appear to mix contamination conditions, site setting and physical conditions. We believe it would make more sense if Table 7 were Tier 1 (like a Method A Table or CLARC). Using Table 7 as a Tier 1 off-ramp would remedy a significant current void in the proposed rule by defining the contaminants and concentration levels of significance. If Tier 1 fails, all of the questions asked in current Tiers 1 and 2 could be incorporated into a more comprehensive Tier 2.

Restoration habitats in the Duwamish Corridor

The Port would like to express its concern with the Table 7 value for TPH of 200 mg/kg. We understand that the POG agreed to this value as long as it is **only** applicable to sensitive habitat areas outside of industrially developed zones. We believe that there was no expectation on either the POG or Ecology's part that areas like the Duwamish industrial corridor would have to be concerned about remediating TPH to 200 mg/kg. The Port is currently restoring several habitats along the Duwamish River. Since TPH is ubiquitously above 200 mg/kg in Duwamish industrial corridor soils, the Port would have to conduct Tier 3, site-specific ecological terrestrial evaluations whenever they create an urban habitat mitigation site. Since restoring habitats along the Duwamish is viewed as a positive step in improving the health of the Duwamish and Elliott Bay, it would be detrimental to the environment to see this practice halted because of the need to conduct Tier 3 terrestrial evaluations. We would like to suggest that the currently proposed Method A TPH cleanup level tables (740-1, 745-1) will be protective of wildlife in the Duwamish.

Comment partially addressed. The Pilot Program was completed, and Ecology published a report on it dated November 1999. Therefore, it was not necessary to retain the "Note to Reviewers" in this section. The Port notes that no sites involved entered tier 3 of the terrestrial ecological evaluation and recommends that Ecology expand the pilot project to include at least one Tier 3 site. This would probably require that the site be specifically selected, rather than randomly selected, as was done with the sites included in the pilot project report. In addition, the report does not include a large, unpaved industrial site with more than four acres of TPH-contaminated soil. Such a site would be useful in demonstrating whether such sites, common in the Duwamish corridor, could be eligible for an exclusion from the terrestrial evaluation requirements.

The Port believes the new petroleum cleanup levels for commercial/industrial sites included in Tables 749-2 and 749-3 to be reasonable, although it also recognizes that they reflect values that are within ranges, as opposed to precise values, and that it may be able to refine the cleanup levels as additional scientific information becomes available.

Finally, the Port emphasizes the need to simplify and re-structure the sections of the rule regarding terrestrial-ecological evaluations so they 1) reflect a tiered approach such as that recommended by the POG, and 2) they are more understandable to a broader range of users.

August 2000: The Port still believes Sections 7490 through 7494 could be restructured and simplified so they would be more understandable to a broader range of users. The Port also emphasizes the comments below under "Proposed exclusion for certain regulated facilities" and the definition of "Physical Barriers" (should include gravel surfaces).

2416 Proposed exclusion for certain regulated facilities

The goal of the proposed rule as applied to industrial sites is protection of wildlife. For some industrial facilities, however, federal regulations require strict control of the presence of wildlife due to the extreme risk wildlife poses to human safety. (See, for example, FAR 139.337 which requires development and implementation of mandatory wildlife management planning for airports, and FAA Advisory Circular AC No. 150/5200-33 which establishes, among other things, a 10,000 foot wildlife attractant-free zone around aircraft movement areas.) Due to the significant safety hazards wildlife pose to aircraft operations, these rules require consideration of various wildlife control measures including expulsion, repelling, capture, and destruction. In addition, with respect to issues very similar to those that would arise for such facilities with the implementation of the proposed ecological standards rule, a draft memorandum of understanding between EPA and various federal agencies recognizes that "the creation, restoration, or enhancement of habitat that is designed to attract hazardous wildlife poses a substantial danger to aviation and wildlife and that such habitat is incompatible with safe airport operations..."

As the purpose of the proposed rule is to protect wildlife in and around such facilities, application of the proposal to these facilities would be in conflict with the dictates and intent of existing

federal requirements. To resolve this conflict and the potential resulting increased threat to human safety, the Port proposes that a new subsection, "(e)", be added to the exclusions created in existing section 173-340-7491(1), as follows:

"(e) Sites are located within an operating facility subject to federal or state wildlife management and control requirements designed to eliminate the threat posed by the presence of wildlife to human safety."

Comment not addressed. The Port places special emphasis on this proposal, as it is particularly important and necessary, not only for Port of Seattle facilities, but for aviation facilities throughout the state. Please reconsider its inclusion in the final rule.

August 2000: Comment still not addressed. Ecology needs to again consider this important proposal as it pertains to the safe operation of aviation facilities.

2417 **173-340-720 (7)(b)(iv):**
Ground water flows into surface waters will not result in exceedances of surface water or **sediment cleanup levels** at the point(s) of entry or at any downstream location where hazardous substances may accumulate.

Although the Port agrees that sediments should not be impacted by contaminated ground water that enters surface waters, we are concerned that this new language will be interpreted to require that PLPs "prove the negative" in a context where absolute proof will require unnecessarily elaborate and expensive modeling and sediment sampling. In very many instances, ground water discharges occur through sediment that has been contaminated due to surface sources such as point source industrial discharges or CSOs. This type of contamination is especially common in urban waterways. This ubiquitous background contamination makes proof that ground water discharges will not cause an exceedance very difficult to obtain. We would also like to posit that it is unlikely that sediments are being contaminated if the ground water that flows into surface waters does not exceed surface water cleanup levels. If Ecology has reason to believe that the surface water standards are not adequate to protect sediment quality, then perhaps the surface water standards should be more restrictive. For purposes of MTCA cleanup approvals, we recommend changing this provision to simply state that use of surface water standards is not permitted if the department determines that use of such standards will cause a violation of surface water or sediment cleanup level.

Comment not addressed. Section (9)(d)(i)(D) still mandates that ground water discharges from sites abutting surface water "not result in violations of sediment quality values..." (page 170). The Port continues to strongly recommend this requirement be deleted.

August 2000: Comment still not addressed. 720(6)(c)(I)(E) (page 178) still contains reference to "sediment quality standards."

2418 4. **"Physical barriers"**. Section 749 describes what physical barriers are acceptable to prevent wildlife from using an area. We would like to suggest that a compacted gravel surface could also serve as a physical barrier for eco receptors, particularly at industrial sites.

Comment not addressed. Language in 7491(1)(b) still needs to include reference to a compacted gravel surface.

August 2000: Comment still not addressed. Language should be included in 7491(1)(b) (page 247) including reference to compacted gravel surfaces.

III. COMMENTS ADDRESSED

2419 1) 173-340-360 **Selection of cleanup actions**
A general comment concerning remediation levels - It is difficult to understand when RL's are used, how they are used, what conditions they are used under, etc. One significant problem is that important RL expectations/conditions are distributed throughout the rule. First, there is no explanation in the RL section that the average RL will just be a Method B/C cleanup equation with modified exposure parameters. This is located in the cleanup standards section. Next, the exposure parameters that one is allowed to alter are located in 708, (page 86). Third, there is nothing in -360 that says that RL's require institutional controls until cleanup standards are achieved. This information can found tucked into Section 440(4)(a). All of this information needs to be brought forward into 360.

This comment was addressed in the November 1999 Proposed Amendments to MTCA.

2420 3) 173-340-370 **Cleanup alternatives**
(1)(g) "The department expects that natural biodegradation of hazardous substances may be appropriate at sites where"...

Ecology uses the term "natural biodegradation" when the term "natural attenuation" would be more appropriate here. Natural biodegradation is one of many processes that occur under the whole process of natural attenuation. In the context of TPH, the POG has discussed this to include all types of attenuation, not limited to biodegradation.

This comment was addressed in the November 1999 Proposed Amendments to MTCA.

2421 6) 173-340-700 (2) – **What is a cleanup level?**
Text should be added explaining how a "cleanup level" differs from a "remediation level".

This comment was addressed in the November 1999 Proposed Amendments.

2422 9) 173-340-700 (c) (right column, top):
Language should indicate that the terrestrial ecological risk pertains to *soil* cleanup levels or selecting *soil* cleanup actions.

This comment was addressed in the November 1999 Proposed Amendments.

2423 13) 173-340-708 **Human Health Risk Assessment Procedures**
The bullet on BCF and the octanol water partitioning coefficient is not recommended by the POG as stated on this page.

This comment was addressed in the November 1999 Proposed Amendments.

2424 16) 173-340-708 (9) **Bioconcentration factor**
The use of BCF and OW partitioning coefficient is not workable for all chemicals. This section needs to be broadened to have more flexibility to use additional literature information and/or empirical testing.

This comment was addressed in the November 1999 Proposed Amendments.

2425 17) 173-340-708 **Human Health Risk Assessment Procedures**
(10)(c) This section assumes what exposure pathways are. It might be helpful to clarify this section by adding a conceptual site model discussion into this section. There is currently a definition on page 7 that could be brought back into this section.

This comment was addressed in the November 1999 Proposed Amendments.

2426 19) 173-340-720(3)(a)(ii) –
At some locations, extraction of groundwater for a potable supply could result in rapid intrusion of water containing high dissolved solids; even through this condition might not currently exist. Comment: Allow for a demonstration of likely rapid salt water intrusion as another means of evaluating the aquifer as a potential drinking water resource.

Comment 19 not addressed. The Port continues to maintain that Ecology should consider aquifers that would be readily degraded by salt water intrusion if tapped as a potable supply should be included in the evaluation [page 164, 720(2)(b)].

August 2000: Comment addressed. Changes to the language on page 171 appear to have addressed this issue, particularly under 720(2)(d)(iv) where consideration of nonpotability includes: " the ground water is sufficiently hydraulically connected to the surface water that the ground water is not practicable to use as a drinking water source."

2427 23) 173-340-720 – right column, near bottom (8)(a)(ii):
The criteria in provisions **(6)** (b)(v), (vi) etc. The appropriate cross reference appears to be to **(7)**(b)(v), (vi) etc. Same reference occurs again on page 100, near bottom of left column.

This comment was addressed in the November 1999 Proposed Amendments.

2428 24) 173-340-720 **Ground Water Cleanup Standards** (8) What are the cleanup levels for non-potable ground water? (b)(ii)
Cross reference to (6)(b)(v)-(viii) is to subsections that do not exist. Did Ecology intent it to be to (7)(b)(v)-(viii)?

This comment was addressed in the November 1999 Proposed Amendments.

2429 25) 173-340-720(d)(iii)(A) **(When it is appropriate to allow for dilution):**
Site specific factors should not include dewatering during construction or maintenance activities if they are non-routine. Cleanup levels need to be based on predictable site components. Special construction or maintenance-related issues can be addressed through other regulation and permitting processes.

This comment was addressed in the November 1999 Proposed Amendments.

2430 27) 173-340-740 **Unrestricted land use soil cleanup standards**
3rd full paragraph in first column - "For leaching or vapor exposure, the cleanup level applies throughout the site since leaching or vapor movement could occur at any depth." The provision should apply only to vadose zone soils.

Comment 27 addressed for vapor, not for leaching. The relevant language still appears on page 183, (6)(b) and (c) under Modified Method B. According to (6)(b): "soil cleanup levels based on the protection of groundwater shall be established in the soils throughout the site." (6)(c) states: "..for soil cleanup levels based on protection from vapors, the point of compliance shall be established in the soils throughout the site from the ground surface to the upper-most ground water saturated zone..." The latter language should also apply to leaching, since this process also occurs within the vadose.

August 2000: The subject language (page 207) has not changed. However, since leaching (i.e., direct partitioning of contaminants from soil solids to ground water) can occur in the saturated zone as well as the vadose, this comment is satisfactorily addressed and is withdrawn.

2431 29) 173-340-740 **Unrestricted land use soil cleanup standards**
Equation 740-3. The **Exposure** parameter, which actually comprises several parameters needs clarification.

This comment was addressed in the November 1999 Proposed Amendments.

2432 30) 173-340-740: **Unrestricted land use soil cleanup standards**
Equation 740-4. GI absorption efficiency will need an explanation somewhere. See also Equation 745-4 on page 128.

Comment 30 not addressed. A brief paragraph describing the assumptions about GI absorption efficiency could be included in Section 708 under (10) Exposure Parameters.

August 2000: Comment addressed. A definition of "Gastrointestinal absorption fraction" has been added to Section 200 (page 15).

2433 31) 173-340-740 **Unrestricted land use soil cleanup standards**
Equation 740-5. IFS and SFS will need explanation somewhere in the document.

This comment was addressed in the November 1999 Proposed Amendments.

2434 32) 173-340-740 **Unrestricted land use soil cleanup standards**
(v) Soil vapors. The volatile definition here is inconsistent with Table 830-1. Which napthalenes should be sampled for?

This comment was addressed in the November 1999 Proposed Amendments.

2435 33) 173-340-740 **Unrestricted land use soil cleanup standards,** (C)(II) "Sites using Method A soil cleanup levels, but establishing higher soil remediation levels will need to protect....."
This sentence's meaning is unclear. Does it mean – "sites that establish soil remediation levels higher than Method A will need to protect . . . ."?

This comment was addressed in the November 1999 Proposed Amendments.

2436 34) 173-340-740 – left column fourth bullet:
"Using an *active* vapor extraction system etc.." There are *passive* vapor control/barrier systems that are just as effective in controlling vapor intrusion into buildings. This appears to be a remedy selection issue rather than a factor in evaluating cleanup levels. This provision should more appropriately be put in remedy with a cross reference here.

This comment was addressed in the November 1999 Proposed Amendments.

35) SECTION 173-340-745 –
Many of the same technical clarifications are needed for soil cleanup standards for industrial properties as for Section 740.

2437 36) 173-340-745 **Soil Cleanup Standards for Industrial Properties**
Equation 745-3. "*Exposure*" needs better definition.

This comment was addressed in the November 1999 Proposed Amendments.

2438 37) 173-340-745 **Soil Cleanup Standards for Industrial Properties**(D), 2nd paragraph.
The paragraph references equation 745-6, but that equation does not exist.

This comment was addressed in the November 1999 Proposed Amendments.

2439 38) **Equation 747-2:**
Note that the term foc has two means in MTCA. 1) fraction of organic carbon and 2) page 115 (Equation 740-1) frequency of contact. This inconsistency should be resolved.

This comment was addressed in the November 1999 Proposed Amendments.

2440 39) 173-340-747. **Equation 747-2: Definition of Koc:**
Indicates that the Koc values listed in table 747-1 may be used to calculate default Kd values, but table 747-1 lists Kd values for metals only. Do they mean Table 747-4?

This comment was addressed in the November 1999 Proposed Amendments.

2441 40) 173-340-747 **Deriving soil concentrations for ground water protection.**
We understanding that either a TCLP or a SPLP test can be used for TPH. This should be clarified in the rule.

This comment was addressed in the November 1999 Proposed Amendments.

2442 42) 173-340-747 **Deriving soil concentrations for ground water protection,** (8) What is an empirical demonstration and how is it used to derive soil concentrations?, (c)(i) "the soil concentration is less than or equal to the soil value predicted by the empirical demonstration;"
This sentence should be clarified to more clearly state how Ecology expects empirical demonstrations to be performed.

Comment 42 not addressed. The idea contained in the sentence in (d)(iii)(A) [page 195] is implicit and should be deleted to avoid confusion. Also, under (d)(iii)(B), the words "or equal to" should be inserted after "Ground water concentrations must be less than.."

August 2000: Comment addressed. The reference to soil concentration has been deleted from 747(9)(b) (page 239). The reference to ground water concentrations prohibits an exceedance of the cleanup level established under 720. Note that this prohibition should specify "at the appropriate point of compliance."

2443 44) 73-340-750 **Cleanup Standards to Protect Air Quality,** (4) What are the Method A air cleanup levels?
(a) This section is confusing because MTCA does not publish Method A air cleanup levels like tables 720-1, 740-1, and 745-1.

This comment was addressed in the November 1999 Proposed Amendments.

2444 46) 173-340-750 **Cleanup Standards to Protect Air Quality**

General Comment: The POG recommended to Ecology that vapor should be dealt with on a site specific basis because the science is currently inadequate to effectively handle this issue in a rule. Specific Comment regarding Equation 750-3: This equation to develop Method B air cleanup levels for petroleum should probably be deleted. At this time, no method exists to sample and analyze the carbon fractions.

Without a method, provision of an equation makes little sense. Ecology states that the development of a vapor method for the petroleum fractions will be simple. This might be true but the method would still need to be case tested just like the new VPH/EPH methods have been over the past two years. Deleting the equation does not prevent a user from calculating a petroleum air cleanup level if a vapor method is developed in the future.

This comment was addressed in the November 1999 Proposed Amendments.

2445 47) Table 720-1, **Method A cleanup levels - ground water**

Reference TPH footnotes over to Table 830-1 for consistency.

The POG only addressed mineral oils that are not contaminated with PCBs. The ground water cleanup number which includes PCBs is not a POG issue.

Xylenes - It is Ecology's decision, not the POG's, to lower the xylene cleanup value below the MCL for aesthetic purposes.

This comment was addressed in the November 1999 Proposed Amendments.

2446 48) Table 740-1 **Method A Soil Cleanup Levels for Unrestricted Land Uses**

BTEX, and naphthalene compounds were derived using the 3 phase partitioning approach resulting in lower cleanup levels than the old MTCA Method A. Many people feel that these lowered cleanup concentrations may be impractical to achieve and will cause undue hardship to site owners who use Method A exclusively. The whole purpose of developing the 3 phase partitioning approach was because the calculation of soil ingestion cleanup levels under Method B and C would result in soil concentrations that might contaminate ground water for soluble chemicals. However, there is no evidence that the existing Method A soil numbers are contaminating groundwater. Given this lack of field experience showing that Method A is not protective of ground water, it does not make sense to apply the 3 phase approach to Method A. The approach's default values are extremely conservative and make the Method A cleanup levels impracticably low. However, in Methods B and C, where one has the flexibility to use site specific parameters, the 3 phase partitioning approach is a more logical choice.

The POG had recommended that a survey be conducted to evaluate whether the existing soil concentrations in Method A were causing ground water cleanup level exceedances. The POG still believes it is appropriate to complete this survey before promulgating 3 phase partitioning cleanup values in Method A.

The POG had no input into the lowered PCB cleanup concentration. Footnote p - where is Equation 740-6?

Comment 48 partially addressed. The Port still has reservations regarding the need to significantly decrease the Method A cleanup levels for soil. The following are comments developed by the POG on Tables 740 and 745 and are endorsed by the Port: 3. The POG disagrees with item (3) in Footnote q for Total Petroleum Hydrocarbons, allowing for the assumption that PCBs which might be associated with mineral oil would not exceed PCB soil cleanup levels if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs."
August 2000: Comment Addressed
4. The identification of footnotes associated with specific chemicals in Table 745-1 is in some cases inconsistent with the actual footnotes following the tables. For example, toluene is given footnote r in the table, but footnote r describes 1,1,1 trichloroethane. Toluene is described in footnote p. These inconsistencies should be corrected in the final rule amendments.
August 2000: Comment Addressed

2447 50) Table 830-1: **Required testing for Petroleum releases**

This table could use some clarification. There are inconsistencies between what has been required in text vs in this table. PAH testing for DRO's should probably be required. The two row on required analytical testing for Method A are unclear. It is not obvious that one must also sample for BTEX compounds. Footnote (1) is not a POG decision. Note: Teri Floyd is working on a similar table as she completes Task 1 of the Foster Wheeler POG scope of work. The two tables will probably be melded and inconsistencies and confusion will be fixed.

Comment 50 partially addressed. Ecology has provided certain improvements to Table 830-1 in the recent amendments. However, the comments developed by the POG are listed below and are endorsed by the Port: 1. The inclusion of PCBs with mineral oil is inappropriate.
August 2000: Comment addressed.
2. Footnote (8) should be added to the cells for Naphthalenes/Gasoline Range Organics, Naphthalenes/Diesel Range Organics and Naphthalenes/Heavy Oils.
August 2000: Comment addressed.

3. In footnote (12)(b), change "when the inhalation exposure pathway may be required" to "when the inhalation exposure pathway is evaluated" for clarification purposes.
August 2000: Comment addressed.
4. In footnote (12)(c), delete the first sentence if footnote (8) is added to the Naphthalenes/Diesel Range Organics cell, as recommended in item 3), above.
August 2000: Comment addressed.
5. Include naphthalenes with "Volatile Petroleum Components" instead of with "Semivolatile Petroleum Components," because they are defined as volatiles for the purposes of evaluating petroleum in MTCA sections 740, 745 and 750.
August 2000: Comment addressed. Heading changed.
7. Change the title of the row that currently reads "TPH Analytical Methods for Use with Method A cleanup Levels" to "TPH Analytical Methods for Total TPH." Change the title of the row that currently reads "TPH Analytical Methods for Use with Methods B or C (TPH "fractions") to "TPH Analytical Methods for Use with TPH Fractions." These recommended changes are to increase the clarity of the analytical applicabilities.
August 2000: Comment addressed.
8. Delete footnote (10) from the cell representing GRO and Volatile Fuel Additives and Blending Compounds, and add an "X" to the cell. Ecology's own research has demonstrated that these hazardous substances are found in this state, and geographic location of a release is not sufficient for prediction purposes. Therefore, these should be standard analytes when gasoline has been released. (If analyses over time show there is little or no reason for concern, this requirement could be amended/deleted.)
August 2000: Comment addressed.
9. Amend footnote (10) language to make clear that it applies to DRO releases only.
August 2000: Comment addressed. The comment above meant to refer to GRO releases, not DRO releases, and the change has been made ("GRO" added) in footnote (10).
10. Add the following language to the note "Use of Table 830-1" immediately under the table: "An 'X' signifies that the analytical requirement applies to both ground water and soil samples, when those are media of concern at a site."

August 2000: Comment addressed.

2448 51) Figure 720-2 **Point of Compliance for groundwater.**
This flow chart is confusing because it does not set up the conditional point of compliance situation for sites not abutting surface water. In practicality, ground water points of compliance are often switched to a conditional point not to exceed the property boundary. See page 101, 720(10)(c).

This comment was addressed in the November 1999 Proposed Amendments.

2449 52) Figure 740-1 **Soil Cleanup Standard - Unrestricted land use**
This figure is confusing in that it leads one to believe that cleanup levels need to be calculated for the dermal and vapor pathways. The dermal and vapor pathways only have to be evaluated when anything beyond the default parameters are going to be used for the soil ingestion pathway. See page 86 (c). Note: for TPH, the soil ingestion and dermal pathways are combined. Also, any requirement for analysis of vapor and dermal pathways beyond TPH is not based on a POG or PAC recommendation.

This comment was addressed in the November 1999 Proposed Amendments.

2450 53) Figure for 747(5), **Four Phase Partitioning Model Flowchart:**
Step 6 does not agree with the language in the rule as it appears in 173-340-747 (C)(vi) "Step 6: Compare the predicted ground water concentration to the ground water cleanup level..."

This comment was addressed in the November 1999 Proposed Amendments.

2451 Definitions

There are several references to words or definitions in Section 749 which are confusing and the Port recommends clarification:

A1. **"Contiguous"**. The term "Contiguous" is used in 749 without a definition provided. Lacking a MTCA definition, one Port site manager automatically referenced a RCRA (section 260.10) usage of contiguous and concluded that all of his property would be forced into Tier 3:

> On site means the same or geographically **contiguous** property which may be divided by public or private rights-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along the right of way. Non-contiguous properties owned by the same person but connected by a right-of way which he controls and to which the public does not have access, is also considered on-site property.

When we discussed this concern with Nigel Blakley on February 11, he agreed that his concept of contiguous was different from the RCRA one above.

This comment was addressed in the November 1999 Proposed Amendments.

2452 A2. **"Native" and "semi-native" vegetation.** The Port is currently landscaping their sites using native and semi-native vegetation for either visual buffers or restoration of a specific type of habitat. The language needs to be clarified so that sites that are landscaped with native and semi-native vegetation for purposes of softening the "hard look" in industrial areas do not become applicable under 7490. In addition, definitions for "native" and "semi-native" are located in Section 200. Definitions used only in section 749 should be moved from 200 to 749.

This comment was addressed in the November 1999 Proposed Amendments.

2453 A3. **"Site" and "facility".** There seems to be some confusion between what is meant by these definitions in terms of where the contamination is located vs. the area of contaminated soil. The impact would be to switch the focus from a 200 acre property to a 10,000 square foot zone of contamination, not defined by property/ownership lines. We recommend that Ecology clarify its intent in Section 749 for these two definitions.

This comment was addressed in the November 1999 Proposed Amendments.

2454 A4. **73-340-720 Ground Water Cleanup Standards (8) What are the cleanup levels for non-potable ground water? (a)(ii) and (C)(ii)**

The Port recommends adding "potable" to this sentence (a)(ii) so that it reads: "is not likely to flow into potable surface water.

The draft is currently written in a way that excludes shoreline properties and near shoreline properties from a "non-potable" definition. This is inappropriate for marine shoreline properties, since no one consumes marine waters. Non-potable ground water should be permitted to enter non-potable surface waters without first being cleaned up to potability standards as long as applicable non-potable surface water standards are met by the cleanup action.

Comment not addressed. The word potable still needs to be added to the text in Section (7)(a)(ii) (page 169).

August 2000: Comment addressed. The definition of "non-potable" has been removed from the language on page 177. Now, non-potability exists if the ground water is not classified as "potable". Potable groundwater is then defined in 720(2) (page 170) (mostly in terms of non-potability).

EXHIBIT A

TPH Project Oversight Group Review of Proposed Amendments to the Model Toxics Control Act Cleanup Regulation 173-340 WAC, August 2000

This document is an amended version of the TPH Oversight Group's (POG) consensus comments to the proposed amendments to MTCA dated November 1999. The August 2000 proposed amendments have been reviewed and each issue below has been scrutinized to determine whether the POG comments were rejected or accepted in the August 2000 proposed amendments. For purposes of clarity, the original comment is repeated, and the POG's interpretation of Ecology's response to each comment is provided in a boxed format. This attachment also contains 11 new issues that have emerged as a result of the August 2000 version of the proposed amendments. We encourage Ecology to consult with the POG if there are any questions or if clarification is needed.

The POG emphasizes the need for a TPH guidance document. The proposed amendments provide the backbone of the new TPH approach for evaluating and remediating petroleum contaminated sites. However, as companies and consultants have started collecting data and evaluating the new approach, many questions have been raised that cannot be dealt with adequately in a rule format and should be addressed in guidance.

Page numbers cited in the original comments refer to the November 1999 ("Salmon") version of the Proposed Amendments. The pages referenced in the boxed text reflect page numbers in the August 2000 Proposed Amendments highlighted version of the rule issued by Ecology.

Issue 1A
200, Page 10, Definitions, Aromatic hydrocarbons

The proposed definition of aromatic hydrocarbons is

> **...organic compounds that are characterized by one or more benzene rings.**

It is suggested that the definition be changed to the following:

...relatively stable cyclic organic compounds containing a delocalized electronic structure. For purposes of evaluating TPH using the fractionation approach, aromatic compounds include alkyl-substituted compounds such as toluene or 2-methylnaphthalene, but do not include compounds with substitutions by other elements, such as 1,4-dichlorobenzene.

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

The proposed definition of aliphatic hydrocarbons is:

...organic compounds that are characterized by a straight, branched, or cyclic arrangement of carbon atoms.

It is suggested that this be changed to the following:

...Organic compounds primarily composed of carbon and hydrogen, including alkanes, alkenes, alkynes and cyclic organic compounds (such as cyclohexane) which do not contain delocalized electronic structures. For purposes of evaluation of TPH using the fractionation approach, aliphatics include alkyl-substituted compounds (such as 2-methyl pentane) but do not include compounds with substitutions by other elements (such as cis-1,2-dichloroethene).

Comment rejected (page 11). The POG reiterates the need to change this definition; Ecology most likely does not want to include chlorinated compounds in this definition.

Issue 1B
200, Page 12, Definitions, Direct contact

The existing definition of direct contact is:

"...exposure to hazardous substances through ingestion or dermal contact."

It is suggested that this be changed from "ingestion or dermal contact" to "ingestion and/or dermal contact," since ingestion and dermal contact both must be evaluated for TPH-contaminated soil in the proposed changes to MTCA. Dermal contact must be evaluated for other substances under specified circumstances.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

Issue 2
200, page 13, Definitions, Equivalent carbon number

The proposed definition is:

> ...a value assigned to a component of a petroleum mixture, empirically derived from the boiling point of the component

normalized to the boiling point of n-alkanes or the retention time of n-alkanes in a boiling point gas chromatography column.

The POG recommends substituting the word "fractions" for "components," as "components" implies that hazardous substances that may be associated with TPH are assigned EC numbers. The term "EC fractions" is consistent with the manner in which equations for determining TPH cleanup levels are presented in sections 720 and 740.

Comment accepted (page 14) and appropriately revised in August 2000 proposed amendments.

Issue 3
200, Page 17, Definitions, Natural biodegradation

It would be preferable to refer to "human intervention" rather than to "man's intervention" in this definition.

Comment accepted (page 19) and appropriately revised in August 2000 proposed amendments.

Issue 4
200, page 17, Definitions, Natural Attenuation

The definition includes the statement that "natural attenuation is not an active measure."

The POG concurs with an explanation of natural attenuation given in a USEPA policy document ("Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," June 9, 1997), which states that monitored natural attenuation is not a "no action" or "walk-away" solution, but that it may be "an alternative means of remediation that may be appropriate for a limited set of site circumstances." Source control is considered to be a crucial component of remedial actions which must be taken before monitored natural attenuation can be included as part of the final remedy.

The POG recommends that the definition be entitled "Monitored natural attenuation" and that the statement "[N]atural attenuation is not an active remedial measure" be deleted from the definition. The POG views natural attenuation as an important option in remediating certain TPH-contaminated sites, such as those in the Duwamish corridor and other Brownfields areas in the state.

Comment rejected (page 18). The POG wishes to reiterate this comment. We additionally recommend that the final sentence be amended to say: "Natural attenuation *other than natural biodegradation* is not an active remedial measure."

Issue 5
350(12)(d), page 47, Input parameters

This paragraph directs the reader to 173-340-708(10) for "input parameters" that may be modified for establishing remediation levels. The term "input parameters" is not used in 173-340-350(12)(d); rather, the term "exposure parameters" is used. "Input parameters" also is not defined in the definitions section of the rule. The POG suggests replacing the term "input parameters" with "exposure parameters" for consistency and clarity.

Comment accepted (page 54) and appropriately revised in August 2000 proposed amendments.

Issue 6
370(6), page 59, Expectations for cleanup action alternatives

This states that, for facilities adjacent to a surface water body, Ecology "expects that dilution will rarely be the sole method for demonstrating compliance with cleanup standards." This appears to conflict with page 179, 173-340-730(6)(b), which states: "Where hazardous substances are released to the surface water as a result of ground water flows, no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels." The latter is not new language, except that the term "mixing zone" previously was "dilution zone." On page 166, 720(9)(d)(i)(C), which deals with points of compliance for sites abutting surface water, it is stated: "Use of a mixing zone under WAC 173-201A-1to demonstrate compliance with surface water cleanup levels shall not be allowed." Again, "mixing" is a new term, having been substituted for the previous word "dilution."

It is not clear to the POG whether the use of the term "dilution" in the first cited passage means the same as "mixing zone" or something different. This is particularly confusing since the use of "mixing zone" has been substituted for the prior use of "dilution zone" in the second two cited passages. The POG recommends that the meaning of the language in 173-340-370(6) be clarified, in particular as to whether it does or does not conflict with the language in 173-340-720 and -730, cited above.

Comment rejected. This sentence has been adjusted but the terms mixing zone and dilution are still used interchangeably (pp 181, 194) making the language difficult to understand. The POG reiterates the comment.

Issue 7
440(4)(d), page 74, Institutional Controls

This now reads:

> The cleanup level is based on the assumption of land use other than residential, such as industrial or commercial.

For clarification of Ecology's intentions, the POG recommends that the sentence be modified as follows:

The cleanup level is based on any exposure parameters other than residential.

Comment altered (page 81). Section 440(4) is new. See New Issue 1D below.

Issue 8
450(6)(a)(ii), page 81, Releases from Underground Storage Tanks

This requires that a remedial investigation and feasibility study be conducted when "[F]ree product is found". The POG recommends substituting the following language: [when] "[F]ree product removal is not achieved according to (4)(a)."

Comment withdrawn (page 90). Addition of new language satisfies POG expectations.

Issue 9
700(5)(b), page 115, Method B Universal Method

This states that Method B is the "universal method" and can be used "at all sites." There should be a clarification that, for substances for which Method B cleanup levels cannot be calculated, but for which cleanup levels are available in Method A tables, that the Method A cleanup levels are to be used. Examples of chemicals for which Method B cleanup levels cannot be calculated are MTBE in ground water and lead in any medium. There should be a similar provision in 173-340-700(5)(c), which discusses Method C.

Comment rejected. (pp 130-131). The POG reiterates this comment.

Issue 10
700(8)(b)(ii), page 121, Method B and Method C tiered approach

The first sentence reads as follows:

> **This chapter provides for a three-tiered approach for establishing Method B and Method C cleanup levels at sites that involve a release of TPH.**

It is recommended that this sentence be revised as follows (changes in italics):

> **This chapter provides for a three-tiered approach for establishing Method B and Method C tiered cleanup levels *and remediation levels* at sites that involve a release of TPH."**

This will clarify that the TPH tiered approach may be used to calculate cleanup and remediation levels.

Comment rejected (page 135). The POG reiterates this comment.

Issue 11
700(8)(b)(ii)(B)(II) and (III), pp 122, Specific procedures for setting cleanup levels at petroleum contaminated sites

The POG believes that the following sentence, which is present in both subsections, does not add benefit to the discussion of procedures for establishing cleanup levels, and instead could add confusion; and therefore recommends its deletion:

> **Consideration of current and future site uses may be considered in establishing remediation levels.**

Comment rejected. (page 136). The POG did not include this sentence in the TPH Overview, and it was not deleted as recommended. All TPH sites, and presumably all MTCA sites are always considered in context of current and future land uses for establishing *both* cleanup levels and remediation levels. This language is out of place and should be located in Section 700. It is not appropriate to place this sentence in the description of TPH Tiers 2 and 3. The POG strongly recommends its deletion.

Issue 12
702(16)(b), page 126, Criteria for quality of information

This paragraph states, in part, the following:

> When deciding whether to approve or require modifications to the default methods or factors specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or factors, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) Whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community; etc.

It appears that the first two uses of the term "factors" should actually refer to the term "exposure parameters," a defined term in this chapter. The third, generic use of "factors" in this paragraph is appropriate. It is recommended that the first two references to "factors" be changed to "exposure parameters."

Comment rejected (page 141). The first "factor" was changed to "assumption." The second "factor" was not changed. We do not understand Ecology's meaning of the words "factors" and "assumptions". The term "exposure parameters" is, however, in the definitions section. The POG recommends the following language:

When deciding whether to approve or require modifications to the default methods or ~~factors~~ exposure parameters specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or ~~factors~~ exposure parameters, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted: (i) whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community etc.

Issue 13
708(3)(d), page 135, Reasonable maximum exposure

(a) It appears that the word "scenarios" was intended to be placed after the term "potential future site exposure" in the second sentence, but was left out. If this is the case, it is recommended that the word "scenarios" be inserted at that location.

Comment rejected (page 152). The POG reiterates this comment.

(b) It is difficult to distinguish between land use and the exposure assumptions associated with a specific land use in this paragraph. It suggests that one cannot use Method A or B for land uses other than residential and industrial. The following sentences from this paragraph are an example:

Land uses other than residential and industrial, such as agricultural, recreational, and commercial, shall not be used as the basis for a reasonable maximum exposure scenario for the purpose of establishing a cleanup level. However, these land uses may be used as the basis for an alternate reasonable maximum exposure scenario for the purpose of developing a remediation level.

The POG recommends that this language be deleted from the paragraph as unnecessary and potentially confusing to the reader.

Comment rejected. The POG reiterates this comment.

Issue 14
708(7)(f), page 138, Reference doses

The EPA document which should be cited for development of reference doses is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

Comment rejected. The POG reiterates its comment. The sentence in the proposed amendments refers to EPA RAGS to develop RfDs (page 156). The reference is incorrect; the correct EPA document to derive toxicity values is: "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993." It is available on the Internet at <http://www.epa/gov/iris/rfd.htm>.

Issue 15
720(4)(b)(iii), page 158, and 720(5)(b)(iii), page 161, Free product limitation

This free product limitation language applies only to ground water cleanups under Methods B and C, as written. The POG recommends that it also apply to ground water cleanups under Method A. [Note: Additional comments pertaining to this language are included in Attachment I, Issue 16.]

Comment partially accepted. Comment withdrawn.

Background: The free product limitation was recommended for TPH by the POG, as a "safety net" to assure that ground water cleanup levels set in 720 did not result in accumulations of TPH as separate phase product. If NAPL is present at or above the cleanup level, then that cleanup level needs to be re-examined. The NAPL limitation was a way of recognizing that some type of check was needed for TPH mixtures (i.e., mineral oil) where maximum dissolved concentrations might not exceed the allowable risk levels. The POG therefore believes the demonstrations described in the recommended language below are appropriate.

Apply to Petroleum Hydrocarbons Only: The free product limitation language for ground water (page 180) has been moved from 720(4)(C)(iii) (Method B cleanup levels for potable ground water/Petroleum Mixtures – page 177) and modified. In its new location in the rule, it appears to apply to hazardous substances in addition to petroleum hydrocarbons, an enlargement of scope not recommended by the POG. Therefore, the language should be moved to 720(4)(C) and (5)(C) and limited to TPH in its application.

Ground Water Degradation from Non-TPH Sources: The POG has concerns that the language mentioning "sheen, discoloration, sludge and emulsion in the groundwater" could result in serious problems for sites where these conditions might occur due to background or naturally-occurring sources (i.e., peat deposits). The proposed wording below is amended to include "attributable to petroleum hydrocarbons."

The revised language recommended by the POG is as follows:

" (d) For total petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product accumulating in or on the ground water. Any of the following observations of ground water at or above the cleanup level attributable to petroleum hydrocarbons may be used to demonstrate compliance with this requirement: (i) the absence of measurable (1/8-inch) product using an appropriate measuring protocol (a clear bailer, an interface probe, or other devices as approved by the department; (ii) the absence of a film, sheen, discoloration, sludge and emulsion in the ground water; (iii) other site-specific methods approved by the department. Such demonstrations must use procedures to ensure that sampling/observation points have the highest likelihood of observing NAPL relative to the groundwater point of compliance and taking into account the vertical and horizontal migration of the NAPL in the groundwater system."

Note: The measurable product thickness of 1/8 inch is a method used by a number of states in determining whether a product layer is present [personal communication: Charles San Juan, Ecology – results of a recent state-by-state survey of state environmental agencies performed by Eric Sadoyama of Hawaii through the Association of State and Territorial Solid Waste Management Officials (ASTSWMO)].

Issue 16
730, pages 172-181, Surface water cleanup standards for TPH

Ecology has added considerable TPH-specific language that was not recommended by the POG. The POG recommended that, since there are no federal or state surface water criteria specific to TPH, and there are no bioconcentration factors for TPH fractions that would allow for a calculation of a surface water cleanup level, that the ground water cleanup levels for TPH in Table 720-1 (Method A) be the default cleanup level for TPH in surface water for the protection of human health.

The POG offers the following specific comments on the new TPH language in section 730:

1. Add a new paragraph, (iv), under 730(2)(b) (Method A), which reads: "For TPH, a concentration that does not exceed the TPH cleanup levels provided in Table 720-1."

Comment rejected. It is still in 730(3)(b)(iii)(C)(page 190), a paragraph which we recommended deleting. The POG reiterates the above comment and addresses it further in (2) below.

2. Delete 730(3)(b)(iii)(C) and 730(4)(b)(iii)(C). It is not possible to use Equation 720-1 for TPH since bioconcentration factors for the fractions are unavailable, and it is unnecessary to have a separate subsection for hazardous substances that may be associated with the TPH, because they are covered in 730(3)(b)(iii)(A) and (B) and 730(4)(b)(iii)(A) and (B) (surface water cleanup levels for noncarcinogens and carcinogens). The POG also is concerned that the inclusion of this equation for petroleum could be construed to infer that the cleanup level calculated using it (assuming appropriate fraction-specific BCFs are developed in the future) would be protective of human health and the environment. In fact, ecological receptors are more at risk from the presence of petroleum in surface waters than are humans. The POG encourages Ecology to concentrate its efforts to address petroleum and surface water on ecological receptors.

Comment rejected (page 190). The POG continues to strongly recommend that Equation 730-1 (surface water cleanup level calculation for noncarcinogens) not be made applicable for petroleum hydrocarbons for the following reasons:

1) Bioconcentration factors for TPH fractions have not been established, but are necessary for use of the equation.

2) A human health-only surface water cleanup standard is both misleading and unnecessary, and potentially harmful. Even if BCFs become available, use of the equation readily could be construed to imply protectiveness of the resulting cleanup number to surface water receptors in general. Petroleum mixtures are more threatening to ecological surface water receptors than to human surface water receptors (i.e., consumers of seafood); therefore, Ecology should concentrate on the ecological receptors of petroleum discharges to surface waters. Such an effort would also protect human health.

3) State and federal statutory prohibitions on the discharge of petroleum to surface waters based on physical (not quantitative or chemical) criteria have long existed. Before promulgating an equation for the calculation of quantitative, chemical-based petroleum surface water cleanup levels, there should be some assurance on the part of Ecology that such cleanup levels would not be likely to violate the statutory prohibitions on petroleum discharges to surface waters. No such assurances exist at this time; therefore, the POG recommends that the text be revised to eliminate the reference to Equation 730-1 for petroleum, and instead to emphasize the statutory prohibitions as well as the requirement to ensure no adverse effects on the environment, the latter given at 730(3)(C)(ii). The POG agrees with the retention of the reference to the Method A ground water cleanup levels for petroleum as an adequate surface water cleanup level, since their historical use has not demonstrated that they are likely to result in violations of the statutory prohibitions on the discharge of petroleum to surface water.

Issue 17
730(b)(v), page 176, Free product limitation

The free product limitation language written by Ecology for ground water cleanup levels has been incorporated into surface water cleanup levels. The POG is concerned that among other things, allowing the use of TPH solubility limits for complying with the free product limitation, instead of just physical observations of sludges, emulsions or sheens, could undermine, or give the impression of undermining, the federal and state prohibitions on petroleum releases to surface water, which rely specifically on those physical observations. The POG recommends that the following changes be made:

1. Change "petroleum products" to "TPH" or "petroleum hydrocarbons" to comport with the definitions in the rule.

Comment accepted. Deleted on pp 190-191. Moved to section 730(5)(d) page 194.

2. Delete the word "discoloration" in the second sentence, as it is an inappropriate criterion for a surface water standard.

Comment rejected. Water discoloration, as well as films and sheens, can result from natural processes as well as released contaminants. The POG believes that significant inconsistency exists in how free product is determined and/or remediated at various sites and that clarifying language will be of assistance to MTCA users. The POG recommends the following clarification to the free product limitation language in section 730(5)(d) (page 194).

(d) Free product limitation. For ~~organic hazardous substances and~~ petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in free product being present in or on the surface water. Physical observations of surface water at or above the cleanup level, such as the lack of a film, sheen, discoloration, sludge or emulsion attributed to the released

organic petroleum hydrocarbons in the surface water or adjoining shoreline, may be used to determine compliance with this requirement.

The POG recommends this language only be applied to petroleum hydrocarbons (see similar justification for the free product limitation for ground water (Issue 15).

3. The third sentence reads: "The solubility limit for the hazardous substance may also be used to determine compliance with this requirement." Petroleum should be excluded from this provision, as the solubility limits of petroleum mixtures in the environment are difficult to estimate accurately, and it is possible that using solubility limits to demonstrate the lack of free petroleum product could result in a violation of the state and federal prohibitions concerning petroleum releases to surface water.

Comment accepted for surface water as reflected in the August 2000 proposed amendments (page 194).

4. The limitation on free product should be applicable to cleanups conducted pursuant to Method A in addition to Methods B and C.

Comment withdrawn (page 194). The Method A numbers are restrictive enough so that they should not result in formation of free product.

Issue 18
730(6)(b), page 179, Point of compliance

The reader is directed to 173-340-720(10)(d) for requirements regarding sites where contaminated ground water flows into surface water. That subsection deals with statistical procedures. It appears that the reference should be to 173-340-720(9), which deals with points of compliance.

Comment accepted (page 194) and appropriately revised in August 2000 proposed amendments.

Issue 19
740(2)(d)(2), page 184, Method A soil cleanup levels

Language should be included to state that sites which have cleaned up to Method A soil levels throughout the site are presumed to have addressed soil vapors. Such language was included in the December 1998 draft proposed amendments but appears to have been eliminated.

Comment rejected (page 198). The POG reiterates this comment.

Issue 20
740(3)(b)(iii)(B), page 188, and 745(5)(b)(iii)(B) page 207

These subsections deal with soil cleanup levels under Methods B and C for carcinogens; therefore, the words "other than petroleum" should be deleted. Cleanup levels for carcinogenic substances associated with a petroleum mixture must be determined using the appropriate equations provided in these sections.

Comment accepted (page 200) and appropriately revised in August 2000 proposed amendments.

Issue 21
740(3)(c)(iii), page 192, Modified Method B soil cleanup levels, Dermal contact

The last sentence in this paragraph states:

> **When conducting this evaluation the following equations and default exposure assumptions shall be used.**

It is recommended that the words "or chemical-specific" be added after "default," because the conditions of Equation 740-4 allow for the use of chemical-specific or default dermal absorption fraction values.

Comment rejected (pp 202-203). The POG reiterates this comment.

Issue 22
740(3)(b)(iii)(C), page 190, and 745(5)(b)(iii)(C), page 209:

The POG participated in the development of the soil cleanup equations for petroleum presented in these subsections, and endorses the inclusion of dermal contact with ingestion in the calculation of cleanup levels for direct contact with soil, for both standard and modified Methods B and C.

Comment accepted (page 203) and appropriately revised in August 2000 proposed amendments.

Issue 23
740(3)(c)(iv)(B), page 194, Modified Method B soil cleanup levels and 745(5)(b)(iv)(B), page 210, Method C industrial soil cleanup levels

An additional bullet item is recommended, as follows, in addition to the others, which delineate when soil cleanup levels can be assumed to be protective of air pathways, as follows:

The conceptual site model indicates that vapors cannot reach receptors.

Comment rejected (page 205-206). The POG reiterates and adds the following clarification to this comment. There may be cases when a conceptual site model shows that the vapor pathway is incomplete. This is a standard risk assessment procedure that would be a helpful tool at sites where potential exposure to vapors is a consideration.

Issue 24
740(3)(c)(iv), page 194, and 745(5)(b)(iv), page 210, Soil vapors for Methods B and C

New language proposed by Ecology for soil vapors incorporated some of the recommendations contained in the POG consensus letter of September 21, 1999. However, important portions were omitted, including the following:

1. **The requirement to evaluate soil vapors when TPH containing less than 8% volatiles by weight is present in soil at levels exceeding 10,000 mg/kg and which meet certain building proximity stipulations was retained from the December 1998 draft proposed amendments. However, there now is no language explaining that, in the presence of more than 8% volatiles, soil cleanup levels will be determined on a site-specific basis. It is recommended that language addressing sites where TPH in soil exceeds 8% volatiles by weight be specifically included in the rule. [Note: It is recommended that the term "petroleum distillates" in these subsections be replaced with the term "total petroleum hydrocarbons." "Petroleum distillates" is not a defined term in the rule.]**

Comment rejected (page 205). The POG reiterates this comment. The user needs to know that the vapor pathway is important when volatiles exceed 8%. The language is unclear as written now. We recommend modifying 740(3)(C)(iv)(A)(I) as follows:

(I) Petroleum Mixtures. Evaluation of soil vapors for sites where petroleum mixtures are released shall be required when the soil cleanup level is based on a condition set forth in 740(3)(C)(iv)(A) and;

(i) The volatile constituents comprise eight percent (8%) or greater of the total mixture by weight; or,

(ii) The volatile constituents comprise less than eight percent (8%) volatile constituents by weight (such as diesel range organics), a potential indoor air pathway exists, and soil cleanup levels exceed 10,000 mg/kg within one foot of: the wall of a structure; bottom slab or a structure; or, conduit that could facilitate transport to a structure.

2. **The POG believes that in most cases where an indoor air pathway is being assessed, that assessment would be protective of ambient air quality. Therefore, the language originally proposed by the POG (excluding the requirement to measure ambient air**

where indoor air is shown to be the more protective point of exposure) should be included.

Comment accepted (page 205) and appropriately revised in August 2000 proposed amendments.

The POG offers the following additional comments regarding the proposed language on soil vapors:

3. The words "other than total petroleum hydrocarbons" should be inserted in parentheses after the words "When the soil cleanup level for a volatile hazardous substance is based on protection of ground water..." in the second bullet items on pages 194 and 210. This is suggested because the first bullet item is specific to the conditions under which soil vapors must be evaluated at TPH-contaminated sites.

Comment rejected (page 205). The POG reiterates this comment.

4. Requirements to evaluate soil vapors should be limited to those sites (and corresponding conceptual site models) where potential vapor exposure pathway(s) are identified and the soil cleanup levels are high enough that indoor air or ambient air concentrations could pose a significant exposure. The current language does not consider whether or not actual pathways are identified, triggering an evaluation based solely on the soil cleanup level.

Comment rejected (page 205). The POG reiterates this comment.

5. Measurement of the soil vapor concentrations: The wording should be changed as follows, for clarification purposes: "... using methods approved by the department, demonstrating vapors in the soil between the source and the point of compliance ~~building~~ would not result in the exceedance of ~~exceed~~ air cleanup levels at the point of compliance established under WAC 173-340-750."

Comment rejected (page 205). The POG reiterates this comment but recommends the following modification to the above: ".... Using methods approved by the department, demonstrating vapors in the soil ~~between the source and the point of compliance building would~~ not result in the exceedance of air cleanup levels at the point of compliance established under WAC 173-340-750."

6.The POG recommends that (740)(3)(c)(iv) and (745)(5)(b)(iv) stipulate which soil exposure parameters may be changed which could result in "soil cleanup levels that are high enough that indoor air or ambient air could become a significant potential exposure pathway." It

appears that only air-filled porosity, dilution factor, inhalation correction factor, soil GI absorption and inhalation absorption are exposure parameters which are allowed to be altered that could significantly impact soil CULs. Other parameters would be allowed only for the determination of remediation levels. It is recommended that this be made clear in the rule language.

Comment rejected (page 205). The POG reiterates this comment.

Issue 25
740(3)(c)(iv)(A), second bullet item, page 194, and 745(5)(b)(iv)(A), second bullet item, page 210, Soil vapors for Methods B and C

The reference to site-specific risk assessment for nonpotable ground water under 173-340-720(8) does not appear to be appropriate to the subject matter. The POG suggests that this should reference 720(7).

Comment accepted and appropriately revised in the proposed August 2000 amendments.

Issue 26
747, pages 215-226, Deriving Method B soil concentrations for ground water protection

The POG has developed suggested changes in the arrangement of how 747 is presented as well as certain specific changes in the requirements and allowances contained in the section. These are presented as Exhibit A, Recommended Language for Section 747. Following is an itemization of the major changes suggested, as they are reflected in Exhibit A:

1. **Re-title Section to indicate it is applicable to both Method B and Method C. There is no reason to exclude the 4-phase model from the Standard Methods (B and C). Modify the available options under Standard and Modified methods so both the 3-phase and 4-phase models are available under each. The logical approach is to allow both models under Standard Methods B and C – used with default parameter values. Site-specific parameter values would then be allowed under Modified Methods B and C. Reorganize the text to reflect this overall approach.**

Comment accepted and appropriately revised in the proposed August 2000 amendments.

2. Where necessary, edit the descriptions of the models and variable definitions to make sure the reader understands they are not limited solely to TPH mixtures. The text should be clear that 4-phase models are applicable only when a substance or substances are present which have the potential to form NAPL. As written, no distinction is made between 3-phase and 4-phase models in terms of applicability (except that the 4-phase model is limited to the modified method). The description of procedures for the use of the 4-phase model should not

be specific only to petroleum hydrocarbons, as it is currently presented in the proposed rule. It should be usable for sites with all manner of potentially NAPL-forming substances. The explanation of elements of the various equations in 747 should be consistent in referring to "each chemical or EC fraction, for TPH" instead of references to "NAPL components" which are confusing as to meaning.

Comment accepted and appropriately revised in the proposed August 2000 amendments.

3. The description of the 3-phase model implies that it can be used for petroleum hydrocarbons. However, as Equation 747-1 is presented, there is no methodology for using TPH fractions. It is suggested that the following language be incorporated after Equation 747-1 "For TPH mixtures using the TPH fraction approach, the three-phase partitioning model should be applied such that the resulting concentrations of individual fractions and associated noncarcinogenic volatile hazardous substances (see Table 830-1) in ground water do not exceed a hazard index of 1.0 Fraction-specific soil organic carbon-water partitioning coefficients and Henry's law constants, as provided in Table 747-3, must be used." A TPH-specific equation could also be provided.

Comment rejected. The POG reiterates this comment.

4. Except for Table 747-2, the subsection on residual saturation should be applicable to all potentially NAPL-forming chemicals.

Comment accepted and appropriately revised in the August 2000 proposed amendments.

5. Under Modified Method B/C: Provide a list of parameters common to both the 3- and 4-phase model, with discussions of how the parameter may be derived (this is done now, but it appears in two places, once under the 3-phase model description, and once under the 4-phase description and there is some lack of consistency). A separate list can follow for parameters specific to an individual model. Be sure the user can readily understand which parameters are considered "hydrogeologic parameters".

Comment withdrawn. The POG expects that this list will be provided in pending guidance.

6. **The text should warn the potential user that mixtures containing chemicals with widely different solubilities may not be appropriate for the fate and transport models, and that serious errors may occur with such use.**

Comment withdrawn. The POG expects that this warning will be provided in pending guidance.

7. The use of Modified Methods B and C for TPH should stipulate that site-specific EC fraction data must be used as inputs to models, i.e., that retrofitting of data or assumptions of product compositions is not permissible. Correlation should be allowed, however.

Comment withdrawn. Retrofitting and correlation are discussed in the TPH overview.

8. Move the prohibition of NAPL to the front of the section, so it is readily apparent and so that it does not need to be repeated in subsections.

Comment accepted and appropriately revised in August 2000 proposed amendments.

9. Check the numbering of the equations and tables. Tables referred to as 747-3 and 747-4 in the text and appearing at the end of the rule are numbered as Tables 747-1 and 747-2. Equations numbered 747-2 and 747-4 are present, but no equation numbered 747-3, although it is referred to in the text (apparently as mistaken references to 747-2).

Comment accepted and appropriately revised in August 2000 proposed amendments.

10. The allowance for empirical demonstrations at 747(4)(d)(I)(A) should specifically include direct measurement of ground water flow rate (Qa), if such data are available.

Comment rejected, page 230-231. The POG believes that empirical demonstrations of Qa should be allowed. It is recommended that an additional paragraph (i) be inserted ahead of the current (i) ("Calculating ground water flow volume) as follows:

(i) **Direct measurements of ground water flow volume.** Direct measurements of the volume of ground water flow (Q_a) using standard geophysical methods or other methods as may be approved by Ecology may be used.

(ii) **Calculating ground water flow volume.** The following equation shall be used, etc.....

Note that the subscripts "a" and "p" in Q_a and Q_p should be subscripted.

11. Table 747-2 (footnote). The footnote indicates the screening levels are "for coarse sand and gravelly soils only." This would seem to imply that it could not be used for silts, clays, fine sands etc. This needs to be changed to indicate that it simply is instructional as to what assumptions were made in deriving the screening levels.

Comment accepted and appropriately revised in August 2000 proposed amendments.

12. Language at 747(3)(b)(iii) describing Leaching Tests: Subsection (iii) should be changed to say that if leaching tests using methods other than those prescribed in (i)(A) and (B) are used, they shall be based on methods approved by the department. As written, all methods must be approved by the department.

Comment accepted and appropriately revised in August 2000 proposed amendments.

13. The subsection on residual saturation should be changed to apply to hazardous substances that can potentially form NAPL, in addition to TPH, with the exception of Table 747-2, which is specific to TPH. Suggested language for this change is included in Exhibit A.

Comment accepted and appropriately revised in August 2000 proposed amendments.

Issue 27
750(2)(b)(ii), page 241, Method A air cleanup levels

This states the following:

> For a hazardous substance deemed an indicator hazardous substance under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background or the practical quantitation limit, subject to the limitations in this section.

This would appear to require that owners of properties where a TPH release to soil has occurred, must measure air concentrations under all circumstances, in order to make a demonstration that soil concentrations have not caused exceedances of TPH in air greater than natural background or PQLs. The POG recommends that this requirement be deleted. It is understood that it is the same language included for Method A ground water, surface water and soil cleanup requirements; however, the POG suggests that the requirement to sample air should require a different threshold than for other media.

Comment accepted (page 264). Ecology decided not to include Method A CULs for air.

Issue 28
750(3)(b)(ii)(C), page 242, Method B air cleanup levels for petroleum mixtures, and
750(4)(b)(ii)(C), page 244, Standard Method C air cleanup levels for petroleum mixtures

These paragraphs require that air cleanup levels for petroleum be calculated using Equation 750-1, adjusting it to account for petroleum fractions and associated volatile hazardous substances. The POG recommends that these paragraphs be deleted unless reliable sampling and analysis methods exist for evaluating TPH in air. Section 830 (Analytic procedures, 173-340-830(3)(f), analytical methods for TPH in air), states that methods will be selected on a "case-by-case basis," implying that no standard analytical procedures exist or have been identified or developed. If Ecology later determines that reliable sampling and analysis procedures exist for evaluating TPH in air, Equation 750-1 could readily be adapted for use with TPH fractions and associated volatile

hazardous substances, if and when such methods become available. Retaining these paragraphs when such methods are unavailable would serve to confuse the owner as to how to comply with MTCA regulations.

Comment rejected (p 266). The POG reiterates this comment.

Issue 29
Table 720-1, Method A Cleanup Levels for Ground Water

1. The POG does not endorse the proposed ground water cleanup levels for Diesel-Range Organics (DROs), Heavy Oils and Mineral Oil, because it believes that Ecology's proposed cleanup levels are not based on SAB- or POG-recommended methods of using a four-phase partitioning model to obtain Method A ground water cleanup levels. This subject is discussed in Exhibit B to this attachment.

Comment rejected (page 285). The POG reiterates this comment and adds the following summary of Exhibit B:

Exhibit B consists of a memo (previously shared with Ecology) setting forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments. We again encourage Ecology to carefully evaluate this issue and develop ground water cleanup levels for these type of TPH mixtures that are based, to the best extent possible, on how these materials dissolve (or do not dissolve) in the water phase.

2. A footnote should be added for TPH that references 173-340-720(4)(b)(iii), the paragraph covering free product limitations for petroleum releases using Methods B and C, as it also should be applicable to Method A TPH ground water cleanups. It also should be included in 720(3), Method A cleanup levels for drinking water aquifers flowing into nearby surface water.

Comment withdrawn (page 285). This footnote is no longer necessary with the proposed Method A cleanup levels.

3. Footnote x (Total Petroleum Hydrocarbons) indicates that the Method A ground water cleanup values are based on mid-range estimates of the composites of the various petroleum

products. The user is directed to Method B or C for products with significantly different compositions. This information is valuable only if the user is directed to a location where the product compositions appropriate to the Method A values is provided. Otherwise, the user would have no way of knowing whether the Method A TPH ground water numbers are appropriate for a particular site. The POG suggests that this information be provided in a table in the rule.

Comment accepted. Paragraph deleted from footnote (page 285).

4. The POG disagrees with the fourth bullet item in Footnote x, which does not require analysis of ground water contaminated with mineral oil if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." Details concerning the POG's disagreement with this are given in Attachment I, Issues 19 and 25.

Comment accepted (page 286) and appropriately revised in August 2000 proposed amendments.

Issue 30
Table 740-1, Method A Soil Cleanup Levels for Unrestricted Land Uses; and Table 745-1, Method A Soil Cleanup Levels for Industrial Properties

1. Footnote c indicates that the cleanup level in the tables is appropriate only for benzene contained in weathered gasoline releases. A Method A soil cleanup number is needed for non-weathered gasoline spills as well as for weathered gasoline. The POG evaluated this matter and determined that the use of the same 3-phase model used by Ecology for determining the cleanup level for benzene in weathered gasoline would result in the same cleanup level for benzene in fresh gasoline. This is apparently because benzene is the risk driver in both cases. The POG recommends that Footnote c be amended to delete the word "weathered" prior to "gasoline" and to delete the second sentence stating that the value may not be protective of ground water for fresh gasoline. However, the POG recommends that there be an added statement directing owners of sites where there have been releases of benzene as a "pure" or commercial-grade product (i.e., not as part of a TPH mixture) to Section 747 for the determination of soil benzene cleanup levels protective of ground water.

Comment partially accepted (page 287). Remainder of comment withdrawn.

2. The POG agrees that soil cleanup levels for ethylbenzene, toluene, and xylenes were calculated correctly for pure products (not mixtures). It is not clear whether the soil cleanup levels for xylenes are based on a risk-based number (or the MCL) in ground water, or on the ground water cleanup level for xylenes given in Table 720-1. Footnote t in Tables 740-1 and 745-1 states that they are "based on protection of ground water for drinking water use..." The POG recommends that Ecology indicate in footnote t precisely what ground water concentration the cleanup levels for xylenes in soil is based on.

Comment partially accepted. The footnotes now specify that the three-phase model [747(4)] was used. However, it is still not clear whether Ecology used Method B or the MCL to derive the target ground water concentration. This information needs to be added to the footnote. One recommended solution is to refer to the ground water CUL in Table 720-1, if this in fact is the basis for the Table 740-1 and 745-1 values.

3. The POG disagrees with item (3) in Footnote q for Total Petroleum Hydrocarbons, allowing for the assumption that PCBs which might be associated with mineral oil would not exceed PCB soil cleanup levels if "it can be documented that the oil released was recently tested and found to contain less than 50 ppm total PCBs." This item is discussed in detail in Attachment I, Issue 19.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

4. The identification of footnotes associated with specific chemicals in Table 745-1 is in some cases inconsistent with the actual footnotes following the tables. For example, toluene is given footnote r in the table, but footnote r describes 1,1,1 trichloroethane. Toluene is described in footnote p. These inconsistencies should be corrected in the final rule amendments.

Comment accepted (page 288) and appropriately revised in August 2000 proposed amendments.

Issue 31

Tables 720-1, 740-1 and 745-1: Derivation of media cleanup levels for carcinogenic PAHs (cPAHs). [Note: this comment was developed with the assistance of Dr. Damon Delistraty, a Department of Ecology toxicologist in the Eastern Regional Office.]

Footnote r in Table 720-1 and Footnote m in Tables 740-1 and 745-1 explain that the cleanup levels were derived based on the cancer potency factor for benzo(a)pyrene (B(a)P) and the assumption that 7 cPAHs "are present in the sample." Discussion with Ecology representatives revealed that the cleanup levels were based on a multiplication of the Method-B derived cleanup level of B(a)P by a factor of 7. This effectively allows for a risk of 7E-6 in Method A, while the Method B cleanup levels reflect maximum cancer risks of 1E-6. In addition, the cancer potency of B(a)P was assumed to represent all of the other six cPAHs; and the mobility of B(a)P through soil was assumed to represent the other cPAHs as well.

The POG has concluded that the cPAH cleanup levels in Method A tables were derived incorrectly. Ecology has proposed in ((708)(8)(e)) to allow for the use of toxicological equivalence factors (TEFs) for the assessment of the cancer potency of cPAHs relative to B(a)P, using the TEFs published by CalEPA. The language in 708 does not limit the use of the TEF approach to Methods B and C (nor should it). Therefore, it should be available to users of Method A tables.

The POG is confident that a single cPAH cleanup number can be given in the three tables, representing the relative toxicity and mobility of the various cPAHs, while offering the owner the

opportunity to evaluate his/her analytical data in a manner which is more likely to result in effective cleanup levels in soil and ground water which reflect the actual contamination at the site. This is not unlike the method proposed for TPH fractions, in which fraction-specific toxicities and (for soil cleanup levels) fraction-specific transport characteristics are accounted for to derive overall cleanup levels. Methodologies for achieving the above for ground water and soil are offered below.

Ground water : The Method A cleanup level for ground water should be 0.012 ug/L B(a)P toxic equivalents (TEQ), based upon the calculation of a Method B ground water cleanup level based on B(a)P alone. This corresponds to a 1E-6 excess individual lifetime cancer risk. Because of the TEF approach to evaluating the cPAHs, they are considered an "individual" contaminant, as opposed to multiple contaminants; and therefore the maximum acceptable risk of 1E-6 is appropriate and is compliant with MTCA policy. The owner should be free to assume that all cPAHs present have TEFs of 1.0, i.e., that they are as potent as B(a)P; but if that TEQ exceeds 0.012 ug/L, the owner has the option of making use of the TEF approach to determine if the TEQ calculated in that fashion exceeds 0.012 ug/L. In that case, the site-specific TEQ would be the sum of the products of the concentration of each cPAH present in the sample and its corresponding TEF. Since none of the other cPAHs has a potency as high as that of B(a)P, the effective cleanup level (in terms of total ug/L of cPAHs) will be higher than 0.012 ug/L, but the B(a)P TEQ of 0.012 ug/L will be preserved, as will the maximum acceptable excess cancer risk level of 1E-6 for an individual carcinogen, i.e., B(a)P, in this case.

Soil : The situation for soils is more complicated because of the soil to ground water leaching pathway, in addition to direct contact (i.e., incidental ingestion). According to Ecology, leaching pathway cleanup levels have been developed for 6 of the 7 cPAHs, using the 3-phase model. The cleanup levels and the CalEPA TEFs are given below:

CPAH	Leaching CUL, mg/kg	CalEPA TEF
Benzo(a)anthracene	0.086	0.1
Benzo(b)fluoranthene	0.43	0.1
Benzo(k)fluoranthene	0.21	0.1
Benzo(a)pyrene	0.23	1.0
Chrysene	0.10	0.01
Dibenzo(a,h)anthracene	0.43	0.4
Indeno(1,2,3-cd)pyrene	Insufficient information	0.1

Using the above, leaching equivalent factors (LEFs) could be derived by ratios, again with B(a)P as the reference compound (to be consistent with TEFs). These would be derived, for example, by dividing the leaching cleanup level for B(a)P by the leaching cleanup level for benzo(a)anthracene to calculate an LEF of 2.7 for benzo(a)anthracene. Next, a composite index for toxicity and leaching would be calculated by multiplying the LEF by the chemical-specific TEF, or 2.7 x 0.1 for benzo(a)anthracene, for an effective "toxicity leaching equivalence factor" or "TLEF" of 0.27. [Note: this is not a standard term but is suggested to help explain this

methodology.] No TLEF can be calculated for indeno(1,2,3-cd)pyrene because a leaching cleanup level has not been derived.

Because Ecology has determined that direct contact is the risk driver, and therefore the basis, for unrestricted soils, the cleanup level for cPAHs would be 0.14 mg/kg B(a)P TEQ, based on the Method B calculation for the ingestion of soil contaminated with B(a)P. For industrial soils, Ecology has determined that leaching is the risk driver. Therefore the Method A cleanup level would be 0.23 mg/kg B(a)P TLEQ.

In order to allow for the derivation of ground water and soil cleanup levels of cPAHs as equivalent to B(a)P, tables giving TEFs (for ground water and unrestricted soils) and TLEFs (for industrial soil) would need to be provided for the user. In addition, a default TLEF for indeno(1,2,3-cd)pyrene would need to be established by Ecology.

The POG recommends that Ecology adopt the above methodologies for establishing Method A ground water and soil cleanup levels based on B(a)P, while allowing for the owner to assess site data more reflective of Ecology's approach to toxicity and leaching. It is recognized that, in certain cases, the PQL could exceed the calculated CUL in soil and/or ground water, in which case, the PQL would be the effective CUL.

Comment accepted, but a direct reference for cPAHs was removed from Tables 720-1, 740-1, 745-1, while a value and footnote for benzo(a)pyrene was added. This change may lead Table A users to believe that one does not have to test for cPAHs other than benzo(a)pyrene. See the POG comment under New Issue 7.

Issue 32
Table 830-1, Required Testing for Petroleum Releases

The POG concurs with the current version of Table 830-1, with the following exceptions:

1. The inclusion of PCBs with mineral oil, as discussed in Issue 19, Attachment I.

Comment rejected (page 304). The POG never agreed to the language in this footnote. It appears that Ecology accepted our request for alteration of the footnote in Tables 720-1, 740-1, and 745-1. The POG requests that footnote 14(3) be changed to comport with the language in Table 720-1(footnote "X") and Tables 740-1 and 745-1 (footnote S), fourth bullet which says:

3) it can be documented that the oil released was recently tested and did not contain PCBs.

2. Footnote (8) should be added to the cells for Naphthalenes/Gasoline Range Organics, Naphthalenes/Diesel Range Organics and Naphthalenes/Heavy Oils.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

3. In footnote (12)(b), change "when the inhalation exposure pathway may be required" to "when the inhalation exposure pathway is evaluated" for clarification purposes.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

4. In footnote (12)(c), delete the first sentence if footnote (8) is added to the Naphthalenes/Diesel Range Organics cell, as recommended in item 3), above.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

5. Include naphthalenes with "Volatile Petroleum Components" instead of with "Semivolatile Petroleum Components," because they are defined as volatiles for the purposes of evaluating petroleum in MTCA sections 740, 745 and 750.

Comment accepted (page 304). The table was appropriately amended.

6. Footnote (8) should be deleted from the cell for PCBs/Heavy Oils and substituted with a new footnote which requires PCB testing only of heavy oils known to have been historically manufactured using PCBs or historically used in processes/activities known to include PCBs. Examples include transformers, railroad transformers, mining motors, hydraulic systems, heat transfer systems, electromagnets, compressors, capacitors, switches, and miscellaneous electrical devices.

Comment rejected (page 304). Comment reiterated.

7. Change the title of the row that currently reads "TPH Analytical Methods for Use with Method A cleanup Levels" to "TPH Analytical Methods for Total TPH." Change the title of the row that currently reads "TPH Analytical Methods for Use with Methods B or C (TPH "fractions") to "TPH Analytical Methods for Use with TPH Fractions."These recommended changes are to increase the clarity of the analytical applicabilities.

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

8. Delete footnote (10) from the cell representing GRO and Volatile Fuel Additives and Blending Compounds, and add an "X" to the cell. Ecology's own research has demonstrated that these hazardous substances are found in this state, and geographic location of a release is not sufficient for prediction purposes. Therefore, these should be standard analytes when gasoline has been released. (If analyses over time show there is little or no reason for concern, this requirement could be amended/deleted.)

Comment withdrawn because it was appropriately revised.

9. Amend footnote (10) language to make clear that it applies to DRO releases only.

Comment accepted. The DRO above is a typo and should have read "GRO".

10. Add the following language to the note "Use of Table 830-1" immediately under the table: "An 'X' signifies that the analytical requirement applies to both ground water and soil samples, when those are media of concern at a site."

Comment accepted (page 304) and appropriately revised in August 2000 proposed amendments.

New POG Issues

The following issues have emerged as a result of revised MTCA August 2000 Proposed Amendments.

New Issue 1- Institutional Controls WAC, 173-340-440, (page 81-82)

Issue 1A Section 440(1) Purpose (page 81)

The POG requests clarification on the last sentence of the first paragraph which reads:
"Institutional controls include:....."
We interpret this language to mean one or more of the items are institutional controls. To prevent the user from thinking that all of the named institutional controls are required, we recommend adding to the sentence to read:

"Institutional controls include one or more of the following:"

Issue 1B, Section 440(1)(e) (page 81)

The POG recommends deleting the following:

"Financial assurances (see subsection (11) of this section.)."

Financial assurances are not institutional controls. Rather, they can be used as mechanisms to ensure that institutional controls will be maintained during the appropriate time frame. Since 440 (11) is titled and discusses financial assurances for institutional controls, deleting the language in 440(1)(e) will not change the mechanisms or requirements for financial assurances. Whereas keeping the subsection (e) in the proposed regulations creates a logical circularity that confuses the reader. For example, the question naturally arises "How can a financial assurance be used to implement a financial assurance?

Issue 1C. Section 440(4) Circumstances required. (page 81)

The POG recommends modifying part of the language in the first sentence to read:

"Institutional controls shall be required for the property ~~to assure both the continued protection of human health and the environment and the integrity of an interim action or cleanup action~~ in the following circumstances."

The POG recommends adding "for the property" because there is a required MTCA-specified process [720(8)(d)(i)(G), 720(8)(d)(iii)(D), 600] whereby other affected property owners must be notified and provided with the opportunity to participate and comment on the decision-making process. The recommended change to incorporate the term "property" is an important one, in that if institutional controls were required for all properties within a

"site," the new approaches for defining points of compliance provided for in the MTCA amendments [i.e., 720(8)] would not be workable. Deletion of the language "to assure both the continued protection of human health and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

Deletion of the language "to assure both the continued protection of human health and the environment" is recommended because it is redundant and already established in 440(g). Deletion of the language "the integrity of an interim action or cleanup action" is recommended because it is already discussed in 440(1) and is repetitive here.

Issue 1D, Section 440(d)

The following language has been inserted into this section:

> "A ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."

The language in 440(4)(d) creates potentially unnecessary requirements for institutional controls for sites where a ground water cleanup level is established using a site-specific risk assessment under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level. Institutional controls and/or deed controls should not automatically be triggered simply because a site exists in an area of ground water nonpotability. Not all ground water cleanup levels must be based on potable criteria. For example, some may be based on the protection of surface water. In all cases, when cleanup levels are approved by the department have been met, no institutional controls should be required. As written, it would require institutional controls at many sites (such as along the Duwamish River and around Harbor Island), even when cleanup levels have been achieved. Therefore, the POG recommends that this sentence be clarified to say:

> **"A ground water cleanup level is established using a site-specific risk assessment that includes institutional controls as part of the scenario under WAC 173-340-720(6)(c) and exceeds the potable ground water cleanup level."**

This is a very important section. The POG recommendation should not be considered lightly or overlooked by Ecology. It is not adequate to say that the language of 440(4)(d) has been moved form another section of the law. In placing this language of 440(4)(d) in this section, it should be revised as recommended by the POG. It must be made to make logical sense in the totality of the new section on Institutional Controls.

Issue 1E, Section 440(4)(e)

Part (e) should be changed as follows:

> **"..a conditional point of compliance is established as the basis for measuring compliance at the property ~~site~~."**

The POG recommends changing "site" to "property" to comport with our recommendation in Issue 1C, above. Otherwise, this requirement would impose a deed restriction on every property participating in an area-wide point-of-compliance or every property deemed to be within a site. This paragraph would otherwise limit implementation of area-wide cleanups in areas such as the Duwamish.

Issue 1F, Section 440(10)

Local government notification: In the first sentence of this paragraph, the POG recommends that Ecology change the words "with land use planning authority" to read "with both land use planning and permit issuance authority." In larger government organizations, such as the City of Seattle, land use planning and permitting are in different departments, and the database for tracking such things as institutional controls is actually kept with the permit issuance department.

Issue 1G, Section 440(11)

The POG asks for clarification. The phrase "all costs associated with the operation and maintenance of the cleanup action" created some confusion among POG members. What is intended here by Ecology? The POG recommends that financial assurances come into play at the time that cleanup actions are completed, in that it is our understanding that this section applies to the integrity of any engineered and institutional controls implemented in connection with the cleanup action.

Issue 1H, Section 440(11)(b)

The POG recommends that Ecology delete the word "similar" that appears before the words "financial hardship" at the end of this paragraph.

New Issue 2. Section 730(2)(b)(iii) (page 188)

This subsection reads as follows:

"For a hazardous substance deemed an indicator hazardous substance for surface water under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantitation limit, subject to the limitations in this chapter."

It has come to the POG's attention that, in response to the above language, at least some consultants and Ecology site managers are preparing tables which contain all detected chemicals at a site , with the assumption that they must all be cleaned up to Background or the PQL if no ARAR or risk-based CUL exists. Some TPH examples are: isopropyltoluene, n-butylbenzene, n-propylbenzene, trimethylbenzene, 4-methylphenol, and phenanthrene. The POG believes that Ecology did not intend to impose a requirement to cleanup all chemicals without ARARs or risk-based cleanup levels to background concentrations or PQLs, but rather that the wording of the regulation is not sufficiently clear, so that some people can interpret it to in fact make such a requirement.

The POG therefore recommends the following modifications to the language, for clarification purposes:

Section 708(2), (page 151) - Selection of indicator hazardous substances (IHS) should be moved to Section 700(5), Methods for setting cleanup levels. This is important because the selection of IHS is a necessary component of Method B and C evaluations, not just risk to assessment procedures.

Section 708(2)(a) language should be modified to say:

"When defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, ~~the department may eliminate from~~ further consideration of hazardous substances may be eliminated when they: 1) do not have toxicity values as defined in 708(7) or 708(8) unless they are deemed by the department to be toxic and, in addition, either bioaccumulative, persistent or highly mobile in environmental media; or 2) contribute a small percentage of the overall threat to human health and the environment.

Section 708(b) language should be modified as follows:

~~"If the department considers this approach appropriate for a particular site,~~ The factors evaluated when eliminating individual hazardous substances from further consideration shall include:..."

New Issue 3. Section 708(7)(f)

way that the language in Section 708(7)(f) is written, it appears that when an RfD is missing, the user must ("shall") calculate an RfD. The POG recommends changing the language from "shall"

to "may" and inserting an important comma, as follows: "... may be established on a case by case basis, using the methods described in "Reference Dose (RfD): Description and Use in Health Risk Assessments: Background Document 1A, March 15, 1993 available on the internet at http://www.epa/gov/iris/rfd.htm." This change will clarify that developing an RfD is optional, but that if an RfD is developed, the cited document must be used.

New Issue 4, Section 700(8)(a), page 134.

A new paragraph on terrestrial ecological receptors was added to the TPH Overview under (8)(a).

> **"For soil contamination, the soil cleanup level must not result in any significant adverse effects on the protection and propagation of terrestrial ecological receptors. This determination must be made in accordance with the requirements and procedures specified in WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under ....."**

The POG believes that the first sentence adds confusion rather than clarification to this subsection. The POG recommends deleting the first two sentences of subsection 700(8)(a) and replacing this language with the language from the 1999 proposed amendments:

> **"The potential impact of TPH on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494."**

It is acceptable to retain the rest of the new language in subsection (8)(a).

New Issue 5, Section 740 (3)(a)(iii)(C) and Section 745(3)(a)(iii)(C) Soil Vapors **(pp. 202 and 218)**

This new section is confusing because it conflicts with the soil vapors language in 740(3)(c)(iv) (page 205). Subsection (3)(a)(iii)(C) does not allow (A) Applicability. We do not believe that this was Ecology's intent. For clarity, the POG recommends that the entire subsection 740(3)(c)(iv) would be more appropriately located in 740(3)(a)(iii)(C). Then in Section 740(3)(c)(iv), soil vapor users can be referred to the earlier subsection. (This recommendation applies to Section 745 as well.)

New Issue 6, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3 (page 218)

The currently proposed language in equations 720-3, 740-3 and 745-3 reads:

> "F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the four phase partitioning approach model under WAC 173-340-747(6)."

The POG recommends modifying the language above to say:

> **"F(i) = Fraction by weight of petroleum component (i) unitless. (Use site-specific ground water composition data, provided the data is representative of present and future conditions at the site, or use the ground water composition predicted by the ~~four phase partitioning approach model under WAC 173-340-747(6).~~ the soil-to-groundwater partitioning approaches defined in (WAC 173-340-747(4) or 173-340-747(6)."**

New Issue 7, Equation 720-3, page 174; Equation 740-3, page 201; Equation 745-3 **(page 218)**

The currently proposed language reads:

> "n = The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1)"

POG members are receiving analytical data from the labs in a format that displays EPH concentrations, VPH concentrations, and the volatile organic compound concentrations (as indicators) below. The definition of n above suggests that to compute the Hazard Index, one must sum the EPH plus the VPH plus the indicators. However, ethylbenzene and xylenes in the C8-C10 range would be double counted, potentially overestimating the HI. The POG understands that defining n is complex. We request Ecology's clarification and assurance that the definition of n above does NOT restrict the user from subtracting double counted chemicals. This definition of n and the manipulation of these risk equations underscores the need for TPH guidance.

New Issue 8, Tables 720-1, 740-1, 745-1

Ecology has deleted PAHs(carcinogens) from these tables and replaced it with Benzo(a)pyrene. The POG believes that deleting cPAHs from these tables will lead users to believe that they do

not have to test for cPAHs. The POG recommends retaining cPAHs in all three tables and under the cleanup level, place a note saying "See Benzo(a)pyrene."

New Issue 9, Tables 740-1 and 745-1, Method A Cleanup Levels

The POG would like to express its concern regarding the new benzene soil cleanup level of 0.03 mg/kg, which has been decreased from 0.1 mg/kg. We understand that both the 3 phase and 4 phase partitioning models were used to generate this concentration (intended to be protective of groundwater). We are concerned that smaller businesses that cannot afford more sophisticated evaluations and techniques for addressing benzene in soils will be exposed to undue hardship with this decreased Method A cleanup level, if in fact the currently proposed level is unnecessarily low. The POG believes that there are several mechanisms, unaccounted for in the partitioning models, which may cause increased degradation and adsorption of benzene in soils and that with time this Method A cleanup value will prove to be significantly overprotective. We strongly encourage Ecology to develop a database with empirical data demonstrating the relationship between benzene in soils and in groundwater, so that the soil cleanup level can be adjusted in the near future, if so warranted.

New Issue 10, Table 720-1

The POG recommends that footnote bb for Xylenes be amended to say:

> "Cleanup level based on xylene not exceeding the maximum allowed cleanup level in this table for total petroleum hydrocarbons and on prevention of adverse aesthetic characteristics."

New Issue 11, Method A Adjustments to Reflect Changes in RfD's

The RfDs for calculating TPH cleanup levels may change in the future. An example of this is the recent "retirement" of the EPA risk assessment issue papers recommending provisional noncancer toxicity values for inhalation and ingestion of benzene. EPA's Superfund Technical Support Center now recommends the use of the values presented in the document entitled "Toxicological Review of Benzene (Noncancer Effects)," NCEA-S-0455, dated September 1998 (the document may be read and/or downloaded at http://www.epa.gov/ncea/benztox.htm.). The currently recommended values are 1E-3 mg/kg-day (RfD) and 9E-3 mg/m3 (RfC). However, the document is under review, and values different from these may be posted to the IRIS database in the future.

The POG requests that Ecology commit to proposing amendments to Method A tables or releasing a policy statement with revised Method A cleanup levels when changes to toxicity values for petroleum fractions or individual petroleum-related chemicals are changed by EPA or under WAC 173-340-708(7)(g) or (8)(f) such that significant changes to Method A cleanup levels would result.

EXHIBIT 1

To: Brownfields/TPH Project Oversight Group
From: Warren Hansen – Onsite Enterprises
Re: Proposed MTCA ground water cleanup levels for diesel range organics, heavy oil and mineral oil.

Introduction

This memo puts forth an alternate manner in which Method A ground water cleanup levels may be derived for diesel and heavy oil (both based on diesel-range organics or DROs) and mineral oil. The method used to derive the cleanup levels contained in the proposed amendments to MTCA regulations, 500 ug/L for DROs and 1,000 ug/L for mineral oil, does not take into account the solubility limits (absolute dissolved concentration) predicted by the four-phase model for pore water moving to groundwater (the Method A conceptual model) and disregards the standard methodology for evaluating the leaching pathway set forth in Section 747 of the proposed rule amendments. Rather, the proposed-cleanup levels make use of limited data from two-phase (product/water) partitioning laboratory experiments to derive the percent of each equivalent carbon fraction contained in the dissolved phase of ingestible ground water. Those relative percentages are then used to estimate a TPH concentration at an equivalent Hazard Index of 1.0. For DROs and mineral oil, these concentrations exceed the dissolved concentration that can occur in groundwater under the accepted conceptual model. This method over-estimates the toxicity as it assumes the relative percentage of TPH fractions is entirely controlled by product solubility in the aqueous phase. Furthermore, use of two laboratory fuel/water partitioning experiments to estimate the relative concentrations of TPH fractions in groundwater is non-representative and disregards the accepted conceptual model, as these experiments were based on two-phase (not four-phase) experiments.

Methodology as included in proposed MTCA amendments

The four-phase model described in Section 747 predicts that the concentration of DRO dissolved in ground water under the Method A conceptual site model assumptions and TPH-saturated soil conditions is 107 ug/L. The composition of the dissolved DRO fractions at 107 ug/L represents a hazard index (HI) of 0.22. Up to this point, there is no disagreement on the assumptions and the use of the 4-phase model. However, to estimate the ground water concentration representing the balance of the allowable HI (i.e., 1.0 minus 0.22, or 0.78), Ecology essentially assumed that the composition of the fractions in the additional (remaining) DRO is the same as that of the solubilized fractions. This results in an additional ground water concentration of 379 ug/L, for a total of 486 ug/L, (rounded up to 500 ug/L, the proposed cleanup level).

Recommended Methodology

The recommended method put forth here is a hybrid between the solubility and whole-product approaches to estimating the composition of DROs and mineral oil in ground water. This method posits that the equivalent carbon fractions comprising the additional DRO are better represented in the accepted Method A conceptual site model (leaching from the vadose zone to groundwater) as undissolved components moving into the groundwater. Remaining TPH (that is, the balance of the TPH comprising the remaining hazard index) is best represented by the same relative equivalent carbon fraction concentrations contained in the original (parent) product. For diesel, the concentration corresponding to the remaining HI of 0.78 is 546 ug/L, resulting in a more scientifically justifiable DRO ground water cleanup level of 107 + 546 = 653 ug/L (which can be rounded up to 700 ug/L or down to 650 ug/L, as a matter of policy).

For Mineral Oil, Ecology's approach to deriving the currently-proposed cleanup level of 1,000 ug/L is similar to that used for diesel. In the May 18, 1999 memo From Steve Robb to the MTCA Science Advisory Board, the allowable (dissolved) mineral oil concentration in ground water (using the same method describe for DRO's above) at a hazard index of 1.0 and saturated soil conditions is 465 ug/L (Note: Ecology later relied on two-phase partitioning experiments to propose a CUL of 1,000 ug/L). Use of the method recommended herein results in a cleanup level of approximately 1,500 ug/L for mineral oil.

DIESEL-RANGE ORGANICS	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	107	107	0.22
Remaining allowable concentration- assumes chemically similar to whole product	--	546	0.78
Remaining allowable concentration – assumes chemically similar to solubilized fractions	379	--	0.78
TOTAL	486*	653	Ecology Method: 1.0 Optional Method: 1.0

* Value based on original diesel fraction estimates by Ecology. Ecology subsequently decided to base the 500 ug/L cleanup level in the recently Proposed Amendments (November 1999) on the results of 2-phase partitioning experiments (Memo from P. Kmet to MTCA Science Advisory Board, December 20, 1999).

MINERAL OIL	GROUND WATER CONCENTRATION, ug/L, Ecology Method	GROUND WATER CONCENTRATION, ug/L, Recommended Method	CORRESPONDING HAZARD INDEX, unitless
Maximum dissolved , from 4-phase model	18	18	0.04
Remaining allowable concentration- assumes chemically similar to whole product	--	1440	0.96
Remaining allowable concentration -- assumes chemically similar to solubilized fractions	447	--	0.96
TOTAL	465*	1458	Ecology Method: 1.0 Optional Method: 1.0

*** Value based on original mineral oil fraction estimates by Ecology. Ecology subsequently decided to propose an alternate cleanup level of 1000 ug/L in the recently Proposed Amendments (November 1999), based on soluble fractions laboratory test data provided by Puget Sound Energy (P. Kmet, ibid).**

Cleanup levels using the compositions of diesel fuel and mineral oil employed by Ecology and Puget Sound Energy in their partitioning experiments (P. Kmet, ibid, Table 1) were also calculated using the proposed method. For Diesel fuel, the HI was exceeded by the soluble fractions, and this was attributed to the detected concentrations of BTEX in the samples. According to calculations by the Pollution Liability Insurance Agency (PLIA) if benzene is present, that compound would then control or "drive" the cleanup. In such cases, the corresponding TPH cleanup level for groundwater (assuming benzene is addressed separately) could be over 700 ug/L. Table 830-1 of the Proposed Amendments requires testing for benzene in groundwater when diesel contamination is suspected. Again, Ecology's proposed DRO cleanup level is overly conservative.

Summary

The recommended approach to calculating ground water cleanup levels for DROs and mineral oil presented in this memo is more scientifically justifiable than the method used for the proposed MTCA amendments, because it adheres to the leaching conceptual site model recommended to Ecology by the Science Advisory Board. The use of two-phase

(product/groundwater) partitioning is not scientifically justifiable and results in overly conservative cleanup levels, as it in effect presumes the presence of NAPL on the water table. Yet the Proposed Amendments prohibit groundwater petroleum cleanup levels from exceeding a "concentration that would result in free product being present in or on the ground water" (WAC 173-340-720(4)(b)(iii)). The method A cleanup levels for diesel-range organics and mineral oil using the recommended method would be 700 (or 650) and 1,500 ug/L, respectively. Because of the much higher solubility of gasoline range organics, the optional method presented here is not recommended for calculating ground water cleanup levels for that petroleum category. I suggest the POG consider recommending this approach for DROs and mineral oil in its next round of recommendations to Ecology. The POG reiterates this comment.

Washington State MTCA Science Advisory Board

October 27, 2000

Mr. Jim Pendowski
Department of Ecology
Post Office Box 47600
Olympia, WA 98504-7600

Dear Mr. Pendowski:

SAB Comments on the Proposed MTCA Rule Amendment

The MTCA Science Advisory Board is responsible for advising the Department of Ecology on cleanup levels for contaminated sites and other scientific and engineering matters related to the Model Toxics Control Act.

In that capacity, the Board recommends the following considerations as related to the proposed MTCA rule amendment.

2456 • The Board supports Ecology's proposal to add a definition for GI absorption in Section 200. We also believe it would be useful to add definitions of additional terms in the equations, for example, the dermal absorption factor. Any definitions provided should, where possible, be consistent with EPA's risk assessment guidance (RAGs).

2457 • As Ecology is aware, the Board has previously expressed concern regarding the proposed 1000 ug/l cleanup level for mineral oil in ground water. The SAB is concerned that only a single sample was used in the study, that the study was not peer reviewed, and that no documentation is available on how the study was done. Board members concurred that they are unable to support the proposed mineral oil value as based on scientifically sound information without receiving additional information.

2458 • The SAB recommends that Ecology add averaging time and exposure duration to the non-carcinogenic cleanup level equations. This is not a substantive change; rather it is intended to make the terms consistent between the old and new equations. The terms in the human health equations should also be checked to make sure that the terms are consistent between the old and new equations. Also make sure that any terms in

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common with terrestrial ecological assessment equations have the same definition, units, and meaning.

2459 • The SAB recommends that Ecology add a statement regarding protection of surface water to Method A in section 720 (similar to the statement for Method B).

Additional comments received from member Dr. Allen-King are attached.

The SAB appreciates the opportunity to comment on the proposed MTCA rule.

Sincerely,

Henry G. Landau, PhD.
Board Chair

Richelle Allen-King, PhD

Marjorie Norman, PhD.

Bruce Duncan, PhD.

Elaine Faustman, PhD.

Attachment (1)

cc: Pete Kmet, Toxics Cleanup Program
Dawn Hooper, Toxics Cleanup Program

common with terrestrial ecological assessment equations have the same definition, units, and meaning.

- The SAB recommends that Ecology add a statement regarding protection of surface water to Method A in section 720 (similar to the statement for Method B).

Additional comments received from member Dr. Allen-King are attached.

The SAB appreciates the opportunity to comment on the proposed MTCA rule.

Sincerely,

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Attachment (1)

cc: Pete Kmet, Toxics Cleanup Program
Dawn Hooper, Toxics Cleanup Program

- The SAB recommends that Ecology add a statement regarding protection of surface water to Method A in section 720 (similar to the statement for Method B).

Additional comments received from member Dr. Allen-King are attached.

The SAB appreciates the opportunity to comment on the proposed MTCA rule.

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Bruce Duncan, PhD.

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Attachment (1)

cc: Pete Kmet, Toxics Cleanup Program
Dawn Hooper, Toxics Cleanup Program

Memorandum

October 19, 2000

To: SAB members and Ecology staff

From: Richelle Allen-King

Subject: Comments on 173-340-747

I think that the section is much easier to understand and that the editing has resulted in substantive improvements in this regard. I also notice that a few inconsistencies noted previously are corrected in this draft. My complements on your hard work on both accounts! I do have a few more comments. Some are conceptual and some are editorial. I will march through the draft as it reads and identify the comments according to the two types.

2460 (2)(c) Conceptual. The current description of the use of the four-phase model is inaccurate. The four-phase model is to be used when NAPL is present. NAPL can be present under conditions that the 3-phase model would NOT predict is present (because the 3 phase doesn't consider presence of the mixture). I recommend revising the statement describing application here and in subsection (6)(a).

2461 (2)(e) Conceptual. The SAB F&T recommended that alternative fate and transport models could also be used in combination with models that describe pore-scale chemical behavior (e.g. the phase partitioning aspects of the 3-phase and 4-phase models). It seems like this aspect may be obscured in the current draft. I recommend explicitly adding statements to this effect, either here or in the pertinent later section.

2462 (2)(g) Editorial. Seems like residual saturation should include the term NAPL within the description/definition. This clause is only relevant to contaminants occurring as a separate oil phase.

(General) I didn't check the equations on this draft carefully because I have done so and commented in detail on previous drafts. All equations should be checked again, if that has not already been done.

2463 (5)(b) (iii) Conceptual. Measures to prevent biodegradation and volatilization should be taken for both adsorption and desorption tests. It is notable that this is one of the few sections for which it is not possible to refer to established procedures applicable to a wide variety of contaminants, yet many of the other sections include the statement "shall be based on methods approved by the department under methods complying with WAC 173-340-702...". It may be advisable to back off of text describing limiting conditions (because there are

more conditions needed to make a good test that depend on the contaminant and matrix), and to replace the description with "this same clause."

2464 Equation 747-7 Editorial. The left-hand side of the equation is the measured soil concentration for each NAPL component in mg/kg. Conceptual. Has someone checked this equation to see if it needs a UCF?

2465 (6) (d) introductory paragraph and (iv) Editorial. The "multiple equations for several unknowns" can easily be specified. The number of equations is simply the number of NAPL components (write 747-7 once for each component) + 3 (747-6, 747-8, and "the condition" that the sum of all component mole fractions equal 1, as described in (iv). The "unknowns" that are solved for, most importantly, are the mole fractions of each of the NAPL components in the mixture. As described later, these are used to predict dissolved concentrations. The other unknowns that are solved are (3 of them, of course), the NAPL density, the volumetric contents of NAPL and air or water (see an added note on this below). One needs to decide whether specifying the above is clearer than writing more ambiguously. I think it is clearer to specify, given that all of these variables are used within the explanation of the process anyway.

2466 (6)(d)(I) Editorial. Specify measurement of NAPL components.

2467 (6)(d)(ii) Conceptual. I believe that the density for each NAPL component is also needed. The other chemical input requirements look ok.

2468 (6)(d)(iii)(B) and (C) Conceptual. I think that there is some confusion here. The volumetric content of NAPL and one more phase (either air or water) is considered an unknown. If the soil is unsaturated, either the water content can be set, and air and NAPL contents determined by solution, OR, the air content can be set and NAPL and water contents can be determined by solution.
If the system is saturated, then the NAPL and water contents must both be considered unknowns. The input parameters as described are confusing and may actually over constrain the problem. The solution description should be consistent with Ecology's other work.

Numerically, the problem is simplified (e.g. the same solution can be applied to either saturated or unsaturated problems) if the air content is fixed and water/NAPL contents are determined in the solution. However, this may not make the best use of the available site data (e.g. if porosity and water content are known for an unsaturated soil, a solution which uses these values would be best).

2469 (6)(d)(vii)(B)(II) and at least one other location-- "use the 4-phase partitioning model in an iterative process to calculate protective soil concentrations" - Is this required? Or is this optional - e.g. "The 4-phase model can be used...".

2470 (7)(d) Conceptual. I still find the statement: "must demonstrate with empirical data that the leaching test results correlate with actual groundwater impacts" confusing. I believe that it could be interpreted in more than one way. This needs further clarification.

2471 (8) Conceptual. The F&T committee recommended that chemical (partitioning) models could be combined with other aspects of transport modeling. While this version does not seem to exclude such possibilities explicitly, it isn't transparent. Again, some editing of this discussion would be helpful.

SEATTLE CITY ATTORNEY
MARK H. SIDRAN

October 27, 2000

Via Facsimile and U.S. Mail

Timothy L. Nord
Curtis Dahlgren
Washington State Department of Ecology
Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Re: WAC 173-340-330(7)(a)(iii)(A)—Delisting Sites from the Register

Dear Tim and Curtis:

2472

This letter serves as both Seattle's comment on the above-proposed MTCA regulation, and it is a follow-up to our meeting on this topic at your office last week on October 12th. I am writing on behalf of Seattle Public Utilities, but we are working with Snohomish County Public Works and the Washington Solid Waste Policy Forum to coordinate responses on this matter. The concerns expressed in this letter are echoed by public works departments across the state who manage or own landfills.

As you are aware, Seattle has been a national and international leader in solid waste management for over 13 years. Since 1987, Seattle has led the world in reducing, reusing and recycling. In order to maintain this leadership position Seattle has had to be as efficient as possible in managing its program. With I-695 and increasing costs of recycling, it faces greater challenges than ever. The duplication of reporting requirements and staff oversight and sampling costs imposed on a landfill by both Ecology and the local health department under the solid waste landfill closure regulations adds to this financial challenge.

The redevelopment stigma from having real estate on the state superfund list, and the negative public perception for affected jurisdictions is another significant consideration supporting the minor change in the above regulation, which we discussed at your office last week. Local governments that own landfills often redevelop them as parks or sell them for other productive uses after they are closed. The stigma of such landfills remaining on the Site Register may preclude or inhibit such conversion to post-closure uses.

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You agreed at the meeting to consider a minor change to the proposed delisting regulation to address these concerns of Seattle, Snohomish County Public Works and the Washington Solid Waste Policy Forum. All parties at the meeting agreed that the delisting exception would not apply until the landfill had *completed the MTCA remedy and applicable cleanup standards were met at the point of compliance.* With this predicate in mind, I have set out below the proposed delisting exception for solid waste landfills:

1) Where the MTCA cleanup, as shown in the Cleanup Action Plan (CAP), *includes* Chapter 173-351 WAC actions that the party would be performing for landfill closure or operation, (such as methane gas extraction, surface water diversion or leachate collection), then the landfill will be delisted from the Site Register if Ecology approves local health department oversight of these on-going activities.

2) Where the MTCA cleanup, as shown in the CAP, *does not include* any Chapter 173-351 WAC actions, then landfill delisting will be pursuant to the MTCA WACs, including the exception clause in italics that I propose adding to the end of Subsection 330(7)(a)(iii)(A):

> All construction and operation of remedial actions have been adequately completed, *except for activities under Chapter 173-351 WAC related to the operation or closure of solid waste landfills,* and only passive maintenance activities such as monitoring, inspections and periodic repairs remain;

Amending Interim Policy 330B or issuing a new policy to address the above exception is inadequate. The new MTCA regulation is incorporating 330B and giving the policy the force and effect of law. Seattle's proposed exception clause is an essential component of this policy and hence it should be given the same legal effect by being part of the proposed regulation. The exception clause should not be left dangling--completely out of context--in a policy where it would have no binding legal effect on Ecology.

Seattle hopes that you see the reasonableness and logic behind this minor—yet critical—change to Subsection 330(7)(a)(iii)(A), and will adopt it in this pending rule change accordingly. As you know, from a legal standpoint there is no bright-line as to whether a regulation amendment requires public notice and comment. The exception clause is a logical and necessary exception to the delisting subsection that has been subject to notice and comment, and the City explicitly discussed the exception in the prior public comment period. *See* the City's January 19, 2000 comment letter to Trish

Akana of Ecology. Given these circumstances, I do not believe that the proposed exception clause is significant enough to require additional public notice and comment. Rather, Ecology can discuss these circumstances and the logic of its inclusion in the final rule in the Responsiveness Summary, and thus publish it as part of the final rule. I would like to discuss my view with an assistant Attorney General, if you have any legal concerns about inserting the exception clause in the final rule.

Seattle would like to know as soon as possible whether Ecology supports insertion of this exception clause so that it can decide on its next step in getting it adopted in the final rule. Please call me at 206-233-2158 or Martha Burke at 206-684-7686 to discuss your position. Thank you in advance for your prompt response.

I am also faxing this letter to Trish Akana for Seattle's formal comments as noted above.

Very truly yours,

MARK H. SIDRAN
Seattle City Attorney

By: Peter E. Hapke
Peter E. Hapke
Senior Assistant City Attorney

Cc: Jim Pendowski, Ecology
Trish Akana, Ecology
Tim Croll, City of Seattle
Martha Burke, City of Seattle
Jeff Kelley-Clarke, Snohomish County Public Works

WASHINGTON OIL MARKETERS ASSOCIATION WOMA

BILL BELLMAN
Executive Director
woma@ix.netcom.com

October 26, 2000

Department Of Ecology
Toxics Cleanup Program
Attn: Trish Akana
P.O. Box 47600
Olympia, Washington 98504-7600

Subject: Comments on Ecology report of probable costs and benefits of proposed rule Amendments to Model Toxics Control Act

Washington Oil Marketers Association has reviewed the cost and benefit analysis provided by Ecology. Our review is not thorough due to the short time we have had the document. With that in mind, our comments are directed at changes in method A clean up levels and the costs attributed to those changes

2473 Ecology uses a model site and indicates the cost of soil cleanup with the new standards in place, will be due to additional soil having to be removed. You then indicate there will be a saving in groundwater cleanup because of the more stringent soil cleanup levels. This may not be true in the real world for the following reasons:

1. There may be additional costs of removing and disposing of soil with an allowable benzene level of .03 versus .5, and a gasoline TPH of 30 versus 100. Table 3-10 does not indicate if landfill charges would remain the same or increase for soil with more stringent contaminant levels.

2. It appears to be an assumption by Ecology, based on a model, that groundwater would be contaminated if soil contaminants were not reduced, and not on actual clean ups.

2474 In chapter 5, Ecology states that 20 of 29 sites did not test for benzene in the groundwater. This would indicate there is little actual data on whether groundwater is being contaminated under the current clean up standards.

2475 We disagree with your conclusions in 5.2.3. The new standards will impact 100% of sites. The impact will be in higher cleanup costs, and higher insurance premiums. The fact that property owners cleaned up 49% of the 29 sites you evaluated to non-detect does not mean they would not be impacted by higher costs due to these rule changes.

WOMA PMB 245, 3377 Bethel Rd SE, Ste 10 • Port Orchard, WA 98366-5608 • Tel 360/769-0771 • Fax 360/769-0762 #96

Sent by:Bill Bellman Oct-27-00 10:39am from 360 769 0762>3604077154 Page 3/ 3

Department of Ecology October 26, 2000
MTCA Cost Benefit analysis

It remains the opinion of Washington Oil Marketers that Ecology has failed to show that current clean up standards are non-protective of human health and the environment, and until that is done, the rules should be left as they are.

Bill Bellman
Executive Director

TOSCO
Marketing
Company

3977 Leary Way NW
Seattle, WA 98107
206.789.3700
1.800.831.2459
fax: 206.789.9274

October 26, 2000

Washington Department of Ecology, Toxics Cleanup Program
ATTN: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA 98504-7600

Transmitted via FAX No. 360-407-7154

Re: Comments on the Proposed MTCA Rule Amendments

Dear Ms. Akana:

On behalf of Tosco Marketing Company, this letter provides comments regarding the Model Toxics Control Act (MTCA) rule amendments re-issued by the Department of Ecology (Ecology) on August 16, 2000. The Tosco Marketing Company (Tosco) owns or operates approximately 180 current or former gasoline retail sites that are potentially impacted by the proposed amendments. We appreciate the opportunity to again comment on the proposed amendments.

Ecology has stated the objective of the amendments as that of making MTCA "fairer, easier to understand, more flexible, less ambiguous and less expensive." Despite one full round of formal notice and comment rule making, the August 2000-issued version of the amendments have not come any closer to meeting the stated objectives than the previous, November 1999-issued amendments. The proposed amendments remain more complex, afford less flexibility and will result in more expensive cleanups than the current rule.

The following comments and questions reflect some of Tosco's concerns with these amendments; we request Ecology's consideration and response to the concerns described below.

2476 **1. Protecting Human Health and the Environment**

The priority of MTCA should be the protection of human health and the environment. Did Ecology undertake any historical evaluation of corrective action completed in the state to determine if the current rule and policies were not protective of human health or the environment? If so, please provide the specific case examples.

#97

2477 **2. Risk-Based Cleanup**

Ecology claims that the proposed amendments contain a risk-based approach based on the nationally recognized ASTM Risk-Based Corrective Action (RBCA) model. It appears that any similarity between the amendments and ASTM are superficial and that the amendments fail to incorporate some of the basic principles of the ASTM RBCA model (specifically, [A] allowance for a reasonable assessment of potential exposure; and, [B] a tiered-system for setting cleanup levels with significant flexibility at the higher levels).

A. Reasonable Assessment of Potential Exposure

The proposed amendments provide a very limited ability to evaluate and use realistic exposure scenarios in establishing cleanup levels. MTCA (and the ASTM RBCA) allows for the use of reasonable maximum exposure (RME) scenarios based on estimates of current and future resource uses. Under the ASTM RBCA process, it is fully anticipated that cleanup levels at many, if not most, sites will be based on RMEs other than ground water ingestion. However, the proposed MTCA amendments contain only a very limited ability to establish cleanup levels based on non-drinking water RMEs. Further, establishing cleanup levels based on non-drinking water use is technically complex. By comparison, the ASTM RBCA provides for Tier 1 cleanup levels for both soil and ground water based on a variety of exposure pathways including ingestion, direct contact, and transport to other media - this results in a system that is more useable for all sites.

B. Tiered-System with Significant Flexibility

The three tiered-system for establishing cleanup levels in the proposed amendments is not comparable to the ASTM RBCA process. Method A contains very conservative cleanup levels based exclusively on the RME of ground water as drinking water. Cleanup levels for other exposure pathways are not included. There are two methods for establishing Method B and C cleanup levels: standard and modified. Ecology has indicated that site-specific information can be used in establish cleanup levels. According to Section 700(5)(b), Modified Method B provides for the use of site-specific information to change selected default assumptions. However, a review of the Modified Method B for ground water suggests that the changeable assumptions are not really site-specific, but rather are various toxicity factors that do not result in site-specific cleanup levels tailored to the risks at a site. The only site-specific information used in establishing ground water cleanup levels is the use of TPH composition to set a fraction-based level. Further, an initial review suggests that the output of the Method B and C equations is very similar to the Method A values. This is completely inconsistent with the ASTM RBCA model in which site-specific information is used to reduce uncertainties assumed in the conservative Tier 1 calculations regarding exposure or fate and transport of constituents.

Why was the ASTM RBCA model not adopted? The Oregon Department of Environmental Quality has implemented a straightforward process for RBCA. Was Oregon's RBCA program considered by Ecology? If no, why not? If yes, why did Ecology elect not to model this program?

2478 **3. Cleanup Levels**

The changes to Method A Soil Cleanup Levels for TPH as gasoline and BTEX compounds are based on an overly simplistic model that ignores basic principles of how hydrocarbons act in the environment. The model uses overly conservative values for input parameters that result in redundant conservatism. . What is the basis for the selection of a CERCLA screening model (over other models available) to generate the revised Method A cleanup standards? Were any other models tested?

Additionally, the establishment of cleanup levels in the proposed amendments lacks significant flexibility. Realistically, cleanup levels at a large percentage of sites should be based on RMEs such as vapor transport to outdoor or indoor air, or direct contact with soils. This would be consistent with risk-based programs in numerous other states where non-drinking water pathways frequently drive the establishment of cleanup levels. The combination of very conservative models and assumptions prescribed in the proposed amendments, along with the inability to use realistic RMEs, produces cleanup levels that are unnecessarily conservative and result in cleanups with much higher costs than are necessary to protect human health and the environment (Note: 2479 Ecology's "Preliminary Draft of Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act," released on October 13, 2000, documents some higher costs for cleanup conducted by the proposed amendments. However, the draft cost-benefit analysis appears to be based upon subjectively-chosen "model" sites that utilize simplistic assumptions and fails to adequately represent the true higher cost required to meet the revised cleanup levels. Further, it is not apparent in the cost-benefit anlaysis how Ecology has clearly demonstrated that any probable benefits of the revised cleanup levels exceed their probable costs).

2480 **4. The Remedy Selection Process**

The remedy selection process described in the proposed amendments is clearly biased toward active remediation as opposed to selecting cleanup actions based on protection of human health and the environment. WAC 173-340-360(2)(e)(iii) states that "[c]leanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site." If a cleanup standard is protective of human health and the environment, and a non-treatment-based cleanup action meets the applicable remedy selection standards (including permanent to the maximum extent practicable), there is no logical justification for requiring treatment. Such a requirement is inconsistent with the PAC recommendation to eliminate the priority given to treatment technologies in remedy selection. Why can't a cleanup action based on natural attenuation or institutional controls be judged by the same remedy selection standards, including protectiveness and the long-term effectiveness, used to judge other cleanup actions?

Tosco Marketing Company recognizes the significant effort put forth by Ecology and many stakeholders to develop the proposed rules, and desires to have this process completed. However it is more important that the rules meet the stated objectives of the amendment. Tosco recommends that Ecology either significantly modify the proposed amendments so that they are reflective of the Policy Advisory Committee recommendations, or withdraws the notice of proposed rule making and reconvene negotiations to develop the rule in accordance with RCW 34.05.310.

Please contact me at 206-706-2341 should you have any questions. We look forward to Ecology's response to these comments.

Sincerely,

Timothy D. Johnson
Project Manager

PAINE, HAMBLEN, COFFIN, BROOKE & MILLER LLP
ATTORNEYS

October 27, 2000

Via Facsimile Transmission and U.S. Mail
(360) 407-7154

Ms. Trish Akana, Rules Coordinator
Washington State Department of Ecology
Toxics Cleanup Program
P.O. Box 47600
Olympia, WA 98504-7600

Re: **Comments on November 1999 Proposed Changes to the Model Toxics Control Act Cleanup Regulation**

Dear Ms. Akana:

Thank you for the opportunity to provide comments on the proposed changes to the Model Toxics Control Act (MTCA) regulation. We support Ecology's stated intent of making the business of environmental cleanups more equitable, more flexible, easier to understand, less ambiguous, and less expensive. We are concerned, however, that making the proposed changes to the MTCA regulation will not achieve Ecology's intent.

2481 Numerous changes are proposed to the MTCA regulation. The result would be a regulation that is longer, more complex, more difficult to administer, and more difficult for PLPs to comply with than the current regulation. The numerous changes would make it more difficult, more costly, and more time consuming to get from discovery of a release to cleanup of a site, whether cleanup is performed under direct Ecology oversight or independently. If a significant fraction of the persons doing independent cleanups contact Ecology for guidance, Ecology's workload will increase. Ecology is currently not able to respond to all requests. Increasing the complexity of the process is likely to result in delaying cleanup at many sites.

2482 The MTCA regulation currently requires protection of the environment and human health, but no procedures to do so are included. The proposed changes include procedures for evaluation of protection of the environment. We support exclusions from further ecological evaluation for some sites in the evaluation process. High voltage electrical substations, distribution stations, or switchyards should be clearly included in the exclusion criteria. These sites are typically not paved, but have special surfaces to eliminate static electricity and electrical arcs and include a grounding grid. The exclusion criteria worded to specifically exclude high voltage electrical substations, distribution stations, and switchyards.

2483 The proposed changes to the regulation include options for a conditional groundwater point of compliance to be off-property in three cases: sites abutting surface water, sites near surface water, and an area-wide point of compliance. The proposed changes exclude one case where an off-property point of compliance may, in some situations, be appropriate. For sites where the person conducting the cleanup can assure that institutional controls are implemented to prevent use of groundwater and where the affected property owners agree, a conditional point of compliance off of the property should be allowed even if the groundwater does not discharge to nearby surface water.

2484 Additionally, for Method A Cleanup Levels - for Groundwater, a detection limit for benzene is not specified to determine whether benzene is present or not detectable in gasoline range total petroleum hydrocarbons. The applicable cleanup level is based on this determination. We recommend that a benzene detection limit of 5 ug/l be specified.

2485 **APPLICABILITY**

The following language is suggested to be included as a New Section WAC 173-340-115 Applicability.

WAC 173-340-115 - Applicability of New Rules.

(1) New rules propounded under the Model Toxics Control Act (MTCA) (Chapter 70.105D RCW) shall apply to all sites or facilities unless there has been an Agreed Order or a Consent Decree issued with respect to a site or facility or there has been substantial cleanup action taken at a site or facility prior to the effective date of new rules or regulations under the MTCA. The terms "site", "facility" and "cleanup action" shall have the same meaning as provided in these regulations. The term, "substantial cleanup action" shall mean cleanup action costing more than $200,000.00. Substantial cleanup action may include independent remedial actions as well as actions taken pursuant to an Agreed Order or Consent Decree.

(2) If there has been substantial remedial action taken prior to the effective date of new regulations, the potentially liable person (PLP) conducting the cleanup action shall be bound by the existing MTCA regulations when the cleanup action was taken. For further cleanup action taken after the effective date of the new rules or regulations, the PLP may elect to follow regulations existing when the substantial cleanup action or Agreed Order or Consent Decree was entered or may elect to follow the new regulations.

REASONS FOR THE PROPOSED NEW REGULATION-WAC 173-340-115

There are sites or facilities at which cleanup actions have been taken under Agreed Orders and Consent Decrees, or were taken as independent remedial actions or cleanup actions. In one case, an RI/FS study and reports were prepared pursuant to an Agreed Order and the existing MTCA regulations. The RI/FS has been underway for at least a year. The RI/FS reports have been submitted. The new regulations could require changes in the reports and could change the costs and liability of the PLP.

There are instances where it would be extraordinarily unfair to a PLP if new cleanup levels or new regulations were promulgated which would change or modify the obligations and liability of PLPs who undertook their cleanup actions in good faith pursuant to existing regulations. The new regulations should be amended to accommodate these instances to avoid unintended consequences or additional costs or new liability arising out of the new regulations.

2486

NONPOTABLE WATER

Recent revisions to the MTCA regulations in WAC 173-340-720(2)(c) are unnecessarily restrictive in regards to a nonpotability demonstration. In particular, the restriction under 720(2)(c)(iv) requires that, for a nonpotable determination, it must be shown that "The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source."

This requirement essentially eliminates the ability to use surface water standards on any properties that are not immediately adjacent to the surface water body. When groundwater is not a current or future source of drinking water, and the groundwater discharges to a surface water body, it is reasonable to use surface water standards. This ensures protection of the receptor - organisms in the surface water (and humans who consume these organisms). It does not put undue burden on property owners and responsible parties to clean up to drinking water standards at locations where the water is not, and will not be used as drinking water. The provision for hydraulic connection, added in the August 2000 revision, undermines the brownsfield effort in the Duwamish and other places across the State. The provision will decrease the number of cleanups being performed and completed in these areas. The addition of this requirement is contrary to Ecology's intent that the changes to MTCA make the business of environmental cleanups more equitable, more flexible and less expensive. Please eliminate this language under WAC 173340-720(2)(c) from the draft regulations as this requirement does not provide additional protection to human health or the environment.

We hope that you will consider these comments on the proposed regulations prior to finalizing the regulations.

Very truly yours,

PAINE, HAMBLEN, COFFIN,
BROOKE & MILLER LLP

JERRY K BOYD

W:\11\150\02678\l\L118 Akana - MTCA Changes.doc

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OCT 27 2000
ECOLOGY

Quality Petroleum Products, Inc.
P. O. box 236 13th and Moore
Walla Walla, Wa. 99362

October 25, 2000

Department of Ecology, Toxics Cleanup Program
ATTN: Trish Akana, Rules Coordinator
P. O. box 47600
Olympia, Washington 98504-7600

Ms. Akana,

2487 Please leave the Method A cleanup standards where they are. You are increasing my potential cost of cleanups by placing more stringent requirements in place, and you have failed to show how current standards are non protective of human health and the environment. Also, our cost of Pollution Liability Insurance may increase because of higher clean up costs if the new ruling goes into effect.

Thank you,

Phyllis Brown

Phyllis Brown

#99

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Page 1 of 1

Broadway Truck Stops

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October, 25, 2000

Dept. of Ecology, Toxics Cleanup Program
Attn. Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA. 98504-7600

Dear Trish Akana:

I'm writing you today to express my concerns with the proposed rule amendments to the Model Toxic Control Cleanup Act.

2488 Our industry has had in place Method A cleanup standards that have been expectable with Ecology. With the new proposed standards our costs will dramatically increase, and will slow down cleanups for oil marketers because of the additional expense. Also we will be faced with possible other concerns of increasing costs of the PLIA program.

If in fact you have failed to show that the current standards are non-protective of human health and the environment, why are the rules being changed?

Please reconsider.

Respectfully Yours,

Tom Hemingway
Owner

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TOSCO

Tosco Refining Company
A Division of Tosco Corporation
Ferndale Refinery
3901 Unick Road – P.O. Box 8
Ferndale, Washington 98248
Telephone: 360-384-1011

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October 26, 2000

Ms. Trish Akana
Rules Coordinator, Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Tosco Refining Company Endorsement of the Western States Petroleum Association (WSPA) Comments on Proposed Amendment to the Model Toxics Control Act (MTCA) Regulation

Dear Ms. Akana:

Tosco Refining Company Ferndale Refinery (Tosco) appreciates the opportunity to comment regarding the proposed amended Model Toxics Control Act Regulation. Tosco is a member of the Western States Petroleum Association and has reviewed the proposed amendments to the MTCA regulation and the comments developed by WSPA.

2489

The proposed amendments are plainly more voluminous, complex and confusing than the present regulation. Consequently, it is difficult to believe that final approval of the proposed amendments, will lead to anything other than, greater time and expense per clean up effort, and less certainty on the parts of both responsible parties and Department of Ecology personnel, that a compliance effort fully meets pertinent requirements.

Tosco fully endorses WSPA's comments. We urge the Department to preferentially withdraw the proposed amendments or failing that, to fully implement the WSPA recommended changes.

Sincerely yours,

Richard T. Bremer
Environmental Coordinator

File: 6.4.3.1.1
Cc: RFP, KJF, DR

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#101

WASHINGTON PUBLIC PORTS ASSOCIATION

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Port of Vancouver
Port of Wahkiakum Co. #1
Port of Wahkiakum Co. #2
Port of Walla Walla
Port of Warden
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Port of Willapa Harbor
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Jim Knapp
Past President

Patrick Jones
Executive Director

October 26, 2000

Department of Ecology
Toxics Cleanup Program
PO Box 47600
Olympia, WA 98504-7600

ATTN: Trish Akana, Rules Coordinator

Dear Ms. Akana,

This is a comment letter on the proposed amendments to the Remedial Action Grants Rule, WAC 173-322. They are submitted by the Washington Public Ports Association, which represents 67 port districts in Washington State. Since the initial passage of the Model Toxics Control Act, port districts throughout Washington State have been cleaning up contaminated sites. Many of these cleanups have been accomplished with the help of the Local Toxics Control Account.

Using the experience of dozens of these cleanup actions, our Association offers these comments as a way for the state to improve the Remedial Action Grant program and expedite many of the remedial actions that face local governments, including port districts.

2490

In particular, we believe that it is appropriate for the Department of Ecology to amend its rule to allow a greater than fifty percent grant match in more circumstances than is currently allowed. The current rule allows up to a 75% match, but only for jurisdictions in counties that are economically disadvantaged, if they are able to demonstrate an extraordinary financial need. (WAC 173-322-090)

This two-part test for additional grant funding has proven to be too limiting in several instances. We encourage the Department to expand this 75% match to also include jurisdictions where the Department makes a finding that there is a compelling interest in protecting a sensitive surface or ground water system, and where the fifty percent match would render the local government unable to meet its fundamental statutory obligations. This amendment would target high-priority sites, and would also help local governments who are prevented from receiving the 75% match because they are within a county not listed as economically distressed.

#102

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P.O. Box 1518 • Olympia, WA 98507-1518 • (360) 943-0760 • Fax 753-6176 • 1501 Capitol Way • Suite 304

This policy change would recognize that the potential for financial hardship exists within many local governments, and that we may need additional tools to encourage remedial actions in some instances.

Thank you for your consideration of this request.

Sincerely,

WASHINGTON PUBLIC PORTS ASSOCIATION

Eric D. Johnson
Environmental Affairs Director

c: Jim Pendowski, Department of Ecology
WPPA Environmental Committee

STATE OF WASHINGTON
POLLUTION LIABILITY INSURANCE AGENCY
1015 10th Ave SE • PO Box 40930 • Olympia, Washington 98504-0930
(360) 586-5997 • FAX (360) 586-7187 • (800) 822-3905

October 27, 2000

Ms. Tish Akana
Rules Coordinator, Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, Wa. 98504-7600

Dear Ms. Akana;

Attached are the Pollution Liability Insurance Agency comments on the Proposed Amendments to the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC), the Small Business Economic Impact Statement, and the Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments to the Model Toxics Control Act.

James M. Sims
Director

Attachments

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Page 1 of 61

STATE OF WASHINGTON
POLLUTION LIABILITY INSURANCE AGENCY
1015 10th Ave SE • PO Box 40930 • Olympia, Washington 98504-0930
(360) 586-5997 • FAX (360) 586-7187 • (800) 822-3905

27 October 2000

POLLUTION LIABILITY INSURANCE AGENCY COMMENTS ON PROPOSED AMENDMENTS MODEL TOXICS CONTROL ACT CLEANUP REGULATION (Chapter 173-340 WAC)

and

SMALL BUSINESS ECONOMIC IMPACT STATEMENT FOR REVISION TO Chapter 173-340 WAC AMENDMENTS TO THE MODEL TOXICS CONTROL ACT

INDEX

A. General Comments

B. January 2000 Comments

C. Empirical Data as compared with Model Results

D. Small Business Economic Impact Statement

E. Increased Costs

F. Analytical Requirements for Naphthalenes and Carcinogenic PAHs

G. Institutional Controls

H. Terrestrial Ecological Evaluations

I. Grandfathering

J. Conclusions

Attachments

Appendix A: Small Business Economic Impact Statement

Appendix B: Cost - Benefit Analysis

2491

A. GENERAL COMMENTS

1. On March 13, 1997, the formal Rule-Making process for Amendments to the Model Toxics Control Act Cleanup Regulation commenced with a statement of objective: "All of the Policy Advisory Committee's recommendations to the Legislature and Ecology focus on making the business of ***cleanups fairer, easier to understand, more flexible with less ambiguity, and less expensive.***" (emphasis added)

2. Those objectives have not been accomplished. The proposed amendments present a cleanup regulation that is longer in text, as well as far more complicated and difficult to understand. That is particularly true for the average citizen or small business operator. Virtually every experienced environmental attorney, consultant or service provider that has commented, either formally or informally, on the proposed amendments has stated the opinion that the proposed rule is considerably more difficult to comprehend and implement than the existing rule.

3. The proposed rule is extraordinarily complex. To the small business operator, particularly one for whom English is a second language, the proposed cleanup regulation is all but impossible to understand or comprehend. As a result, a property owner encountering contamination (no matter whether the contamination is limited in scope, or extensive and complicated) will be forced to hire an environmental consultant just to find out what action is or is not required. This will result in additional expense the property owner is currently not faced with.

4. Attachment A (Figures A-1 through A-4), provides an illustrative description of four processes directed by the proposed rule; the TPH Decision Framework, Groundwater Cleanup Standards, Soil Cleanup Standards, and the Terrestrial Ecological Evaluation. These diagrams provide a dramatic exhibit of the incredibly complex and confusing nature of the proposed amendments. As complicated as these diagrams are, attempting to understand or determine requirements and processes from text alone is, at best, a daunting task. To expect a business owner or operator, or a homeowner to be able to comprehend the requirements and the process of a cleanup as set forth in the proposed rule is not reasonable, and not fair to the citizens of Washington. This is particularly true for contaminated sites that are very limited in scope, such as a residential heating oil release involving only contaminated soil. If the proposed amendments are not changed significantly to make assessment and cleanup requirements less complicated and confusing, the proposed rule should at least include illustrations similar to those included in Attachment A.

5. The proposed amendments are more arbitrary, not more equitable or less ambiguous. The proposed amendments have not provided the flexibility pledged. Throughout the proposed rule, Ecology has placed so many restrictions on the

use of site-specific assessment tools, that flexibility has all but disappeared. Further, the proposed amendments will result in a dramatic increase in the cost of cleanup of soil contaminated with petroleum products. The proposed amendments also cause an even more dramatic cost increase in the case of analytic testing requirements to determine cleanup requirements and achievement of cleanup standards. The proposed amendments are replete with ambiguity.

6.The proposed amendments are basically the same as published November 17, 1999. Changes are, by and large, only *cosmetic.*

7. The proposed amendments will have a significant negative impact on cleanup of contamination within the state. The proposed amendments will not encourage or enhance cleanups. Because of the increased complexity and increased cost of cleanup, the proposed rule will act as a detriment to Ecology's published Goal to "clean up pollution." The proposed rule will also have a negative impact on the accomplishment of the Toxics Cleanup Program Mission, "To get contaminants out of the environment and keep contaminants out of the environment."

8. If the proposed amendments are adopted as written, the process of conducting cleanups will be even more complicated than current, and significantly more expensive. Under those circumstances, it is quite likely that property owner and business operator will **avoid** conducting or completing cleanups of contaminants.

B. JANUARY 2000 COMMENTS

1. The draft of the proposed amendments published November 17, 1999, resulted in 52 written comments sent to Ecology in January 2000. Those comments were from other state agencies, federal agencies, local government entities, environmental interest groups, industry, trade associations, petroleum organizations, insurance companies, environmental engineers, consultants, service providers and private citizens.

a. .Lest there be any question as to whether the comments reflect undue attention from the petroleum industry, it must be noted that only 16 of the 52 written comments were submitted by petroleum companies, marketers, or interest groups.

2492

2. **Of the 52 comments submitted, 31 noted that the proposed amendments failed to meet the objectives of the Legislature (and endorsed by Ecology) of "making the business of making cleanups fairer, easier to understand, more flexible with less ambiguity, and less expensive."** The proposed rule remains more costly, more arbitrary, much more complicated and difficult to understand, and less flexible. The criticisms remain valid.

2493 3. **20 of 52 comments complained that the proposed amendments failed to include specific recommendations and/or the language of the PAC, POG or SAB.** Without significant changes to the proposed rule, the criticisms remain valid.

2494 4. **28 of 52 comments noted that the cost of cleanup would be increased because of the proposed rule, and/or questioned whether the increased cost was out of line with expected results.** Ecology has yet to explain or justify the increased costs of cleanup that will result from the proposed rule. Further, Ecology has yet to explain or justify the estimate included in the Small Business Economic Impact Statement of increased cleanup cost of "no more than 20%." The Department has yet to acknowledge or comment on the detailed cost increase analysis submitted by PLIA on January 18, 2000. Further, the new proposed amendments include requirements for analytic testing that will increase costs even more. The criticisms of increased costs of cleanup, with questionable justification or benefit, remain valid.

2495 5. **33 of the 52 comments included criticism of the model used by Ecology to determine cleanup levels, and/or questioned the lack of application of empirical data in developing the proposed rule.** Ecology persists in using a highly questionable approach and a very conservative model as the basis for determining cleanup levels ..... while continuing to ignore an overwhelming body of empirical data that demonstrates that more stringent or conservative cleanup levels are not justified. The criticisms remain valid.

2496 6. **22 of the 52 comments included criticism of the Terrestrial Ecological Evaluations and recommended significant changes.** In spite of promises from the Department for significant changes in this portion of the proposed amendments, the only changes made have been, at best, *cosmetic.* The criticisms remain valid.

2497 6. **15 of the 52 comments complained that Ecology had failed to engage in a negotiated rule-making process as Ecology had promised.** Over the past nine months, Ecology has communicated on the proposed rule with only a very selective number of stakeholders on a very selective basis. Further, Ecology has yet to comment on the written comments submitted in January 2000, and oral comments made at public forums by a broad range of stakeholders. Those comments were submitted in good faith by interested stakeholders who deserve more from the Department than to have opinions and recommendations ignored.....without even the courtesy of a comment. The criticisms remain valid.

2498 7. **14 of the 52 comments noted that although Ecology had claimed to have used a "risk-based approach" to cleanups, that the risk-based approach by Ecology, in fact, bore little resemblance to the ASTM Risk Based Corrective Action (RBCA) process.** The new proposed amendments include no changes

in this area. The contention of Ecology to have used a "risk-based approach" to cleanups, is hypocritical. The criticisms remain valid.

2499 8. In the current proposed amendments to the MTCA Cleanup Regulation, Ecology has all but ignored the significant comments and recommendations for change by interested and effected stakeholders

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C. EMPIRICAL DATA AS COMPARED WITH MODEL RESULTS

1. Ecology has proposed Method A soil cleanup standards for benzene and gasoline that are far more conservative and stringent than standards currently in place. Ecology has based the proposed cleanup levels on the narrow scientific results of a model that depends on extremely conservative, over-simplified and unrealistic assumptions. The model was developed for a different purpose and has been only partially validated.

2501 2. Ecology has failed to consider or to evaluate an overwhelming body of empirical and anecdotal data that demonstrates that more stringent soil cleanup levels for benzene and gasoline are not required and are not justified. Any added or increased benefit of more stringent cleanup levels has yet to be demonstrated by the Department.

3. Model-derived Method A soil cleanup levels should not be more stringent or conservative than existing levels unless Ecology is able to demonstrate that:

a. Existing or current cleanup levels are not protective of human health and the environment; or

b. Cleanups conducted over the past ten years under existing cleanup levels are not adequate to protect human health and the environment; or

c. Contamination, having been cleaned up to current cleanup standards, continues to pose a threat to human health and the environment.

4. To date Ecology has failed to demonstrate or document that existing or current cleanup levels are not protective of human health and the environment! To date Ecology has failed to demonstrate or document that cleanups conducted over the past ten years under existing cleanup levels are not adequate to protect human health and the environment!

2502 5. Empirical data not considered or ignored by Ecology includes: a 1995 study by the Lawrence Livermore National Laboratory; a 1997 study by the Bureau of Economic Geology of the University of Texas; a 1999 study completed by the Washington Departments of Ecology and Health; and, the results of several

thousand cleanups of petroleum products in Washington over the past ten years under existing cleanup standards.

2503 6. The Lawrence Livermore study was the result of an 18-month review of the regulatory framework and cleanup processes of California's leaking underground fuel tanks (LUFT).

a. The study found that out of 12,151 California public water-supply wells tested statewide, only 0.4% (48 wells) were reported to have measurable benzene concentrations. Of the 28,051 California LUFT sites, only 0.5% had effected drinking water wells. The total potential volume of groundwater impacted by LUFT plumes greater than 1 ppb benzene was estimated to be only 0.0005% of California's total groundwater basin storage capacity. Most of the affected wells were shallow, private domestic wells in close proximity to LUFT release sites.

b. 70% of LUFT site closures resulted in no impact on groundwater. The study concluded that the risk to groundwater had been over-estimated by 70%.

c. The study concluded that fuel hydrocarbons (FHCs) have limited impacts on human health, the environment, or California's groundwater resources. The study further concluded that the costs of cleaning up LUFT FHCs are often inappropriate when compared to the limited magnitude of the impact on groundwater resources.

d. The Livermore study is based entirely on field data. A model was used to only to aid statistical analysis of the field data.

e. In the past, Ecology has dismissed the findings of this study by one of the Nation's foremost research institutions as "not meeting the concept of MTCA". Ecology has not defined "the concept of MTCA" as it is relevant to this study, nor has Ecology provided any other justification for the rejection of this study that has been endorsed by industry, public interest groups and almost every other state.

2504 7. Ecology's Briefing Paper on the proposed amendments addresses, in part, the issue of empirical evidence. In an attempt to demonstrate that the Lawrence Livermore Study is flawed, the paper includes a statement from a California EPA Fact Sheet; "They concluded that the LLNL report unrealistically minimizes the magnitude of the Leaking Underground Fuel Tank (LUFT) problem."

a. That statement is misleading and not accurate. The entire statement from the CAL/EPA fact sheet is: "On May 31, 1996, the SB 1764 Advisory Committee submitted its final report. This report also recommends the use of risk based decision making in formulating corrective actions. They concluded that the LLNL report unrealistically minimizes the magnitude of the Leaking

Underground Fuel Tank (LUFT) problem. " The last sentence of the fact sheet is not accurate!

b. The SB 1764 Advisory Committee Recommendations Report, in fact, concludes, "The LLNL Recommendations Report provides a cogent, generally realistic review of the regulatory framework and cleanup processes currently applied to LUFT sites in California; however, *parts* of the report unrealistically minimize the magnitude of the LUFT problem." (See Attachment B)

c. Since the CAL/EPA fact sheet was published, representatives of the California EPA and the California State Water Resources Control Board have publicly acknowledged that the fact sheet was misleading and not accurate. During at least two national EPA UST/LUST Conferences and during each of the past three national EPA State Fund Administrator's Conferences representatives of the two California organizations have publicly discussed the fact sheet being incomplete, misleading and not accurate. Copies of the CAL/EPA Fact Sheet and SB 1764 Advisory Committee Recommendations Report are attached. (See Attachment B)

2505 8. The Texas study compiled and summarized data on more than 19,000 leaking petroleum storage tank (LPST) sites in Texas, 6,000 of which had impacted groundwater and resulted in fuel hydrocarbon plumes. The study concluded that because plumes appear to attenuate naturally, active remediation methods, such as pump and treat, would be required only in special cases to prevent a plume from impacting nearby receptors, or to reduce a plume that has already impacted a receptor.

2506 9. Ecology's Briefing Paper also includes the following statement: "The similar 1997 study by the Bureau of Economic Geology at the University of Texas also shows that benzene will degrade in groundwater. However, *this study has the same limitations as discussed above for the LLNL study.*" (emphasis added)

a. This statement is also misleading. The statement is not based on any formal study or analysis of the Texas study — just the personal opinion of the individual who wrote the comment. According to Dan Neal, head of the UST Reimbursement section of the Texas Natural Resource Conservation Commission, no formal analysis of the Texas study has been completed that either:

(1) concludes that the Texas study unrealistically minimizes the magnitude of leaking USTs, or

(2) concludes that the study failed to properly represent the degradation of benzene.

Mr. Neal, a veteran of several hundred UST cleanups, has expressed his continued confidence in the results of the study.

10. This flimsy attempt in Ecology's Briefing Paper to discredit the prestigious Lawrence Livermore and Texas studies is misleading and is, at best, very unprofessional.

2507 11. An April 1999 study by the Departments of Ecology and Health provides an analysis of approximately 160 contaminated wells throughout Washington. Of those 160 wells, only five (5) were contaminated by gasoline.

a. It is worthy of note that the cleanup levels for the hazardous substances (nitrates and arsenic, pesticides and others) causing contamination to 155 of the 160 wells have not been changed in the proposed amendments. The cleanup level for the substance contributing to only 3.2% of the contaminated wells, however, has been singled out for more stringent corrective action requirements.

b. **If there is no justification for changing the cleanup levels for the sources of 96.8% of the contamination of wells, surely there should be no justification for imposing a much more stringent cleanup level on the source of only 3.2% of the groundwater contamination.**

2508 12. Ecology has attempted no analysis of its own, in spite of an abundance of records and data associated with over 8000 petroleum cleanups, and in spite of over five years of review of the cleanup rule. Ecology has yet to complete, or even to attempt, an analysis of the more than 8000 completed petroleum cleanups in Washington. This is particularly troubling considering the 33 of the 52 comments received in January 2000 in response to the proposed rule criticized the model used by Ecology to determine Method A cleanup levels, and questioned the lack of application of empirical data in developing the proposed rule.

2509 13. Models and Results

a. The initial work performed by Ecology in reviewing MTCA cleanup levels and proposed Method A soil cleanup levels, was conducted using a Three-Phase Model. The Three-Phase Model was published in the 1996 EPA technical guidelines regarding soil cleanup protocols. The soil-partitioning model was introduced for the purpose of providing quick screening levels for protection of groundwater at CERCLA sites. The model was developed for screening of large industrial sites, not to establish cleanup levels for small or routine petroleum cleanups.

2510 b. Ecology also examined the Interim TPH Policy (developed by Ecology) and contracted with Dr. Richelle King of Washington State University to assess

the basic assumptions underlying the Interim TPH Policy. On June 29, 1998, Dr. King reported to Ecology her assessment that, based on a survey of literature, the Interim TPH policy was not sensitive enough. She recommended the use of the Four-Phase Model.

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c. The Four-Phase Model. The non-linear mathematical formula describing the equilibrium four-phase partitioning for organic mixture and its subsequent numerical techniques to solve equations was developed by Drs. Paul Mariner, Henry Mott, Stan Feenstra and others, and has been in the academic world for about ten years. However, the numerical techniques to solve equations were not readily accessible to the general consulting community. Ecology considered awarding another grant to Dr. King to perform additional analysis regarding the use of the model. Instead, Hun Seak Park of PLIA spent most of his time over a period of several months to translate the equations and calculations of the model into an executable program using *Excel*. Park delivered his program to Ecology in late November 1998.

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14. The Four-Phase Model used by Ecology is an improvement over the Three-Phase Model in describing a single phenomenon in the microscopic soil system. The Four-Phase Model, however, like most models, has its limitations.

a. The model fails to incorporate other important natural attenuation phenomena, one of the most important factors related to benzene or gasoline release sites. The model assumes that the concentration of petroleum at the point of source is exactly the same as the concentration that will reach groundwater, no matter the actual distance between the two.....whether 8 feet or 80 feet in depth.

b. The model depends on very conservative assumptions (including default input parameters) regarding the factors influencing the transport of fuel hydrocarbons to groundwater, and regards potable groundwater as the ultimate receptor at the source.

c. The model has not been fully validated for developing cleanup levels for small or routine petroleum cleanups.

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15. By using the model as its single source for Method A soil cleanup levels, Ecology has adopted the most conservative and stringent approach available, and has adopted it without regard to other considerations, particularly empirical data and anecdotal evidence readily available from Ecology's UST/LUST field regulatory staff.

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16. It is noteworthy and indeed ironic that Ecology's staff is actively promoting and advocating the use of natural attenuation as a preferred method for petroleum marketers to deal with cleanups ..... while using as its single source for determining Method A cleanup levels, an approach that ignores the natural

attenuation phenomena. When members of the Ecology staff have been queried as to the contradiction, the response has usually been shrugged shoulders.

2575 17. Over the past ten years, several thousand cleanups of petroleum spills and releases throughout the state have been completed, or are underway.

- There is no evidence whatsoever that the results of these cleanups has not been protective of human health and the environment!

- There is no evidence that any cleanup of petroleum products has failed to protect ground or surface water!

- There is no evidence that current soil cleanup levels are not adequate to protect human health and the environment!

2576 18. The Pollution Liability Insurance Agency (PLIA) has, under various programs, completed cleanups of 215 UST sites and over 350 heating oil sites. There is no evidence whatsoever that the cleanup of any of those 565 contaminated sites was not sufficient or adequate to protect human health and the environment. PLIA is currently working on the cleanup of an additional 93 UST sites and another 90 heating oil sites throughout the state. As with closed claims and completed cleanups, **there is no evidence that existing cleanup levels are not sufficient to be protective of human health and the environment.**

2577 19. Ecology has not demonstrated nor articulated justification for the adoption of more stringent costly cleanup levels without consideration for extensive empirical and anecdotal data! Therefore, the proposed Method A soil cleanup levels for benzene and gasoline should be withdrawn. PLIA recommends returning to the current Method A soil cleanup levels for benzene and gasoline.

2578 **D. SMALL BUSINESS ECONOMIC IMPACT STATEMENT**

1. The Small Business Economic Impact Statement (SBEIS) prepared to accompany the proposed amendments is a disappointing statement of the impact of the proposed rule on small businesses. The SBEIS demonstrates an appalling lack of understanding of the challenges facing small business operators, particularly petroleum marketers.

2. The SBEIS is long on *boilerplate* and rhetoric, but very short on substance, particularly impact on and increased costs to small business owners and operators (less than one page out of eight pages). Further, the SBEIS includes approximately one and one half pages of *Regulatory Relief* measures; measures which represent little, if any, actual relief for, or positive impact on, small businesses owners and operators. In fact, more than half of the thirteen

measures already exist and to date have proved to be ineffective as relief measures for owners and operators of small businesses.

3. The proposed amendments must be changed to mitigate the increased cleanup costs and disproportionate negative economic impact on small business owners and operators.

4. Appendix A provides a detailed critique and analysis of the SBEIS.

2546 **E. INCREASED COSTS**

1. The stated objective of the proposed amendments is "making the business of cleanups fairer, easier to understand, more flexible with less ambiguity, and **less expensive**." (emphasis added) The objective of the proposed amendments to the cleanup rule was certainly not to make the cost of cleanup of contamination so high and prohibitive that fewer cleanups will be accomplished.

2. The stated objective of MTCA, and Ecology to increase and to facilitate cleanup of the environment will actually be diminished by the proposed amendments to the cleanup rule, not increased or facilitated.

3. Gasoline Cleanups

a. The proposed amendments establish Method A soil cleanup levels that are far more stringent and conservative that those cleanup levels currently in place. The result will be a significant increase in the cost of cleanup of sites contaminated with petroleum products.

b. Potential cleanup costs have been increased even more because of the adoption of additional analytic testing requirements of more chemicals than those requirements currently in place. The requirement for those more stringent testing and assessment requirements has not been demonstrated by Ecology. The benefit to be derived from those more stringent testing and assessment requirements has not been demonstrated by Ecology

c. Attachment C (Tables C-1 through C-5), provides a detailed analysis of PLIA's estimate of increased cleanup costs: a 41% cost increase for soil cleanup and 20% cost increase for cleanup of groundwater under Method A.

d. The PLIA cost increase estimates are realistic, not over-estimated. It is quite probable that if the proposed cleanup levels are adopted, actual increased costs for soil cleanup might exceed 45 or 50% for quite a few sites.

e. For the majority of commercial LUST sites contaminated by gasoline, the potential savings in remediation cost of cleanup under Method B (tiered

approach) will be off-set by the significant cost of risk assessment. This is due to the conservative default RME (reasonable maximum exposure) specified in the proposed rule. Attachment C provides detailed analysis.

f. It should be readily apparent that such a dramatic increase in the cost of cleanup will result in fewer cleanups being accomplished. It is a fundamental reality that there is only a finite amount of money available, particularly to a small business owner or operator.

(1) If the cost of cleanup of contamination increases 44%, or even 20% (Ecology's cost increase estimate included in the SBEIS), that increased cost will lead business owners to delay as long as possible accomplishing cleanups.

(2) If the cost of cleanup of contamination increases 44%, or even 20%, it is quite likely that property owner and business operator will **avoid** conducting or completing cleanups of contaminants.

(3) The proposed rule will, no doubt, have quite the opposite effect of encouraging or enhancing cleanups of contaminants.

2547 **4. Heating Oil Cleanups**

a. In the case of heating oil contamination cleanups, the proposed amendments include requirements for additional analytic testing during the initial site assessment. Attachment D (Figure D-1 and Table D-1) compares testing requirements and costs for the current cleanup regulation, as well as the proposed rule. In the case of a typical heating oil cleanup five samples are usually taken. The impact on a heating oil cleanup is:

Current Testing Costs	5 samples X $80 = $400.00
Proposed Method A	5 samples X $325 = $1625.00
Proposed Method B	5 samples X $575 = $2875.00

b. Additional costs may also be incurred in the cleanup of heating oil contaminated soil because of the requirement for a *Terrestrial Ecological Evaluation* of each site. Also attached is a chart that is a comparison of the total cost of a heating oil cleanup for contaminated soil. The comparison is based on the average cost of cleanup experienced by PLIA in responding to 433 claims.

Current Cost (Interim TPH)	$5320.00	
Proposed Method A (Human Health Protection – 2000 mg/kg)	$7465.00	(40% increase)

Proposed Method A (Terrestrial screening level – 460 mg/kg)	$8305.00	(56% increase)
Proposed Method B	$9195.00	(73% or more increase)

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5. Additional Testing Costs

a. The proposed amendments include requirements for additional analytical testing. Attachment E is a detailed analysis of PLIA's estimate of increased costs associated with additional analytical testing requirements. The cost estimate is based on current analysis fees charged by Sound Analytical Services of Tacoma. PLIA estimates that increased costs for analytical testing for initial site assessment to be:

- Gasoline Range Organics (Method A) – 150% increased cost.
- Gasoline Range Organics (Method B) – 172% increased cost.
- Diesel Range Organics (Method A) – 306% increased cost.
- Diesel Range Organics (Method B) – 619% increased cost.

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6. Analytical Requirements for Naphthalenes and Carcinogenic PAHs

a. Table 830-1 of the proposed rule directs Required Testing for Petroleum Releases. Table 830-1 includes requirements for testing of Carcinogenic PAHs and Naphthalenes for diesel range organics. These tests would add additional expense to the cost of cleanup, but are not necessary for residential sites contaminated with heating oil.

b. Attachment F provides a detailed discussion of the reasons the tests for Carcinogenic PAHs and Naphthalenes are not necessary.

c. Recomendations:

(1) Remove Table 830-1 from the proposed amendments and include the table in guidance documents to be published in the future..

(2) For Naphthalene: For #2 fuel oil petroleum hydrocarbons, the analysis of Naphthalenes is not necessary, and will not violate the groundwater cleanup level in the Method A table due to the multiple substance effects.

(3) For Carcinogenic PAHs: For #2 fuel oil petroleum hdrocarbons, the analysis of Carcinogenic PAHs is not necessary, and will not violate the cancer risk level in Method B.

(4) Delete requirements for analytical testing for Naphthalenes and Carcinogenic PAHs for diesel range orgaqnics. By not requiring analytical testing for Naphthalenes and Carcinogenic PAHs, a significant cost savings will be experienced, particularly for residential heating oil release sites

2552 **7. Increased Cost of Pollution Liability Insurance.** The more stringent cleanup standards directed by the proposed rule will result, not just in increased cleanup costs, but also in costs for pollution liability insurance ... required by federal and state law for underground petroleum storage tanks. The impact of increased cleanup costs on the price of insurance was clearly stated by experienced insurance professionals in written comments submitted to Ecology in January 2000. The comments also addressed the problem of questionable availability of pollution liability insurance, if more stringent cleanup standards are adopted. Those comments have been ignored.

a. In determining insurance premiums, an insurance company calculates projected costs associated with a policy: corrective action costs, program and policy monitoring, legal defense costs, third party bodily injury and property damage losses, underwriting expenses, loss adjustment expenses, and transactional expenses such as agent's commissions.

b. Corrective action costs represent approximately two-thirds of the total costs for an insurance company selling pollution liability coverage. Any increase in corrective action costs must result in a direct increase in premiums for the insurance coverage.

c. Loss adjustment expenses, such as the costs of engineering consultants employed to assist with administration of claims, will increase because cleanups under more stringent standards and more complicated rules, will take longer to complete and will take more effort.

d. Sites that were previously closed may be subject to review by Ecology. Although the proposed rule includes a *grandfather* clause (to be discussed later in these comments), the rule provides that Ecology has the authority to review and require additional cleanup if Ecology believes the previous cleanup was not adequately protective of human health and the environment. This is likely to result in prior claimants suing for additional cleanup of their properties. This presents the insurance company with new liabilities that are not currently quantifiable and for which premiums were not charged. The result will be that current and future insureds must pay the additional cleanup costs and expenses from the previously closed claims. That obligation will be paid by increased premiums on future policies.

e. Because cleanups in many cases will take significantly longer to accomplish than under the current rule, third parties whose properties could be contaminated may be more likely to sue for diminution of property values. This

too presents the insurance company with liabilities that are not currently quantifiable, but will probably result in higher pollution liability insurance premiums.

f. The January 2000 comments from one insurance company (which currently insures more than 50% of the USTs in the state) estimated that future and retroactive costs associated with the then-proposed amendments would increase the cost of claims from 30% to 75%. Those increased costs will be passed along directly to UST owner and operators in the form of higher pollution liability insurance premiums.

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G. INSTITUTIONAL CONTROLS

1. Institutional Controls are defined and detailed in WAC 173-340-440, and are also outlined in an information bulletin published with the proposed amendments. Institutional controls are defined as "measures used at contaminated sites to ensure that the actual use to which a site is put after cleanup is compatible with the level of cleanup completed." The bulletin goes on to explain, "Where cleanup standards cannot be met and, therefore, a permanent cleanup is not possible, the department may approve the use of institutional controls as a remedy or cleanup action for all or a portion of the site." Institutional controls can include physical measures such as fences, or use restrictions on the property.

2. In reality, an institutional control results in a *deed restriction*, because the institutional control will limit the use of the property. It will be very difficult to sell a property with a deed restriction. It is also not likely that a lender would make a loan (for example, for improvements) if the property were the collateral, because there would be a restriction on the use of the property. Further, placing a deed restriction on a property will likely result in dramatic reduction in the value of the property.

3. Unfortunately, institutional controls result in a *deed restriction* that will make the transfer of the property, whether a residence, small business or a church, all but impossible.

4. Institutional controls may be of benefit in some limited circumstances, particularly for large businesses that seldom have turnovers of properties. However, when institutional controls are applied to a small business property or a residence, there is no benefit, only restriction....not just restriction of use, but also restriction as to the possibility of transferring the property in the future.

5. Useful in limited circumstances, institutional controls do not provide regulatory relief to small business owners or operators, or to homeowners. Quite to the contrary, institutional controls have an almost staggering and overwhelming impact on the small business operator.

6. The Final Report of the MTCA PAC (December 15, 1996) provided Ecology guidance regarding Institutional Controls; ".... avoid unnecessary land use controls or regulation on sites and avoid incentives for excessive paving." That guidance has not been followed in the preparation of the proposed rule.

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H. TERRESTRIAL ECOLOGICAL EVALUATIONS

1. Terrestrial Ecological Evaluations provide a prime example of the ambiguity of the proposed amendments; ambiguity that the Legislature directed and Ecology promised would be reduced in the proposed amendments.

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2. "Terrestrial Ecological Evaluation" is not defined in the proposed amendments. Terrestrial Ecological Evaluation requirements are simply not clearly stated in the proposed rule.

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3. "Terrestrial ecological receptors" are defined as "plants and animals that live primarily or entirely on land." One is led to conclude (perhaps or perhaps not) that a Terrestrial Ecological Evaluation is the evaluation of impact on terrestrial ecological receptors

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4. Terrestrial Ecological Evaluations are of particular concern regarding potential impact on residential and small business sites that have experienced contamination from heating oil tanks. The impact of this portion of the proposed rule on heating oil contamination sites is potentially very serious, and very costly. While the proposed Method A includes a soil cleanup level for diesel range organics of TPH 2000 mg/kg, for all intensive purposes the Terrestrial Ecological Evaluation Procedure imposes a cleanup level of 460 mg/kg.

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5. Considering terrestrial ecological evaluation procedures, without being trapped by *Institutional Controls*, the only way to obtain a more favorable cleanup level than TPH 460 mg/kg for a site contaminated by heating oil is:

a. To have the area of soil contamination be less than 350 square feet, or

b. Contamination deeper than 15 feet below the ground surface, or

c. To conduct a site-specific terrestrial evaluation (WAC 173-340-7493).

6. Site-specific terrestrial ecological evaluation assessment tools are not currently available to readily measure the impact of chemical constituents on terrestrial ecological receptors. Because of the overall qualitative nature of eco-science, results would be uncertain and ambiguous. Further, the process would be extremely time-consuming and expensive. This process would involve a significant expenditure of funds, funds that would be much better spent on cleanup actions that actually accomplish the removal/remediation of contaminants.

7. WACs 173-340-7491 and 7492 provide exclusions from the requirement to conduct the evaluation, and many heating oil contamination sites should be able to qualify for an exclusion. However, WAC 173-340-7492 (c) (3) includes the statement:

> "Institutional controls. If any of the conditions listed above in subsection (2) (a) through (c) of this section are used to end the simplified terrestrial ecological evaluation, ***institutional controls may be needed*** to ensure that the condition will continue to be met in the future." (emphasis added)

8. The problems resulting from this statement are twofold:

a. Institutional controls result in a deed restriction that will make the transfer of the property, whether a residence, small business or a church, all but impossible.

b. Many Ecology field inspectors might well err on the side of being conservative and, particularly when in doubt or if the inspector is inexperienced, would impose institutional controls on a site without understanding the financial and social implications on the homeowner or small business operator. The term ***institutional controls may be needed*** must be changed.

9. PLIA recommends the statement be changed to read; "...are used to end the simplified evaluation. If the department can demonstrate that the condition is a potential threat to human health and the environment, institutional controls may be required."

10. The Final Report of the MTCA PAC, when discussing Terrestrial Ecological Evaluations, provided Ecology guidance regarding Institutional Controls; ".... avoid unnecessary land use controls or regulation on sites and avoid incentives for excessive paving."

11. The only study Ecology accomplished on Terrestrial Ecological Evaluation examined impact on businesses (bulk oil plant, apartment buildings, etc.). Criteria established for commercial sites should not necessarily be applied to residential homes.

12. Nine months ago, the impact of these various aspects of Terrestrial Ecological Evaluations were identified by a wide range of stakeholders; 22 of the 52 written comments included criticism of the Terrestrial Ecological Evaluations and recommended significant changes. Ecology personnel promised those changes. However, changes made to this portion of the proposed rule have been *cosmetic* only, with no real substance. The same problems with this portion of the proposed rule that existed in the previous draft still exist.

13. Substantive changes must be made to this portion of the proposed rule. If not made, homeowners and small business operators will experience additional

increased costs.....for questionable, if any, benefit to human health and the environment.

2559 **I. "GRANDFATHERING"**

1. WAC 173-340-702 (12) discusses what is commonly referred to as *Grandfathering* of cleanups completed prior to adoption of the proposed cleanup levels included in the amendments. WAC 173-340-702 (12) provides that:

a. For cleanup actions conducted by Ecology, or under an order, the cleanup level is to be that level in effect when Ecology issued the final cleanup action plan.

b. For cleanup actions conducted as independent remedial actions, the cleanup level is to be that (1) in effect when final cleanup action began, or (2) in effect when Ecology reviews the action ... whichever is less stringent.

c. Cleanup actions completed under either of these options are not to be subject to further review action unless Ecology considers the cleanup level no longer sufficient to be protective of human health and the environment.

2. The concept of *grandfathering* cleanups completed under previous cleanup levels is a fine concept, but it is a concept, not reality. The concept fails to take into account fundamental business practices and the lending philosophy of most lending institutions.

3. A lending institution dealing with a property with a history of contamination that was cleaned up to a previous cleanup standard will demand a clear title to a property before its sale will be financed, or before the lender will consider the property as collateral for a loan. Based on PLIA experience, the lender will probably not be satisfied with a deed which reflects a cleanup conducted years or months prior .... under previous cleanup levels, as opposed to the proposed cleanup levels, or cleanup levels to be proposed in the future. Few lenders will be comfortable granting a mortgage or making a loan (with the property as collateral) on property that has not been cleaned up to the proposed cleanup levels.

4. It will matter little whether Ecology does or does not conduct a review of each cleanup completed ....lenders will probably demand such reviews. It is highly questionable if Ecology will be able to assemble the resources necessary to conduct reviews of thousands of previous cleanups in a timely manner so as not to disrupt property transfers or loans.

2560 5. The WAC calls for reviews by Ecology on a case-by-case basis. Without reviewing each previous cleanup action and considering a risk assessment of each, how could Ecology possibly determine whether any or all of the previous cleanups are protective of human health and the environment? Ecology simply

does not have the resources to complete the review and risk assessment of several thousand cleanups completed under existing cleanup levels and procedures.

2561 6. This particular issue demonstrates a fundamental contradiction in Ecology's proposed amendments to the cleanup rule.

a. The proposed amendments include cleanup levels for many substances (particularly petroleum) that are much more stringent or conservative than those currently in effect.

b. In order to justify adoption of more stringent cleanup levels, Ecology should have determined that existing cleanup levels are not protective of human health and the environment. That being the case, cleanup actions completed under the existing cleanup levels are all likely to be subject to review action by the department.

7. The contradiction is elementary:

a. Either all cleanups completed under the existing levels are not sufficient to protect human health and the environment, and therefore must be subject to review by Ecology, or

b. Cleanups are protective and need not be reviewed.

c. If the latter is true, that all cleanups completed under previous cleanup levels are indeed protective, Ecology cannot justify new, more stringent and conservative cleanup levels.

8. PLIA recommends deletion of WAC 173-340-702 (12) (c).

J. CONCLUSIONS

1. Because of the increased complexity and increased cost of cleanup, the proposed rule will act as a detriment to Ecology's Goal to "clean up pollution." The proposed rule will also have a negative impact on the accomplishment of the Toxics Cleanup Program Mission, "To get contaminants out of the environment and keep contaminants out of the environment."

2. If the proposed amendments are adopted as written, the process of conducting cleanups will be even more complicated than current, and significantly more expensive. Under those circumstances, it is quite likely that property owner and business operator will **avoid** conducting or completing cleanups of contaminants.

3. The proposed amendments will not encourage or enhance cleanups of contaminants.

Attachment A:
- Figure A-1 – TPH Decision Framework
- Figure A-2 – Groundwater Cleanup Standards
- Figure A-3 – Soil Cleanup Standards
- Figure A-4 – Terrestrial Ecological Evaluation

Attachment B:
- Cal/EPA Fact Sheet
- SB 1764 Advisory Committee Report

Attachment C:
- Table C-1 – Cost Analysis for Soil Cleanup (Method A)
- Table C-2 – Cost Analysis for Soil Cleanup (Method B Tier I)
- Table C-3 – Cost Analysis for Soil Cleanup (Method B Tier II)
- Table C-4 – Cost Analysis for Soil Cleanup (Method B Tier III)
- Table C-5 – Cost Analysis for Groundwater Cleanup

Attachment D:
- Figure D-1 – Heating Oil Cleanup Cost
- Table D-1 – Cost Analysis for Soil Cleanup (Heating Oil)

Attachment E: Analytical Testing Cost Comparison

Attachment F: Analytical Requirements for Naphthalenes and Carcinogenic PAHs
- Figure F-1 – TPH Partitioning Model Soil Cleanup Levels for Groundwater

Appendix A – Small Business Economic Impact Statement (SBEIS)

Appendix B – Cost-Benefit Analysis

Figure A-1. TPH DECISION FRAMEWORK
(Proposed Amendments of MTCA: August 2000)

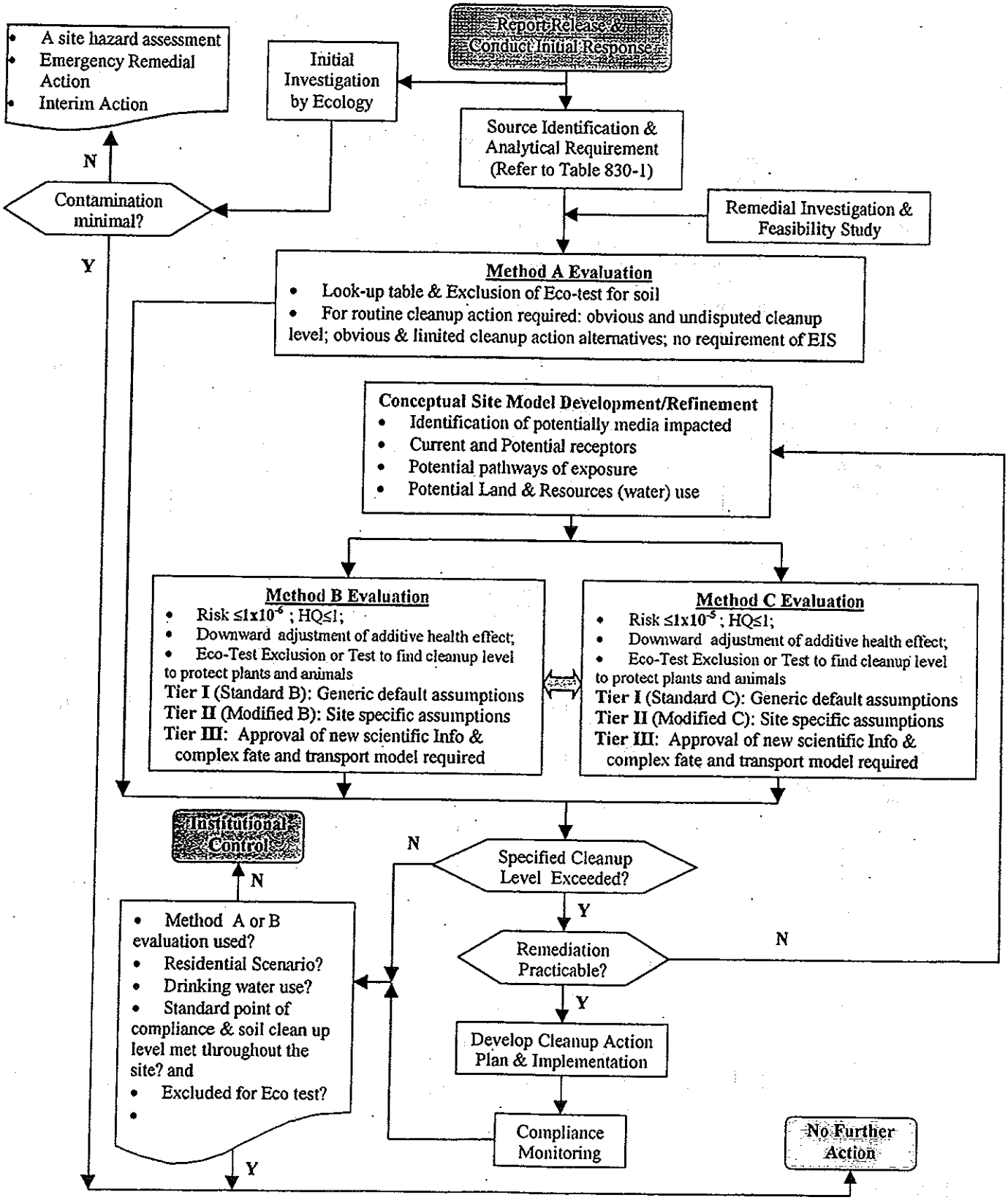
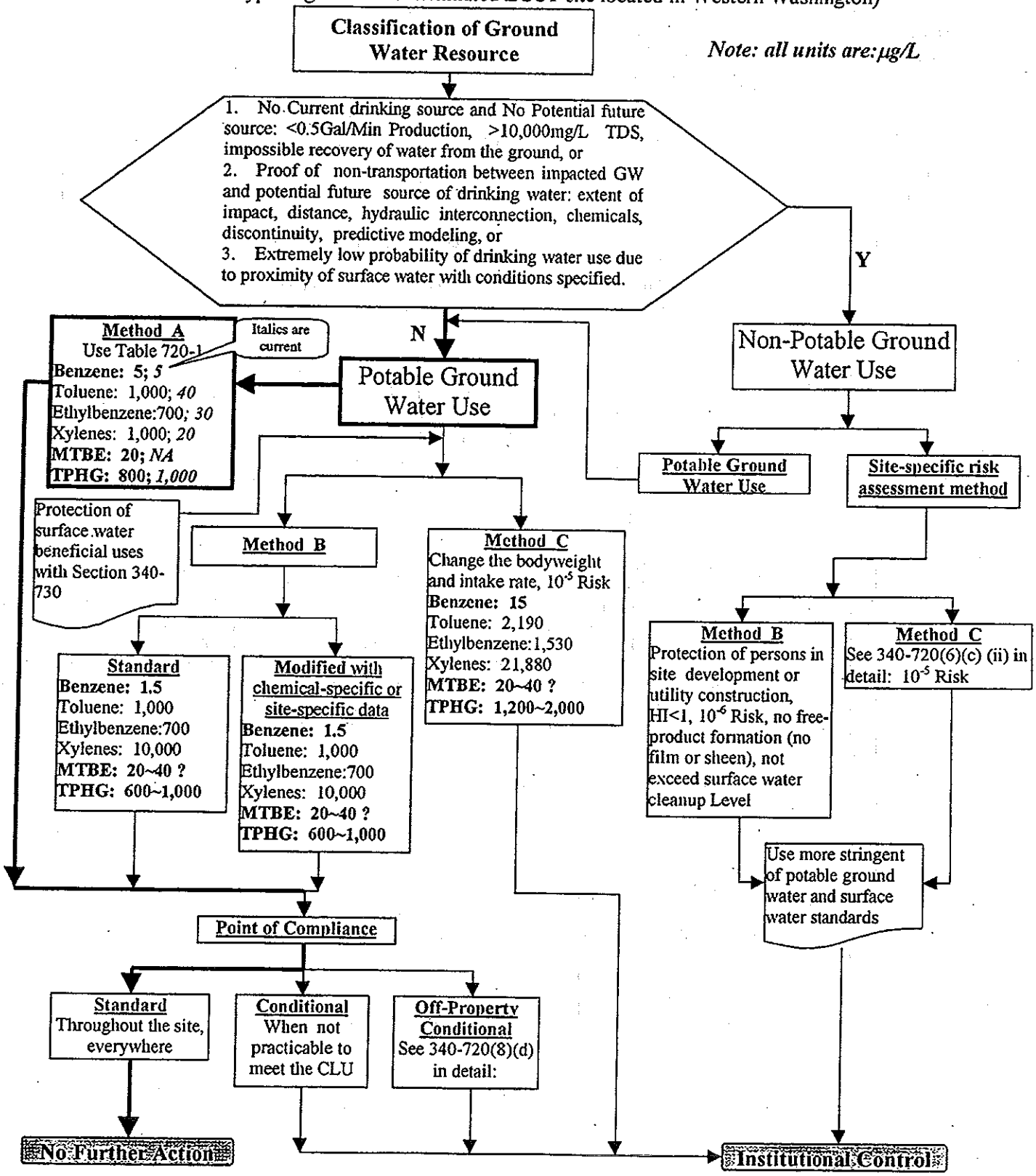


Figure A-2. GROUND WATER CLEANUP STANDARDS

(Proposed Amendments of MTCA: August 2000:
For a typical gasoline contaminated LUST site located in Western Washington)



GW_CUL.doc 10/19/2000

Figure A-3. SOIL CLEANUP STANDARDS for Unrestricted Land Use

(For a typical gasoline contaminated LUST site located in Western Washington: August 2000)

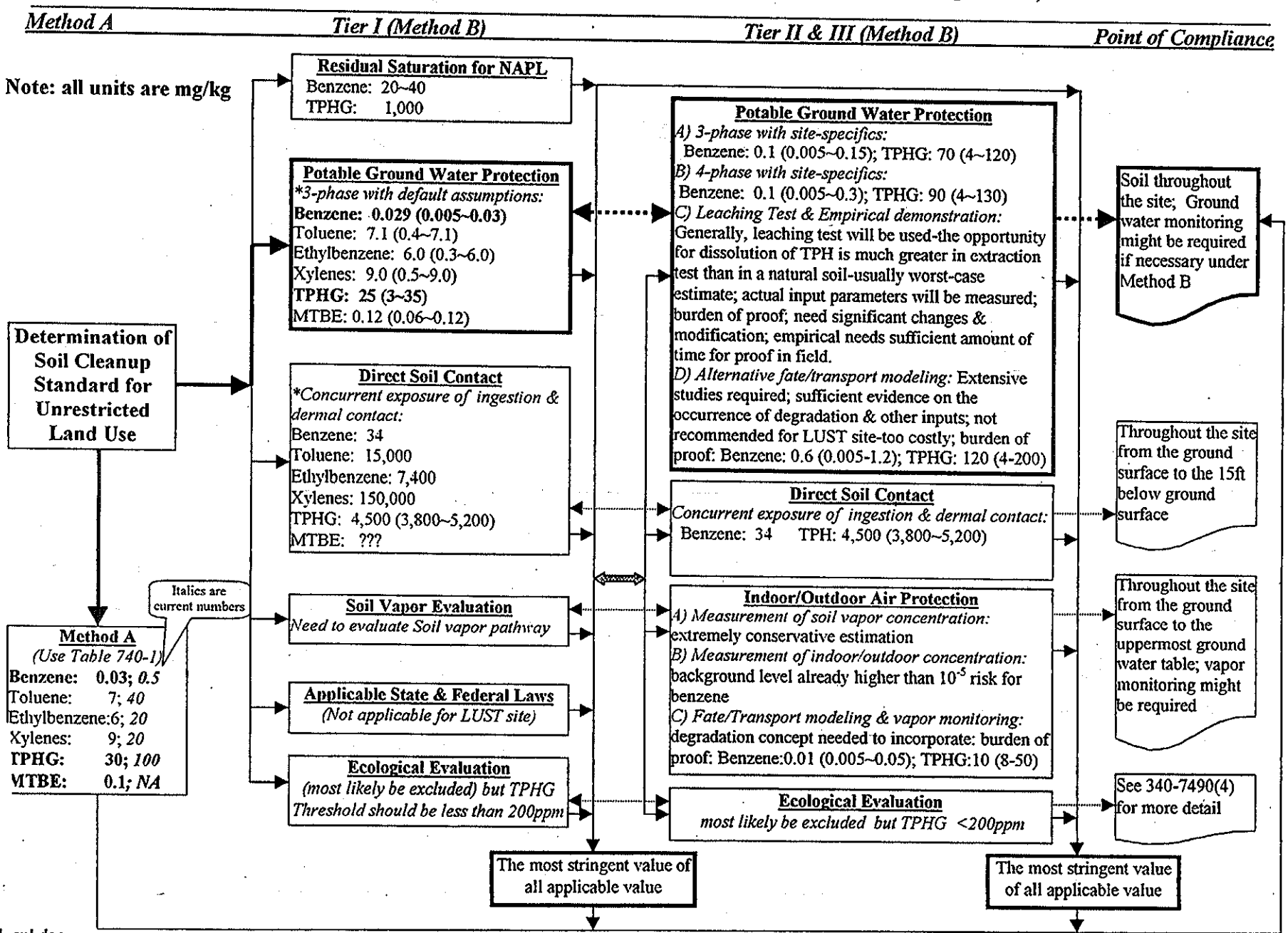
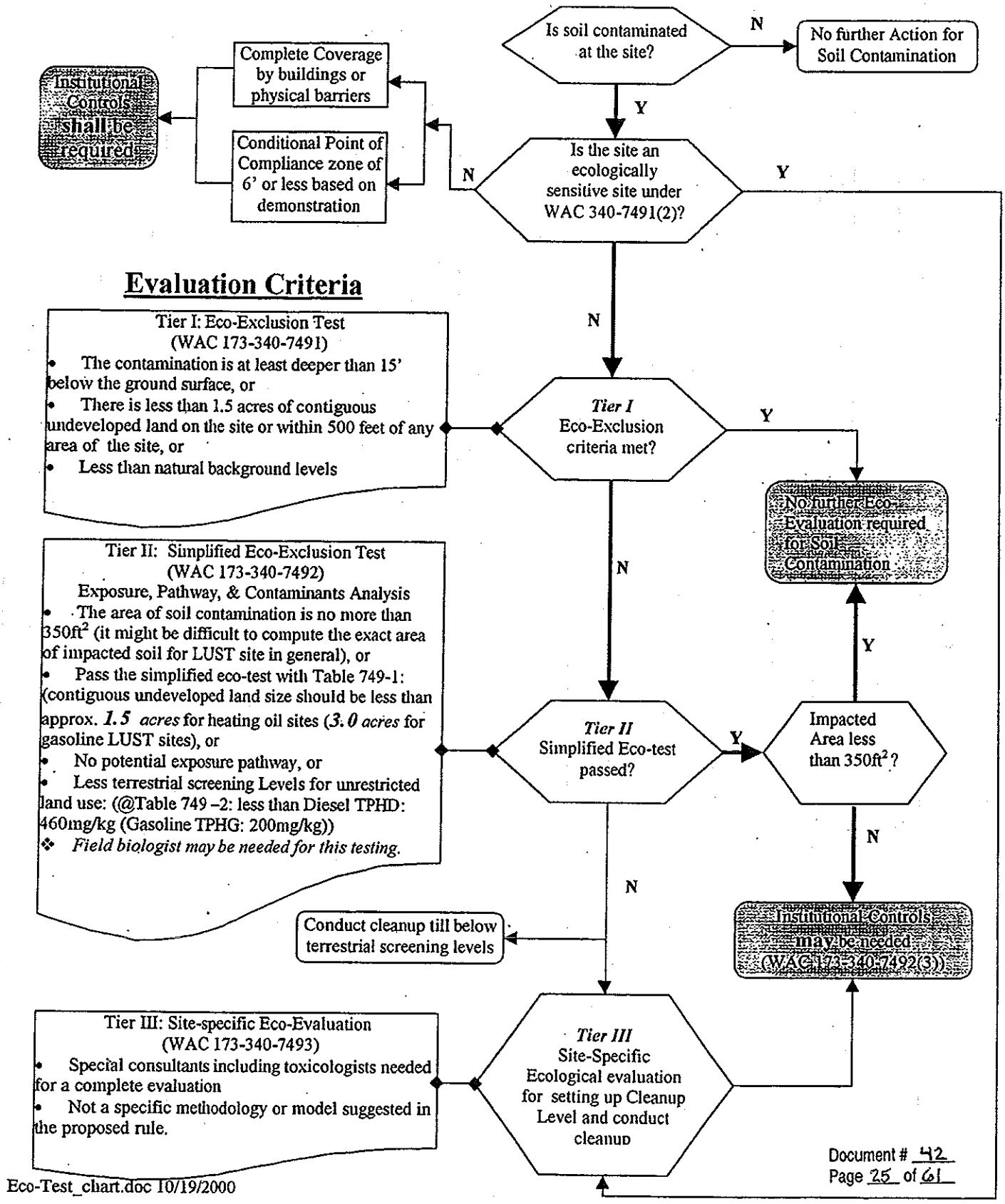


Figure A-4. Terrestrial Ecological Evaluation

(Unrestricted Land Use: Proposed Amendments of MTCA August 2000)



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Policy For Cleanup of Underground Petroleum Storage Tanks

Revised: January 1997

Contact: For additional information regarding the policy for cleanup of underground petroleum storage tanks, please contact SWRCB Ombudsman's Office at (916) 657-1287.

SUMMARY

The cleanup requirements for underground petroleum storage tanks have been a major issue with tank owners and the Legislature.

The Legislature directed the State Water Resources Control Board (SWRCB) to form a Scientific Advisory Committee to provide advice on cleanup requirements (SB 1764 Advisory Committee).

The SWRCB contracted with the Lawrence Livermore National Laboratory (LLNL) to study the petroleum tank cleanup problem and make recommendations regarding appropriate cleanup strategies.

BACKGROUND

On November 2, 1995, LLNL submitted a report that concluded that leaks from underground petroleum storage tanks did not appear to cause a pervasive problem with domestic drinking water supplies. They concluded that classical petroleum plumes degraded within relatively short distances from the sources. The report recommended:

- Utilization of passive bio-remediation as a remediation alternative wherever possible.
- Modification of existing policies to use risk based decision making in the cleanup decision.

On May 31, 1996, the SB 1764 Advisory Committee submitted its final report. This report also recommends the use of risk based decision making in formulating corrective actions. They concluded that the LLNL report unrealistically minimizes the magnitude of the Leaking Underground Fuel Tank (LUFT) problem. The report further recommends the SWRCB provide written guidance on risk classification, analytical protocols, source removal, cleanup standards. The report suggests the SWRCB modify its current process for designation of drinking waters in the statewide context as well as the Basin Planning process.

In response to these reports, the SWRCB staff has prepared a draft policy which is undergoing internal review. That policy will be subject to the SWRCB's rule making process and will undergo full public review including public hearings, prior to adoption of any specific policy provisions.

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Senate Bill 1764 Advisory Committee Recommendations Report Regarding California's Underground Storage Tank Program

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Submitted to the California State Water Resources Control Board

May 31, 1996

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Recommendation

Cal/EPA should create a task force to develop such written guidance.

16. SOIL CLEANUP STANDARDS

Conclusion

Default regulatory standards for soil cleanup at LUFT sites are not scientifically supportable, particularly those based on TPH concentrations in soil.

Recommendation

Soil cleanup "standards" should be developed site-specifically as outlined in the adopted risk-based decision-making approach, and should be determined for chemicals of concern (not TPH).

LLNL HISTORICAL CASE ANALYSIS REPORT

Conclusion

The LLNL Historical Case Analysis Report adds significantly to the growing body of evidence that average benzene plume dimensions tend to be smaller than if the benzene were not biodegrading significantly at many sites. The LLNL and SWRCB staff should be congratulated for this major effort in data reduction and analysis. Estimates of plume dimensions in the LLNL report are highly approximate, however, and should not be used directly as general screening criteria in risk-based decision making.

Recommendation

The LLNL Historical Case Analysis Report findings should be used to provide a scientific foundation for consideration of intrinsic bioremediation as a viable clean-up alternative where appropriate. Also, the SWRCB should direct LLNL to thoroughly demonstrate the efficacy of methods used in estimating plume dimensions so that readers can more fully ascertain the meaning of the results. Following this necessary demonstration, some of the report statistics may be useful in development of screening-level criteria for risk-based decision-making.

LLNL RECOMMENDATIONS REPORT

Conclusion

The LLNL Recommendations Report provides a cogent, generally realistic review of the regulatory framework and cleanup processes currently applied to LUFT sites in California; however, parts of the report unrealistically minimize the magnitude of the LUFT problem.

Table C-1. Cost Analysis for Soil Cleanup (Method A)

(For a Typical Gasoline Contaminated LUST site located in Western Washington)

CORRECTIVE ACTIONS	Method A Current	Method A Proposed	SPECIFIC COMMENTS
Initial responses			
reporting a release to Agency; fire and safety hazard mitigation; identification of source and cause of release; gathering the basic site information; facilities search; familiarization	$640	$640	standard labor cost of 8 hrs work @$80/mhr
Immediate and Interim Actions			
mitigation of hydrocarbons in their vapor, dissolved, or liquid phase; liquid hydrocarbon recovery and containment; vapor abatement; identification of potentially affected community; alternating drinking water supplies; security of site; off-site access permit	$1,920	$1,920	standard labor cost of 24 hrs work @$80/mhr
Site Assessments			
basic sampling activities with soil borings and chain of custody required:	$3,500	$3,500	10 subsurface boring locations with a geoprobe type tool used
lab analysis of samples taken:	$3,460	$8,360	20 samples; additional lab test analysis required; refer to the proposal
on-site and off-site delineation to see the extent & movement of contamination; source area identification; receptor survey; simple site survey; finding impact to structures and utilities; review of geologic/hydrologic setting; defining the remediation goal; reporting	$1,920	$2,208	additional site assessment cost due to more indicator compounds to monitor than before (+15%); standard labor cost of 24 hrs work @$80/mhr
Terrestrial Ecological Evaluation			
characterizing the existing or potential threat to terrestrial plants or animals	$0	$240	refer to 340-7491 (exclusion) and 340-7492 (simplified test); needs experienced field biologist; need labor cost of 3 hrs work @$80/mhr
Risk Evaluations for the Protection of Human Health			
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with fate/transport models; reporting	$800	$920	under the Method A, soil cleanup levels have been developed under the generic site conditions (the most conservatively); minimal cost for risk evaluation; proposed need additional 15% labor due to additional chemicals to monitor; standard labor cost of 10 hrs work @$80/mhr
Remedial Action Plan and Implementation [a]			
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; installation of remedial systems; pre-excavation evaluation for excavation area if chosen; alternatively, the excavation/transport/disposal of the soil impacted above cleanup levels	$24,000	$24,000	soil remediation cost calculation was based on two alternatives: A) with SESOIL modelling[b] under a hypothetical LUST scenario, volume of soil to be treated was calculated using unit cost for soil excavation/disposal; B) Bioventing process was used to compute varying O/M time period depending on relevant cleanup levels, field engineering data[c] used; Bioventing process was chosen for direct remedial action cost because it was the lesser of the cost increment; proposed rule will require 36 month and current rule will require 23 months operation, respectively.
O&M of Remedial System & Performance Monitoring			
measuring the effectiveness and Operation & Maintenance of remedial system:	$24,917	$39,000	
sampling and analyzing[d] soil samples for performance monitoring:	$7,498	$16,776	
Compliance Monitoring after Termination of Active Remediation			
a period of monitoring might be required after the termination of remediation (target level achieved); additional sampling/analysis might be needed	$0	$0	In general, Method A approach for soil does not require any additional compliance soil monitoring after achieving the soil cleanup levels
Closure for NFA			
gathering all information including monitoring data and reporting to Agency for NFA	$2,560	$2,944	Standard labor cost of 32 hrs work @$80/mhr proposed need additional 15% labor due to additional chemicals to monitor
Follow-up Activities			
nstitutional Control Required?	NO	NO	Method A approach does not require Institutional Control afterwards; MTBE 0.1mg/kg might be another driving factor depending on the regions a site locates.
)riving Factor for Corrective Actions: Benzene	0.5 mg/kg	0.03 mg/kg	
TPHG	100 mg/kg	30 mg/kg	
Total	$71,215	$100,508	
Relative Cost Indicator	**1.00**	**1.41**	

Does not include active air abatement costs.

Prepared by Ground Service Inc, Predicted Benefits of Risk-based Corrective Action for Iowa LUST and Wisconsin site Remediation Program; Job No G-1723 (1996) and G-1662 (1995)

US air Force Center for Environmental Excellence; Bioventing Performance and cost results; Principles and Practices of Bioventing Principles Volume I and II, 1996

[a] Naphthalenes will not be analyzed for routine testing during remediation stage.

Table C-2. Cost Analysis for Soil Cleanup (Method B Tier I)

(For a Typical Gasoline Contaminated LUST site located in Western Washington)

Method B Tier I (Standard Method B of 3-phase soil partitioning Model with default input parameters)

CORRECTIVE ACTIONS	Current	Proposed	SPECIFIC COMMENTS
Initial responses			
reporting a release to Agency; fire and safety hazard mitigation; identification of source and cause of release; gathering the basic site information; facilities search; familiarization		$640	standard labor cost of 8 hrs work @$80/mhr
Immediate and Interim Actions			
mitigation of hydrocarbons in their vapor, dissolved, or liquid phase; liquid hydrocarbon recovery and containment; vapor abatement; identification of potentially affected community; alternating drinking water supplies; security of site; off-site access permit		$1,920	standard labor cost of 24 hrs work @$80/mhr
Site Assessments			
basic sampling activities with soil borings and chain of custody required:		$3,500	10 subsurface soil boring locations with a geoprobe type tool used
lab analysis of samples taken:		$9,060	20 samples; additional lab test analysis required; refer to the proposal
on-site and off-site delineation to see the extent & movement of contamination; source area identification; receptor survey; simple site survey; finding impact to structures and utilities; review of geologic/hydrologic setting; defining the remediation goal; reporting		$2,208	additional site assessment cost due to more indicator compounds to monitor than before (+15%); standard labor cost of 24 hrs work @$80/mhr need TPH fraction (VPH) and interpretation
Terrestrial Ecological Evaluation			
characterizing the existing or potential threat to terrestrial plants or animals		$240	refer to 340-7491 (exclusion) and 340-7492 (simplified test); needs experienced field biologist; need labor cost of 3 hrs work @$80/mhr
Risk Evaluations for the Protection of Human Health			
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with fate/transport models; development of site-specific target soil cleanup level if any; reporting		$1,280	Tier I needs minimal consulting with default parameters given; minimal cost might be required for risk analysis; refer to section 747 in detail for soil-to-groundwater pathway; standard labor cost of 16 hrs work @$80/mhr
Remedial Action Plan and Implementation [a]			
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; installation of remedial systems; pre-excavation evaluation for excavation area if chosen; alternatively, the excavation/transport/disposal of the soil impacted above cleanup levels		$24,000	soil remediation cost calculation was based on two alternatives: A) with SESOIL modelling[b] under a hypothetical LUST scenario, volume of soil to be treated was calculated using unit cost for soil excavation/disposal; B) Bioventing process was used to compute varying O/M time period depending on relevant cleanup levels, field engineering data[c] used;
O&M of Remedial System & Performance Monitoring			Bioventing process was chosen for direct remedial action cost because it was the lesser of the cost increment; proposed rule will require 36 month operation to achieve a tareget cleanup level
measuring the effectiveness and Operation & Maintenance of remedial system:		$39,000	
sampling and analyzing[d] soil samples for performance monitoring:		$16,776	
Compliance Monitoring after Termination of Active Remediation			
a period of monitoring might be required after the termination of remediation (target level achieved); additional sampling/analysis might be needed		$0	In general, Method B-Tier I approach for soil does not require any compliance soil monitoring after achieving the soil cleanup levels
Closure for NFA			
gathering all information including monitoring data and reporting to Agency for NFA		$3,200	Standard labor cost of 40 hrs work @$80/mhr proposed need additional 10% labor due to additional calculation
Follow-up Activities			
nstitutional Control Required?		NO	Method B standard Tier I approach might not require Institutional Control afterwards;
Driving Factor for Corrective Actions: Benzene		0.03 mg/kg	MTBE 0.1mg/kg might be another driving factor depending on the regions a site locates.
TPHG		25 mg/kg	
Total		$101,824	Relative cost indicator is based on current Method A cost estimate of "one" for comparison purposes
Relative Cost Indicator		**1.43**	

Does not include active air abatement costs.

Prepared by Ground Service Inc, Predicted Benefits of Risk-based Corrective Action for Iowa LUST and Wisconsin site Remediation Program; Job No G-1723 (1996) and G-1662 (1995)

US air Force Center for Environmental Excellence; Bioventing Performance and cost results; Principles and Practices of Bioventing Principles Volume I and II, 1996

[a] Naphthalenes will not be analyzed for routine testing during remediation stage..

Table C-3. Cost Analysis for Soil Cleanup (Method B Tier II)

(For a Typical Gasoline Contaminated LUST site located in Western Washington)

Method B Tier II (Modified Method B of 4-phase soil partitioning Model with site specific parameters)

CORRECTIVE ACTIONS	Current	Proposed	SPECIFIC COMMENTS
Initial responses			
reporting a release to Agency; fire and safety hazard mitigation; identification of source and cause of release; gathering the basic site information; facilities search; familiarization		$640	standard labor cost of 8 hrs work @$80/mhr
Immediate and Interim Actions			
mitigation of hydrocarbons in their vapor, dissolved, or liquid phase; liquid hydrocarbon recovery and containment; vapor abatement; identification of potentially affected community; alternating drinking water supplies; security of site; off-site access permit		$1,920	standard labor cost of 24 hrs work @$80/mhr
Site Assessments			
basic sampling activities with soil borings and chain of custody required:		$3,500	10 subsurface soil sampling locations with a geoprobe type tool used
lab analysis of samples taken:		$9,060	20 samples; additional lab test analysis required; refer to the proposal
on-site and off-site delineation to see the extent & movement of contamination; source area identification; receptor survey; simple site survey; finding impact to structures and utilities; review of geologic/hydrologic setting; defining the remediation goal; reporting		$2,208	additional site assessment cost due to more indicator compounds to monitor than before (+15%); standard labor cost of 24 hrs work @$80/mh need TPH fraction (VPH) and interpretation
Terrestrial Ecological Evaluation			
characterizing the existing or potential threat to terrestrial plants or animals		$240	refer to 340-7491 (exclusion) and 340-7492 (simplified test); needs experienced field biologist; need labor cost of 3 hrs work @$80/mhr
Risk Evaluations for the Protection of Human Health			
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with fate/transport models; development of site-specific target soil cleanup level; reporting		$8,200	Tier II needs moderate level of consulting with site specific parameters measured moderate cost might be required for risk analysis; refer to section 747 in detail for soil-to-groundwater pathway with 4-phase model; labor cost of 40 hrs work @$80/mhr and cost for input field measurement
Remedial Action Plan and Implementation [a]			
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; installation of remedial systems; pre-excavation evaluation for excavation area if chosen; alternatively, the excavation/transport/disposal of the soil impacted above cleanup levels		$24,000	soil remediation cost calculation was based on two alternatives: A) with SESOIL modelling[b] under a hypothetical LUST scenario, volume of soil to be treated was calculated using unit cost for soil excavation/disposal; B) Bioventing process was used to compute varying O/M time period depending on relevant cleanup levels, field engineering data[c] used;
O&M of Remedial System & Performance Monitoring			
measuring the effectiveness and Operation & Maintenance of remedial system:		$33,583	Bioventing process was chosen for direct remedial action cost because it was the lesser of the cost increment; proposed rule will require 31
sampling and analyzing[d] soil samples for performance monitoring:		$14,446	months operation to achieve a target cleanup level.
Compliance Monitoring after Termination of Active Remediation			
a period of monitoring might be required after the termination of remediation (target level achieved); additional sampling/analysis might be needed		$0	Method B-Tier II approach for soil might not require any compliance soil monitoring after achieving the soil cleanup levels
Closure for NFA			
gathering all information including monitoring data and reporting to Agency for NFA		$3,600	labor cost of 45 hrs work @$80/mhr proposed need additional 10% labor due to additional calculation
Follow-up Activities			
nstitutional Control Required?		NO	Method B standard Tier II approach might not require Institutional Control afterwards;
Driving Factor for Corrective Actions: Benzene		0.1 mg/kg	MTBE 0.1mg/kg might be another driving factor depending on the regions the site locates.
TPHG		90 mg/kg	
Total		$101,397	Relative cost indicator is based on current Method A cost estimate of "one" for comparison purposes
Relative Cost Indicator		1.42	

Does not include active air abatement costs.

Prepared by Ground Service Inc, Predicted Benefits of Risk-based Corrective Action for Iowa LUST and Wisconsin site Remediation Program; Job No G-1723 (1996) and G-1662 (1995)

US air Force Center for Environmental Excellence; Bioventing Performance and cost results; Principles and Practices of Bioventing Principles Volume I and II, 1996

[1] Naphthalenes will not be analyzed for routine testing during remediation stage..

Table C-4 Cost Analysis for Soil Cleanup (Method B Tier III)

(For a Typical Gasoline Contaminated LUST site located in Western Washington)

Method B Tier III (Modified Method B of Alternative Complex Fate/Transport Models with site-specific parameters)

CORRECTIVE ACTIONS	Current	Proposed	SPECIFIC COMMENTS
Initial responses			
reporting a release to Agency; fire and safety hazard mitigation; identification of source and cause of release; gathering the basic site information; facilities search; familiarization		$640	standard labor cost of 8 hrs work @$80/mhr
Immediate and Interim Actions			
mitigation of hydrocarbons in their vapor, dissolved, or liquid phase; liquid hydrocarbon recovery and containment; vapor abatement; identification of potentially affected community; alternating drinking water supplies; security of site; off-site access permit		$1,920	standard labor cost of 24 hrs work @$80/mhr
Site Assessments			
basic sampling activities with soil borings and chain of custody required:		$3,500	10 subsurface soil sampling locations with a geoprobe type tool used
lab analysis of samples taken:		$9,060	20 samples; additional lab test analysis required; refer to the proposal
on-site and off-site delineation to see the extent & movement of contamination; source area identification; receptor survey; simple site survey; finding impact to structures and utilities; review of geologic/hydrologic setting; defining the remediation goal; reporting		$2,208	additional site assessment cost due to more indicator compounds to monitor than before (+15%); standard labor cost of 24 hrs work @$80/mhr need TPH fraction (VPH) and interpretation
Terrestrial Ecological Evaluation			
characterizing the existing or potential threat to terrestrial plants or animals		$240	refer to 340-7491 (exclusion) and 340-7492 (simplified test); needs experienced field biologist; need labor cost of 3 hrs work @$80/mhr
Risk Evaluations for the Protection of Human Health			
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with fate/transport models; development of site-specific target soil cleanup level; reporting & negotiation with Agency; soil cleanup levels based on the potability of ground water		$20,000	Tier III needs significant level of consulting with site specific parameters with soil attenuation model and groundwater flow model required; hydrology study needed; field degradation data needed for input; SESOIL and Trans-1D model was chosen to simulate fate/trasnport in the subsurface; input parameters to measure in the field are seven
Remedial Action Plan and Implementation [a]			soil data, 10 climate data, 16 chemical data, 18 application data, local
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; installation of remedial systems; pre-excavation evaluation for excavation area if chosen; alternatively, the excavation/transport/disposal of the soil impacted above cleanup levels		$24,000	and regional hydrological data set; actual risk evaluation cost varies $15k ~$35k; SESOIL has been widely used/accepted for its ease and scientific credibility; refer to detailed assumptions at hypothetical LUST scenario;
O&M of Remedial System & Performance Monitoring			direct soil remediation cost calculation was based on the selection of
measuring the effectiveness and Operation & Maintenance of remedial system:		$23,833	Bioventing process; significant saving on the system operation period;
sampling and analyzing[d] soil samples for performance monitoring:		$10,252	proposed rule will require 22 month operation to achieve target soil cleanup level
Compliance Monitoring after Termination of Active Remediation			Method B-Tier III approach for soil might require compliance soil monitoring
a period of monitoring might be required after the termination of remediation (target level achieved); additional sampling/analysis might be needed		$5,880	after achieving the target soil cleanup levels; assumed 3Qtr compliance monitoring of 4 wells to confirm the groundwater quality
Closure for NFA			Standard labor cost of 55 hrs work @$80/mhr
gathering all information including monitoring data and reporting to Agency for NFA		$4,400	proposed need additional 30% labor due to additional calculation
Follow-up Activities			Method B standard Tier III approach might require Institutional
Institutional Control Required?		Likely	Control; cost of restricting land use might be difficult, particularly the
Driving Factor for Corrective Actions: Benzene		0.6 mg/kg	the potential impact on property value and liabilities associated with futre;
TPHG		120 mg/kg	MTBE 0.1mg/kg might be another driving factor
Total		$105,933	Relative cost indicator is based on current Method A cost estimate
Relative Cost Indicator		1.49	of "one" for comparison purposes

Does not include active air abatement costs.

Prepared by Ground Service Inc, Predicted Benefits of Risk-based Corrective Action for Iowa LUST and Wisconsin site Remediation Program; Job No G-1723 (1996) and G-1662 (1995)

US air Force Center for Environmental Excellence; Bioventing Performance and cost results; Principles and Practices of Bioventing Principles Volume I and II, 1996

[1] Naphthalenes will not be analyzed for routine testing during remediation stage..

Table C-5. Cost Analysis for Ground Water Cleanup Only
(In addition to soil cleanup costs)

(For a Typical Gasoline Contaminated LUST site located in Western Washington)

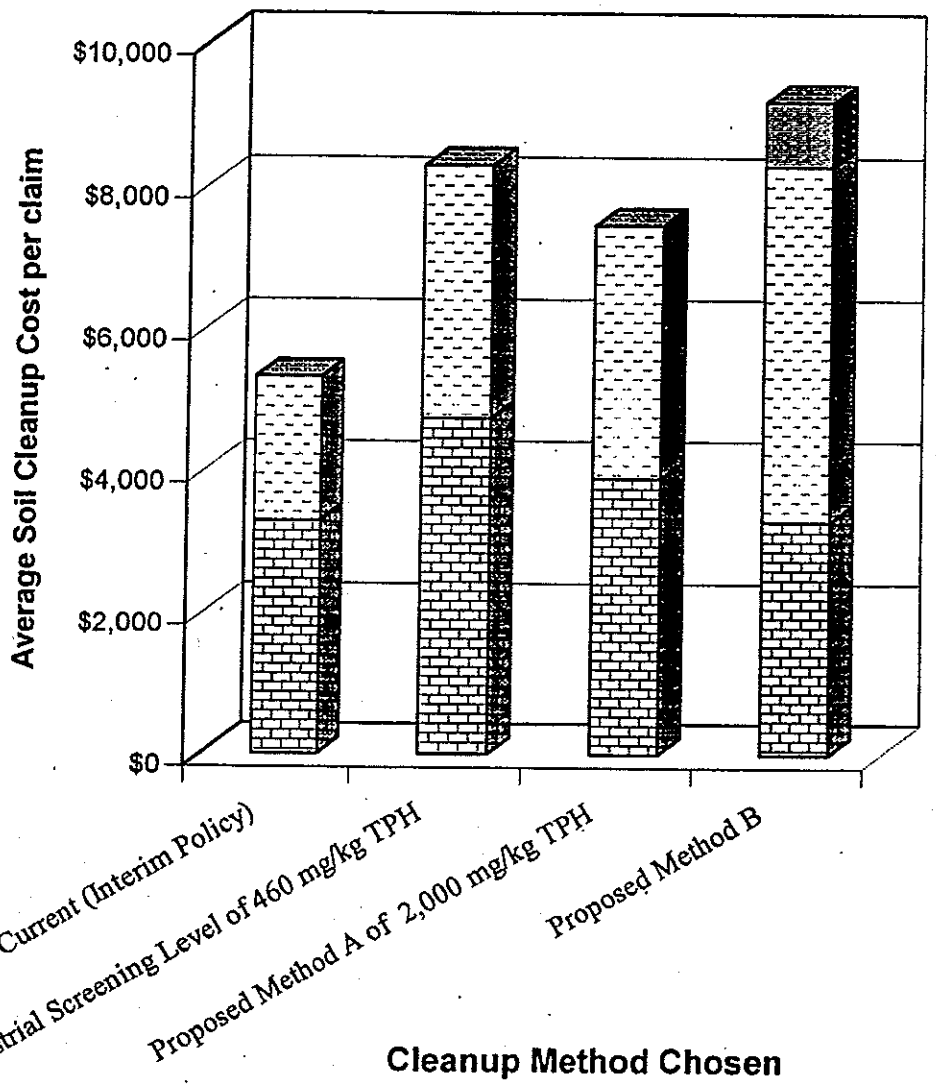
CORRECTIVE ACTIONS	Method A Current	Method A Proposed	SPECIFIC COMMENTS
Site Assessments for Ground Water Contamination			12 subsurface temporary water sampling locations with a hydro-punch and 8 ground water(2" ID x 30' D) monitoring well development and installation for monitoring afterwards; total 20 groundwater samples taken and analyzed; additional chemicals to be analyzed, current needs 5 compounds, proposed needs ten; proposed needs additional 15% more labor; standard labor cost of 40 hrs work @$80/mhr
basic sampling activities with soil borings and well development for water sampling:	$15,000	$15,000	
lab analysis of ground water samples taken:	$3,000	$7,900	
on-site and off-site delineation to see the extent & movement of contamination; source area identification at saturated zone; investigation of mobility, thickness of ground water; review of geologic/hydrologic setting; defining the remediation goal; reporting to Agency; work plan; site access permit; estimation of total mass in dissolved phase, flow study	$3,200	$3,680	
Risk Evaluations for the Protection of Human Health			under the Method A, GW cleanup levels have been developed under the direct ingestion (most conservatively); minimal cost for risk evaluation; proposed need additional 10% labor due to additio-nal chemicals to monitor; standard labor cost of 30 hrs work @$80/mhr
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with ground water transport models to find general flow scheme; locating water resource	$2,400	$2,640	
Remedial Action Plan and Implementation			assuming MTBE becomes a design criteria and critical cleanup for the 20% or less of groundwater contaminated site in Washington, additional cost was calculated with the normalized percent cost incremental data from EPA document[a] and other sources, actual direct cleanup cost might be as high as twice of current ground water cleanup cost at worst case
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; installation of remedial systems; pilot aquifer testing; design specifications; pilot testing; free-product recovery if necessary; slug-pump testing etc..	$52,000	$59,020	
O&M of Remedial System & Performance Monitoring			weekly visit for system O&M for 3 or more years operation; same normalized percent cost increment above was used to calculate O&M cost; Naphthalene was not considered for routine testing.
measuring the effectiveness and Operation & Maintenance of remedial system:	$54,000	$61,290	
sampling and analyzing soil samples for performance monitoring & reporting:	$30,600	$39,000	
Compliance Monitoring after Termination of Active Remediation			two years ground water monitoring for analyticals and well elevation survey; quarterly sampling and reporting; Naphthalenes will not be analyzed for routine testing.
a period of monitoring might be required after the termination of remediation (target level) achieved; additional sampling/analysis might be needed	$20,640	$27,920	
Closure for NFA			proposed need additional 15% labor due to additional chemicals to monitor: Standard labor cost of 60 hrs work @$80/mhr
gathering all information including monitoring data and reporting to Agency for NFA	$4,800	$5,520	
Follow-up Activities			Method A approach does not require Institutional Control afterwards; usually, either Benzene or MTBE might be a driving factor, TPHG could be another driving factor for some sites;
Institutional Control Required?	NO	NO	
Driving Factor for Corrective Actions: Benzene	5 µg/L	5 µg/L	
TPH	1,000 µg/L	800 µg/L	
MTBE	NA	20 µg/L	
Standard Point of Compliance: throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.			
Total	$185,640	$221,970	
Relative Cost Indicator	**1.00**	**1.20**	

JS EPA, 1998, MTBE Fact Sheet #2: Remediation of MTBE contaminated soil and groundwater, EPA 510-F-98-002

Figure D-1. HEATING OIL CLEANUP COST

AVERAGE COST FOR SOIL CLEANUP PROJECT

(BASED ON COST OF 433 CLAIMS)



Risk Evaluation only
Site assessment, Analytical Testing & Others
Remedial Action Implementation and performance

10/19/00 TotalCost.xls/soilcostCompar

Table D-1: Cost Analysis for Soil Cleanup (Heating Oil Site)

(Typical home heating oil residential site located in Western Washington; unrestricted land use)

	Current	Proposed		
		Method A		Method B
CORRECTIVE ACTIONS	Interim Policy (1997)	Ecological Protection	Human health Protection	
Initial responses				
reporting a release to Agency; fire and safety hazard mitigation; identification of source and cause of release; gathering the basic site information; facilities search; familiarization	$120	$120	$120	$120
Immediate and Interim Actions				
mitigation of hydrocarbons in their vapor, dissolved, or liquid phase; liquid hydrocarbon recovery and containment; vapor abatement; identification of potentially affected community; alternating drinking water supplies; security of site; off-site access permit	$300	$300	$300	$300
Site Assessments				
basic sampling activities with soil borings and chain of custody required:	$320	$320	$320	$320
lab analysis of samples taken:	$320	$810	$810	$1,310
on-site and off-site delineation to see the extent & movement of contamination; source area identification; receptor survey; simple site survey; finding impact to structures and utilities; review of geologic/hydrologic setting; defining the remediation goal; reporting	$180	$180	$180	$180
Terrestrial Ecological Evaluation				
characterizing the existing or potential threat to terrestrial plants or animals	$0	$180	$180	$180
Risk Evaluations for the Protection of Human Health				
development of site conceptual model; identification of exposure pathways; key physical and chemical parameters estimation and field measurement; simulating site setting with fate/transport models; development of site-specific target soil cleanup level if any; reporting; soil residual saturation test with leaching test;	$0	$0	$0	$900
Remedial Action Plan and Implementation [a]				
feasibility and remedial investigation; corrective action plan; checking the technical practicability; technology selection; pilot study; evaluation of remedial system design; the excavation/transport/disposal or Bioremdiationof the soil impacted above cleanup lev	$3,300	$4,740	$3,900	$3,300
O&M of Remedial System & Performance Monitoring				
sampling and analyzing soil samples for performance monitoring:	$600	$1,475	$1,475	$2,225
Compliance Monitoring after Termination of Active Remediation				
a period of monitoring might be required after the termination of remediation (target level achieved); additional sampling/analysis might be needed	$0	$0	$0	$0
Closure for NFA				
gathering all information including monitoring data and reporting to Agency for NFA	$180	$180	$180	$360
Follow-up Activities				
Institutional Control Required?	NO	NO	possibly	possibly
Driving Factor for Corrective Actions: TPH-D,	3,000	460	2,000	3,000
Total	$5,320	$8,305	$7,465	$9,195
Relative Cost Indicator	**1.00**	**1.56**	**1.40**	**1.73**

Table E. Analytical Testing Cost Comparision For Petroleum Releases under proposed MTCA

Washington State DOE Requirements in accordance with MTCA proposal published August 2000
(price tag provided by Sound Analytical Services, Tacoma; price as of 11/24/1999)

10/19/00

	Gasoline Range Organics			Diesel Range Organics		
	Method A		Method B	Method A		Method B
	Existing	Proposed		Existing	Proposed	
Volatile Petroleum Components						
BTEX	$70.0	included	included		$70.0	$70.0
n-Hexane		included	included			
Fuel Additives and Blending Compounds						
Dibromoethane, 1-2 (EDB); Dichloroethane, 1-2 (EDC);		included	included			
Methyltertiary-butyl ether (MTBE)		$140.0	$140.0			
Other Petroleum Components						
Carcinogenic PAHs					included	included
Naphthalenes		$175.0	$175.0		$175.0	$175.0
Other Compounds						
Polychlorinated Biphenyls (PCBs)						
Halogenated Volatile Organic Compounds (VOCs)						
Total Lead	$28.0	$28.0	$28.0			
Total Petroleum Hydrocarbons Methods						
Total TPH Analytical Method (Method A Cleanup Levels)	NWTPH-Gx $65.0	NWTPH-Gx $65.0	NWTPH-Gx	NWTPH-Dx $80.0	NWTPH-Dx $80.0	NWTPH-Dx
TPH Analytical Methods for TPH fractions (Method B or C)			VPH $100.0			EPH $250.0
Total Analytical Cost, $	$163.0	$408.0	$443.0	$80.0	$325.0	$575.0
Percent Analytical Cost Increase due to Rule Change during the site assessment period, %		**150%**	**172%**		**306%**	**619%**

2530 **ATTACHMENT F: Analytical Requirements for Naphthalenes and Carcinogenic PAHs**

1. The discussion following provides details as to why the tests for Carcinogenic PAHs and Naphthalenes are not necessary.

2. Multple-phase and Multi-component effects for Naphthalene

a. Diesel fuel is a complex mixture of the intermediate distillates from crude oil. Data for the Naphthalenes weight fraction are from the TPH Criteria Working Group (July 1997, Selection of Representative TPH Fractions based on Fate and Transport Considerations, Volume 3). The document includes tables of composition data for 11 petroleum products, and states weight fraction ranges for #2 fuel oil (heating oil): Naphthalene 0.009-0.4%, 1-Methylnaphthalene 0.29-0.48%, and 2-Methylnaphthalene 0.36-1.0%. Normal ranges of Naphthalenes encountered in soil at sites contaminated with #2 fuel oil are from 0.66 to 1.88% (13 to 38 mg/kg) of TPH. Under the default condition and the maximum possible Naphthalenes weight fraction found in #2 fuel oil, the maximum possible water concentration of Naphthalenes, using the four-phase model, is 36.2 µg/L, which is one order of magnitude lower than the Method A number demonstrated in Figure F-1 (attached). The four-phase model will need to apply at least 150 mg/kg of Naphthalenes (7.5% @ TPH 2000 mg/kg) with TPH in the soil in order to make equilibrium 160 µg/L of Naphthalenes dissolved in groundwater.

b. Lee, et al. (Lee, S.L., Hagwell, M., Delfino., 1992, Partitioning Polycyclic Aromatic Hydrocarbons from Diesel Fuel into Water, ES&T, 26,2104-2110) conducted a water and fuel experiment with odiesel to examine the ultimate dissoluble water concentration. These researchers measured the equilibrium of Naphthalene concentration of 300 µg/L dissolved in water when applying TPH 79,000 mg/kg (1,500 mg/kg of Naphthalenes) of Diesel into the fuel/water system. Considering Ecology's default dilution factor of 20 and soil/water partitoning effects in an actual soil system, Naphthalene as a part of TPH in heating oil would <u>never</u> violate the Naphthalene groundwater cleanup level specified in Method A. An experiment of fuel/water conducted by Ecology's Charles San Juan conducted to test the conservativeness of the four-phase model for determining the Naphthalene concentration in water , showed that the range of over-estimation by the four-phase model was almost one order of magnitude.

c. Under the non-equilibrium mass-transfer conditions of an actual situation, the concentrations of diesel constituent detected in groundwater are likely to be much smaller than those estimated using the equilibrium approach used in the four-phase model (Lee, et al, 1992).

d. Analytical testing for Naphthalenes should not be required. If analytical testing for Naphthalenes is not required for all sites contaminated with heating oil,

owners and operators could avoid the cost of wasteful corrective action efforts and unnecessary analytical costs.

2557 3. Detection of Carcinogenic PAHs in Heating Oil

a. In 1999, Oregon DEQ developed specific guidance (Oregon DEQ, September 1999, Draft Heating Oil Tank Generic Remedy Guidance Document) on site investigation and remedial action activities with a generic remedy for heating oil releases. The purpose of the Guidance was; (1) cost savings for homeowners for analytical costs and/or for contaminated soil removal expenses, and (2) faster and easier reports by service providers and streamlined reviews by DEQ. An additional task was to determine if constituent data and risk-based concentrations could be used to recommend when TPH measurement might be used for risk-based closures at residential heating oil release sites without the need for constituent data.

b. DEQ examined analytical data from 258 soil samples collected from residential heating oil release sites from across the state. The samples were collected by different groups, analyzed by different laboratories, and were from work accomplished over a several year period.

c. Chrysene was the most frequently detected of the carcinogenic PAHs, and was the one with highest concentration. Chrysene was detected in 68 of 213 samples. Compared to the non-carcinogens, its detection frequency and concentrations are significantly lower. Chrysene concentrations range from $1.11x10^{-4}$% up to $5.9x10^{-3}$% of TPH, with an average weight percent of $7.8x10^{-4}$%. The 90th percentile of the field data is 0.0012%. Benz(a)anthracene was the olny other Carcinogenic PAH detected in more than one or two samples. Benz(a)anthracene was, however, only detected in 17 out of 169 samples. The average weight concentration was $8.4x10^{-4}$% of TPH. The 90th percentile corresponds to a concentration of 0.0042%.

d. Based on the proposed rule's Method A cleanup level of 2000 mg/kg for diesel range organics, the resulting 90th percentile of Chrysene and Benz(a)anthracene concentration should be equivalent to 0.024 and 0.084 mg/kg, respectively. When converting these soil concentrations into Cancer risk with 7.3 kg-day/mg of Carcinogenicc Potency Factor given, calculated risks are $1.75x10^{-7}$ and $6.13x10^{-7}$, respectively, whereas the total Cancer risk is $7.88x10^{-7}$.

e. Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Benzo(k)fluoranthene, and Benzo(b)fluoranthene were detected so infrequently that these five PAHs were either not detected at all, or were detected in only one or two samples of the 168 samples tested. Based the low detection frequency, it can be safely assumed that these constituents are not present at residential heating oil release sites at concentrations exceeding standard detection limits.

(6) During 1997 and 1998, **PLIA collected 15 random samples throughout the state and could not detect any measurable concentrations of carcinogenic PAHs** specified in Table 830-1 of the proposed rule.

4. Based on the insignificant amount of carcinogenic PAHs found in soil samples contaminated with heating oil, the TPH-D cleanup level of 2000 mg/kg proposed under Method A should be adequate to protect against unacceptable Cancer risk exposure from carcinogenic chemicals. Therefore, analysis requirements for carcinogenic PAHs are not warranted at residential heating oil release sites under Method A.

Figure F-1. TPH Partitioning Model: Soil Cleanup Levels for Ground Water Protection

(for multiple-phase and component effect of Naphthalenes in Heating oil fuel) Refer to MTCA WAC 173-340-747 proposed

Today is 10/20/00
Site Name: dummy XYZ site/Bellevue WA
Contamination Type: default fuel oil (weathered diesel)
Data Interpreter: Hun Seak PARK/
Remark:

1. Enter Soil Concentration measured

Equivalent Carbon Group	Actual Soil Concentration or, Composition mg/kg, %, fraction, etc	Predicted Water Concentration @Well µg/L
Aliphatics		
AL_EC >5-6	0.0010	3.252E+00
AL_EC >6-8	0.0010	4.212E-01
AL_EC >8-10	0.0110	2.850E-01
AL_EC >10-12	0.0600	9.990E-02
AL_EC >12-16	0.3000	9.085E-03
AL_EC >16-21	0.3700	1.408E-05
AL_EC> 21-34	0.0000	0.000E+00
Aromatics		
Benzene (EC5-7)	0.0000	0.000E+00
Toluene (EC>7-8)	0.0000	0.000E+00
Ethylbenzene	0.0000	0.000E+00
Xylenes	0.0000	0.000E+00
AR_EC >8-10	0.0010	5.207E+00
AR_EC >10-12	0.0060	1.144E+01
AR_EC >12-16	0.0320	1.254E+01
AR_EC >16-21	0.1880	5.170E+00
AR_EC >21-35	0.0320	9.041E-03
Naphthalene	0.0040	9.768E+00
2-methylnaphthalene	0.0048	8.430E+00
1-methylnaphthalene	0.0100	1.962E+01
Sum	**1.021**	**7.625E+01**

Testing Soil Total Conc (mg/kg) is: ***3,000.00***

2. Decision Criteria

Groundwater TPH Quality Criteria Applicable		500.0	µg/L
3. Enter Hydrogeological Characteristics			
Total soil porosity: default is 0.43	n	0.430	Unitless
Volumetric water content: default is 0.3	Θ_w	0.300	Unitless
Initial volumetric air content: default is 0.13	Θ_a	0.130	Unitless
Soil bulk density measured: default is 1.5	ρ_b	1.500	kg/L
*or, use soil bulk density computed @solid density=2.65kg/L:		1.811	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.001	Unitless
Dilution Factor: default is 20	DF	20.0	Unitless

TPH OUTPUT

Total Soil Concentration (mg/kg) tested:	**3.000E+03**
Passed for Soil TPH test:	**YES!**
Predicted TPH (µg/L) @Well:	**7.625E+01**
HI @Well (for your reference only):	0.31
Initial Weighted Average MW of NAPL (g/mol):	209.3
Equilibrated Weighted Average MW of NAPL (g/mol):	209.3
Initial Weighted Average Density of NAPL (kg/L):	0.852
Volumetric NAPL Content, Θ_{NAPL} :	0.005
NAPL Saturation (%), Θ_{NAPL}/n:	1.23%
Type of model used for computation:	***4-Phase Model***
Computation completed?	***Yes!***

Chemial Components Distribution @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.01%	in Solid: 0.23%
Total Mass distributed in Air Phase: 0.01%	in NAPL: 99.75%

Please Check Soil Residual SaturationTPH Levels: Table 747-5

2519

Appendix A
SMALL BUSINESS ECONOMIC IMPACT STATEMENT (SBEIS)

The Small Business Economic Impact Statement (SBEIS) published by Ecology to accompany proposed amendments to The Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC), is unsatisfactory. The SBEIS is replete with flawed analysis and specious conclusions.

The SBEIS is long on *boilerplate* and rhetoric but very short on substance, particularly discussion of the impact on and increased costs to small business owners and operators (less than one page of eight pages). The SBEIS includes approximately one and one half pages of *Regulatory Relief* measures; measures which would represent little, if any, actual or genuine relief for or positive impact on small businesses.

The SBEIS is essentially the same document as published in November 1999, except for a few minor changes in text and numbers, the addition of one sentence on page 351, and the addition of one paragraph on page 353.

2520

1. Advisory Group

a. The SBEIS includes the statement (page 347) *"This effort included the formation of an external advisory group and extensive discussions with stakeholders."*

b. If, in fact, such an advisory group did meet, the vast majority of the affected stakeholders associated with the petroleum industry and petroleum cleanups were not included. Although they represent all elements of the petroleum industry and business entities that directly impact the petroleum industry, none of the following were included in an *external advisory group*:

- ✓ Washington Oil Marketers Association,
- ✓ Oil Heat Institute of Washington,
- ✓ Independent Business Association,
- ✓ Western States Petroleum Association,
- ✓ Korean Grocer's Association,
- ✓ Automotive United Trades Organization,
- ✓ Representatives of lending institutions,
- ✓ Realtors,
- ✓ Service providers (small and medium size contractors) who perform the vast majority of petroleum cleanups,
- ✓ Independent Insurance Agents and Brokers, and
- ✓ The insurance companies that provide pollution liability insurance coverage in Washington (particularly those under contract with PLIA) ---

the insurers that actually complete and pay for many of the petroleum cleanups in the state.

c. If this statement refers to the Duwamish Coalition's Brownfields/TPH Project, it should be noted that the orientation of the Duwamish Coalition has been almost exclusively with large industrial sites, not small businesses with property of an acre or less.

d. **The statement, "*This effort included the formation of an external advisory group....* ", is, at best, misleading and without merit!**

2521 **2. Proposed Rule Impact on Small Business**

a. Statements (page 353) regarding whether the proposed rule will cause businesses to lose sales or revenue, are the only statements included in the entire SBEIS that reflect Ecology's view of the impact of the proposed rule on small businesses. The statements are fundamentally flawed and reflect an alarming lack of understanding of the challenges facing small business owners and operators, particularly those in the retail and wholesale petroleum industry.

b. For Ecology to find it *"unlikely that the proposed regulatory amendments will cause affected business any sales or revenue losses"*, and to state, *"Ecology does not anticipate these amendments would cause a significant increase in that down time"* is to ignore reality.

c. The proposed amendments include cleanup levels for benzene and TPH for gasoline releases that are dramatically more stringent than those currently in place. The logic and mathematics involved are fundamental:

(1) Dramatically more stringent cleanup levels result in significant increases in the cost of cleanups.

(2) More stringent cleanup standards that cost significantly more will no doubt result in cleanups that take longer to accomplish.

(3) The longer it takes to complete a cleanup, the longer the business will be affected. Depending on the circumstances of the cleanup, business loss can also be a significant additional cost the small business operator must cope with.

For Ecology to conclude that dramatically more stringent cleanup levels will not result in more time required to complete cleanups is not realistic.

d. The source of the *department's experience* that "cleanup costs range from $10,000 to $100,000" is not stated nor defended, nor is it known on how many cleanups this estimate is based.

(1) The experience of the commercial insurance companies that provide environmental liability insurance and the experience of the Pollution Liability Insurance Agency over the past ten years (based on more than 250 UST cleanups), is that this estimate is significantly understated.

(2) The experience of PLIA is that the average cost of cleanup of a site with only contaminated soil (no ground or surface water) is at the very top of Ecology's range of $10,000 to $100,000. The average cost, to date of the cleanup of a site with contaminated soil only is $96,328.00.

(3) The average cost of cleanup of a site with contaminated groundwater, however, will almost always exceed $250,000.

e. The SBEIS includes the statement, *"While the proposed rules may slightly increase this cost, Ecology does not expect an increase of more than 20%."* The basis of this estimation and the data used to develop the estimate are not known, nor are they provided or justified in the SBEIS. No matter the source or basis, **an estimate of cost increase for a small business operator of 20% is not trivial**, nor should it be addressed in such a cavalier manner. **Small business profit margins are far too sensitive and narrow to accommodate a 20% cost increase without serious consequences.**

(1) The estimate is very understated. PLIA estimates the cost increase for contamination cleanup of a site with only soil contamination to average 44%. A detailed analysis of PLIA's estimate of cost increase is included in Attachment C, Tables C-1 through C-5.

(2) The PLIA cost increase estimates are conservative. It is quite probable that if the proposed cleanup levels are adopted, actual increased costs will exceed 44% for soil cleanup, and might well exceed 40% increase for groundwater and soil cleanup.

(3) **Even if Ecology's estimate of increased cleanup costs of 20% were reasonably accurate, how can the department justify such a significant increase in the cost of cleanup?** This is a particularly egregious and unreasonable increase in cost considering the absence of any evidence that existing cleanup levels are not protective of human health and the environment.

f. The proposed amendments include requirements for more analytic testing that have not been included in any previous draft. PLIA estimates that the additional increased costs for testing during the initial site assessment include:

- Gasoline Range Organics (Method A) – 150% increased cost.

- Gasoline Range Organics (Method B) – 172% increased cost.

- Diesel Range Organics (Method A) – 306% increased cost.

- Diesel Range Organics (Method B) – 619% increased cost.

A detailed analysis of these cost estimates is included in Attachment E to the basic comments. Costs are based on current analysis fees charged by Sound Analytical Services of Tacoma.

g. The SBEIS includes (page 353) the statement: "Ecology's toxics cleanup program generated "typical" cleanup site models after analyzing a group (informal sample) of sites on Ecology's leaking underground storage tank list. The proposed rule amendments were applied to the model sites, and the resultant costs were then compared with cleanup costs of the model sites using the existing regulation. The modeling results demonstrate that there will be minimal additional cost caused by the implementation of the proposed rule amendment."

(1) These comments, meant to *prove or demonstrate* that the proposed rule will not result in additional or increased cleanup costs, are specious and without merit. This is an shallow attempt to demonstrate that additional cleanup costs will not result from the proposed rule. Yet the SBEIS still includes the statement; "While the proposed rules may slightly increase this cost, Ecology does not expect an increase of more than 20%."

(2) No data is provided to the reviewer to determine the accuracy or validity of the conclusion: number and location of sites; type of contamination (soil, groundwater, or both); whether the contamination could be easily reached or whether the contamination was under a building, road or pump island; the method of selection of the sites considered; whether an NFA letter was issued, or whether Institutional Controls were imposed; etc. The statement also fails to address the significant additional financial burden associated with new testing and analysis requirements.

h. As noted above, even if Ecology's estimate of increased cleanup costs of 20% were accurate (as compared with PLIA's higher estimates), how can the department justify such a significant increase in the cost of cleanup?

i. This is a particularly unreasonable increase in cost considering the absence of any evidence that existing cleanup levels are not protective of human health and the environment. Over the past ten years, several thousand cleanups of petroleum spills and releases throughout the state have been completed, or are underway.

- There is no evidence whatsoever that the results of these cleanups has not been protective of human health and the environment!

- There is no evidence that any cleanup of petroleum products has failed to protect ground or surface water!

- There is no evidence that current cleanup standards are not adequate to protect human health and the environment!

2522 **3. Gas Station Profit and Cleanup Costs**

a. To pay for the cost of cleanup, the SBEIS discusses an additional cost per gallon to a merchant of $0.01 per gallon in such a manner that the reader is led to consider that, to a merchant, one penny a gallon is an insignificant amount. This is simply not accurate nor is it an objective presentation. For the matter to be presented in such a manner demonstrates an appalling lack of knowledge of the petroleum marketing industry. . **The loss of one penny per gallon is the loss of 17% to 25% of the dealer's gross profit!**

b. Retail petroleum dealers calculate profit on the basis of a *pool margin.* The dealer may make only 3 cents profit on each gallon of regular unleaded gasoline, but 11 cents on super unleaded, 7 cents on diesel, etc. The dealer then calculates the number of gallons sold in each category and the result is the margin of profit for the entire pool of products sold. (Total gallons divided by the profit on each product, average, etc.) In the metropolitan areas of Washington (Seattle, Tacoma, Everett, Spokane and the Tri-Cities) the pool margin is usually **4 to 6 cents GROSS profit per gallon.** In the rural areas of the state, the margin is slightly higher. This narrow profit margin is true, not just in Washington, but across the nation. Reporting in National Petroleum News, petroleum industry analyst Daniel Johnson has stated that gasoline retailers nationwide typically earn between 3 and 6 cents net profit per gallon.

c. Adding to the burden of the dealer, if the purchase of fuel is with a credit card, the dealer is charged 1.5% to 2% for the transaction. The experience of petroleum dealers is that approximately ½ of all sales are with a credit card. With the customer using a credit card, the dealer's net profit for gasoline sales is even lower.

d. To emphasize this matter further, it must be understood just how unsettled the business and profit picture is for a small gas station or convenience store. A commonly accepted industry standard is that a convenience store should sell at least 30,000 gallons per month to be profitable. Johnston in National Petroleum News stated that gasoline usually accounts for about 1/3 of convenience store sales. With monthly sales of 30,000 gallons, **the monthly GROSS Profit of a convenience store for gasoline sales is between $1800 and $2400; annual GROSS Profit of only $21,600 to $28,800.**

e. The impact of the loss of one penny per gallon profit is not a trivial issue for a retail dealer in Washington! As noted previously, the loss of one penny per gallon is the loss of 17% to 25% of the dealer's gross profit!

2523

4. Regulatory Relief Provided to Small Business

a. General. The SBEIS introduces regulatory relief provisions that are presented as mitigating increased costs to small businesses. Most have or will have little, if any actual impact on small businesses. In fact, more than half of the 13 provisions already exist and have proved to be ineffective as relief measures for small businesses. A summary of these measures is provided in the Table below. Additional detailed comments on specific regulatory relief measures follow:

Regulatory Relief	Comment
Use of Remediation Level	**No relief because of stigma of Institutional Controls (ICs)**
Area-wide points of compliance	**Rarely applicable to small business and no relief because of ICs**
Expansion of financial assurance mechanisms	**No relief to small business; small businesses will continue to depend on insurance or loans; costs still increase regardless of how paid.**
Use of Model Remedy	**Model Remedies do not exist; no relief provided.**
Provision for technical assistance	**No relief; Ecology is already understaffed and has yet to demonstrate the ability to achieve this goal.**

Use of site-specific risk assessment (Method A vs. Method B)	**No relief; additional time and costs would be incurred to accomplish analysis, and perhaps to accomplish cleanup. Cost of risk evaluation will not be off-set by higher site-specific cleanup levels.**
State Toxics Control Account	**No relief or extremely limited application; lack of funding of the account.**
Resource sharing and PLP targeting	**Limited application and virtually no relief for small businesses.**
Agreed Orders	**No relief; the administrative process itself will add at least 30% to the cleanup cost.**
Interim Actions	**No relief; an "end point" is not reached and the property remains devalued.**
Citizen Technical Advisor	**No relief; this additional position will not provide the resources to fully assist small business as needed.**
Terrestrial Evaluation	**Becoming exempt from a new requirement maintains status quo, but does not offer relief. Further, Institutional Controls may devalue the property.**

2524

b. Contamination Remaining On Site. The section includes the statement "The proposed rule explicitly allows that a remediation level that leaves hazardous substances at the site in concentrations above cleanup levels may be considered protective of human health and the environment."

(1) The concept provides no practical economic benefit or relief to small business owners or operators, nor is the concept *user friendly* to small businesses as the SBEIS contends.

(2) This statement and concept fail to take into account fundamental aspects of small business. Leaving contamination on the site really has no impact unless, (a) the owner wants to sell the property, or (b) the owner wants to borrow funds for improvements using the property as collateral. If contamination

is present on a property, neither of those options is possible, except under very unusual circumstances. Further, because of these probable restrictions, the value of the property will no doubt be decreased.

(3) As a matter of fact, since a property probably cannot be sold without completion of cleanup, nor could the property be borrowed against without completion of cleanup, there really would be no point in a small business exercising a partial cleanup unless it was absolutely required because of a threat to human health and the environment.

(4) The frequency of transfer of property and business turn-over among small businesses is a significant issue. Because of contractual agreements, PLIA maintains close supervision of the small businesses that received grants under the UST Community Assistance Program. In just six years, since 1994, 37 of the 103 properties have changed hands, 2 have changed hands 3 times. This level of turnover is typical and cannot be ignored. Commerce would be severely impacted if property transfers were not possible because contaminated properties were not cleaned up.... and Institutional Controls were imposed.

(5) To exercise a partial cleanup of a property, leaving existing contamination in place, would also seriously complicate future pollution liability insurance coverage of the site. Future pollution liability insurance coverage would reflect the existence of contamination and premiums would be higher. In the event of a future claim, the burden of proof would be on the property owner to demonstrate that new contamination was not in any way related to the previous condition. Such a demonstration by the small business operator would involve a potentially very expensive investigation.

(6) The number of insurance companies that will provide pollution liability insurance coverage for a site with known contamination is very limited. Further, that coverage is, and will continue to be, very expensive. Without pollution liability insurance coverage, a small business will not be in compliance with state and federal regulations, and will lose its business license.

2525 **c. Financial Assurance Mechanisms.** Expanding financial assurance mechanisms that Ecology will accept is of no value or benefit to the small business owner or operator. The small business operator must depend almost entirely on one of two vehicles for financial assistance in paying for the cost of cleanup of contamination; either pollution liability insurance coverage, or a conventional loan from a commercial lending institution with the property as collateral for the loan.

(1) Additional financial assurance mechanisms apply only for sites where the cleanup action selected includes engineering and/or *institutional controls*. If cleanup standards cannot be met and a permanent cleanup is not possible, approval by Ecology of the use of *institutional controls* as a remedy is of no value or benefit to the small business operator. If the small business operator must

depend on a conventional loan, letter of credit or surety bond, he or she must find a way to pay the fees and provide collateral. If the property is the collateral, he or she had better hope that the loan is approved prior to the lender discovering that the loan will be made against a property that is and will remain contaminated. Otherwise, the loan will probably not be approved.

(2) The provision for an exemption as established in WAC 173-340-440 (11.b) is really a moot issue for the small business operator. He or she is faced with the practical matter of finding a source to pay for the cleanup, reopening the business, declaring bankruptcy, or perhaps just "throwing the keys on the roof and walking away". In that case, it is Ecology that would eventually assume responsibility for the cleanup.

2526 **d. Model Remedies.** The development of model remedies may or may not be of value to the small business operator. Since model remedies have yet to be developed or even vaguely outlined, their impact on small businesses cannot be evaluated. Model remedies that have not been developed or evaluated should not be portrayed as "regulatory relief provided to small businesses."

(1) The concept of model remedies seems to imply a "one cleanup method fits all circumstances" theory. This is seldom the case: the sources of contamination are different; the configuration of tanks, lines, dispensers and especially proximity to buildings and streets vary significantly; soil types and proximity to groundwater are different; etc. Seldom, if ever, will two UST cleanup sites be the same.

(2) Model remedies can be developed reflecting only existing cleanup technology; new cleanup technologies are being developed at a very rapid pace. To make model remedies effective, a continuous review and updating process must be implemented .... another drain on Ecology's already limited resources.

(3) The small business operator will be driven or motivated by which technology is the most cost effective (the least expensive method that will satisfy cleanup standards) whether the technology or method is or is not part of a model remedy.

(4) Today the options available to a small business operator for cleanup of contaminated soil are limited: ex-situ involving excavation; or, in-situ with the options of soil vapor extraction or soil bio-venting. With such limited options, of what benefit is a *model remedy*? There really is no such thing as a model remedy; there is only application of the least expensive, but appropriate option for the specific cleanup being considered.

(5) There will be little benefit to the small business operator if the model remedy includes *natural attenuation*. Natural attenuation is a viable alternative to a property owner ..... so long as the property owner does not plan to sell the

contaminated property, or so long as the owner never wants to obtain a loan with the contaminated property as collateral for the loan. Natural attenuation might be a viable alternative for Weyerhaeuser or Alaska Airlines; it is not a practical alternative for Tony Tankowner in Toutle Lake. As noted previously, property turnover among small business operators is frequent.

(6) It is particularly ironic that Ecology's staff is actively promoting and advocating the use of natural attenuation as a preferred method for petroleum marketers to deal with cleanups, while using as its single source for Method A cleanup levels, a model that ignores the natural attenuation phenomena.

2527 e. ***Method A vis-a-vis Method B.*** The use of Method B methodologies, rather than use of Method A cleanup levels is not a practical alternative and provides no relief for small business owners or operators. Method B requires, as Ecology states in the draft SBEIS, "more sophisticated methods.... to make risk assessment and risk management decisions". These methods, however, will not be as readily used by small business because they are more complex and technical, and consequently more expensive. As a result, Ecology concludes that small businesses are more likely to face "disproportionately higher costs than large business."

(1) Even if the Method B site-specific risk approach is used by a small business, the cost of risk evaluation under Method B (Tier I, II, or III) will usually not be off-set by a resulting more favorable site-specific cleanup level. Often, proceeding with the higher tiered site-evaluation will likely lead to even more restrictive cleanup levels and thereby dramatically increase site risk evaluation and remediation costs. Further, the additional time required to conduct the analysis and evaluation associated with a Method B cleanup will probably be prohibitive to the small business operator.

(2) The following Table is a summary of the most probable cleanup levels for a typical petroleum LUST site in Western Washington under the proposed amendments to the Rule.

		Method A	Method B		
			Tier I	Tier II	Tier III
Ground-water (µg/L)	MTBE	**20**	**?20?**	**N/A**	**N/A**
	Benzene	**5**	**1.5**	**N/A**	**N/A**
	TPHG	**800**	**600~1000**	**N/A**	**N/A**
Soil (mg/kg)	MTBE	**0.1**	**0.12 (0.06~0.12)**	**0.2 (0.06~0.5)**	**??**
	Benzene	**0.03**	**0.03 (0.005~0.03)**	**0.2 (0.005~0.3)**	**0.6 (0.005~1.2)**
	TPHG	**30**	**25 (3~35)**	**90 (4~130)**	**120 (4~200)**

2528 **f. Toxics Account.** The SBEIS notes, "Financial assistance is contingent upon the availability of funds within the Model Toxics Control Account." The proposal that the State Toxics Control Account can be used to help fund remediation efforts cannot be considered a serious relief for small business owners or operators.

(1) The Toxics Account is currently not sufficient to meet the needs of Ecology. A Focus Bulletin dated April 2, 1999 notes actions Ecology must take to deal with reductions in the account. Yet, the proposed amendments include such additional expenses as establishing a Citizen Technical Advisor position, an additional drain on already insufficient resources. Further, recent decisions by the Board of Tax Appeals may result in significant refunds from the Account. The future availability of funds from the Toxics Account will be even more in doubt. This proposal is almost frivolous, certainly without merit!

2529 **g. Agreed Orders.** Establishing an administrative process for issuing Agreed Orders will provide no relief or benefit to the small business owner or operator. As noted in the previous discussion of financial assurance, when faced with a required cleanup of contamination, the small business operator is concerned with finding a source of funds to pay for the cleanup, and with determining the easiest and quickest method of effecting the cleanup, with the least interruption possible to business. The vast majority of small business operators will conduct cleanups as independent cleanups and will never even be aware of the existence of Agreed Orders.

CONCLUSION

In the Small Business Economic Impact Statement, Ecology acknowledges that each Rule proposed by Ecology in response to a legislative mandate must comply with the Administrative Procedure Act (RCW 34.05.328) and the Regulatory Fairness Act (RCW 19.85). Ecology must revise the proposed amendments to the Rule to mitigate the negative economic impact on small business owners and operators.

Appendix B
COST-BENEFIT ANALYSIS

1. The opportunity to comment on the draft Cost-Benefit Analysis is appreciated. We recognize that Ecology does not have a strict obligation to submit the Analysis for comment. It is noted that the Cost-Benefit Analysis does include the required analysis of alternatives.

2. Based on limited (because of a lack of time) examination, we conclude that the Cost-Benefit Analysis is fundamentally flawed in its approach and conclusions.

3. This critique of the Cost-Benefit Analysis is not complete. Sufficient time has not been available to thoroughly address all issues and properly comment on this very complicated analysis. This critique will, however, address in some detail several examples of fundamentally flawed analysis and invalid conclusions of the Cost-Benefit Analysis.

2530 4. The Cost-Benefit Analysis is based on analysis of only twelve TPH contaminated sites. 12 sites out of the more than 6000 closed contaminated sites within the state is a sampling of only 0.2%. By any calculation, this is not a satisfactory sample for analysis and realistic determination of cost and benefit.

a. It is worthy of note that, in 1999, when PLIA was collecting and testing soil samples to validate the Interim TPH policy, 15 samples were collected from approximately 300 contaminated heating oil sites. Ecology's Toxics Policy staff demanded additional samples, stating that a sampling of 15 sites out of 300 was not adequate for a proper analysis. That same Toxics Policy staff now bases a Cost-Benefit Analysis on a sampling of only 12 out of 6000 sites. The lack of consistency is noteworthy.

5. The probable costs associated with the proposed rule will well exceed the probable benefits! There can be no realistic question that costs and benefits are directly related to the establishment of cleanup levels and changes in remediation policy requirements (analytical testing, etc.).

EXAMPLE A: Soil Cleanup Cost Calculations (Chapter 3)

To attempt to demonstrate minimal cost impact from changes in the cleanup standards for soil cleanup for a hypothetical generic site (Chapter 3), Ecology has estimated the cost of the removal of contaminants simply by multiplying the Unit Cost of Removal by the difference between current and proposed cleanup levels.

(Unit Cost of Removal) X (Difference in Proposed and Current Cleanup Levels)

2531 1. Source of Unit Cost Data:

- Median unit cost developed from data from 15 Super Fund sites

- Data is based on a very wide range of costs --- from 0.16 $/kg to 2203 $/kg (13,769 times different)

- Data is based on a very wide range of difference in sites and, therefore, difference in data
  - -- Different cleanup levels from different states
  - -- Different chemicals (very little presence of TPH)
  - -- Different soil and hydrogeological conditions
  - -- Different geographical and access conditions, etc.

2532 2. Flaws in Unit Cost Data for Soil Vapor Extraction Approach

- The removal efficiency of a remediation system varies greatly depending on residual soil concentration ranges. The contaminant concentration remaining in the unsaturated zone is an extremely important cost consideration.

- Ecology assumes the Unit Cost to be constant during a cleanup, from commencement to completion

- In reality, the majority of the mass is removed at the beginning of a cleanup .... with less and less removed near the end; therefore, the Unit Cost is much higher at or near the end of a cleanup.

- The Unit Cost of removal toward the end of a cleanup will increase exponentially.

- For further clarification of the issue of Unit Cost not being constant, see:
  -- How To Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites, EPA 510-B-95-007, May 1995, Page XI-35

  -- Cleanup of Releases From Petroleum USTs, EPA 530-UST-88-001, April 1988, page 67

  -- Alternatives for Ground Water Cleanup, National Resource Council, National Acedemy Press, 1994, page 242

  -- Multi-Phase Extraction: State-Of-The-Art Practice, EPA 542-R-99-004, June 1999, page 48

2533

- Ecology assumes the Unit Cost of removal for Benzene and Diesel to be the same -- $16.60/kg.

  -- This assumption is flawed and not logical. The mass distribution pattern of the two is very different. Benzene is a chemical and Diesel is a mixture of more than 20,000 different chemicals. Their chemical properties are very different and their removal behavior is likewise very different. Consequently, the Unit Cost for removal of the two will be quite different.

2534

- For a site that is approximately ¼ acre of petroleum contaminated soil to a depth of 25 feet, Ecology estimates that **17 times the reduction in the soil cleanup level for Benzene will cost only $90 more.** This conclusion is so unrealistic that it might well be considered a *typo.*

  -- The cost of a single sample of soil to test for MTBE costs more than $90.

2535

3. Flaws in Calculations for Soil Excavation and Off-Site Disposal

- Excavation and off-site disposal costs, under normal circumstances, is based on cost per volume of soil to be treated or disposed, not on the cost per kg of contaminants, as shown in Table 3-10.

- Ecology assumed equal concentrations of 1000mg/kg of Arsenic and Lead in the soil. That is not a valid assumption for normal petroleum LUST sites, because metals (Arsenic and Lead) and Benzene behave quite differently in soil.

- Calculations must predict the mass distribution pattern for each chemical of concern, in order to estimate the exact perimeters of impacted soil.

4. The approach used by Ecology to attempt to compute the incremental cost of soil cleanup is not valid. The conclusion, therefore, is not valid that adopting more stringent soil cleanup levels would result in only small increases in the cost of soil cleanup costs of sites contaminated with gasoline.

EXAMPLE B: Site "A" Analysis (Chapter 5)

1. In the analysis of Site "A", Ecology attempts to compute incremental costs to assess the impact of excavation of soil under different Method A soil cleanup standards.

2536 2. Flaws in calculations regarding excavation

- Ecology's calculations take into account only the costs associated with the excavation of soil. The calculations fail to take into account the expense of transportation and off-site disposal of contaminated soil.

- The experience of PLIA, over a period of more than nine years and involving over 600 cleanup sites, is that the cost of transportation and disposal of contaminants is much higher than the cost of excavation alone. In fact, it is PLIA's experience that more than 85% of the total cost of a removal project is associated with transportation and off-site disposal.

2537 3. Flaws in calculating costs (table 5-4, page 125)

- Based on Ecology's example, the contamination starting source point for calculation of cost should be at the depth of 6.08 feet. (This is, in fact, industry's experience with most LUST sites.)

- Considering the cost of excavation, transport, and off-site disposal of contaminated soil, the correct Calculation of Difference should be:

	Current Rule depth of excavatn.	Proposed Rule depth of excavatn.	% Incremental Difference
TPHG	11.68	11.95	5%
Benzene	10.805	11.95	24%
Toluene	6.09	10.805	47,150%

Ethylbenzene	6.09	9.93	38,400%
Xylenes	10.98	11.54	11%

- Ecology concludes that, "The proposed rule could result in an increase of anywhere from $1,021 to $5,564 (2.1% to 11.1%)."

- This conclusion is not valid! Based on Ecology's assumptions, but correct calculations, the proposed rule would result, in the case of Site "A", an increase cost of anywhere from 5% to 38,000%. This estimate includes costs for transportation and disposal of additional soil.

4. The basic approach Ecology has taken to compute the incremental cost calculation of soil cleanup is not valid. Therefore, the result of the calculations regarding Site "A" are likewise not valid.

EXAMPLE C: Site "B" Analysis (Chapter 5)

1. In the analysis of Site "B", Ecology attempts to assess the economic impact of treating contaminated soil and ground water to Method B cleanup levels of the current and proposed rules.

2538 2. Flaws in calculations regarding Site "B"

- Site "B" could not, in fact, be cleaned up under Method B of the current rule. A January 28, 1994 Ecology Memorandum states specifically that Method B should not be used for petroleum cleanups, just for industrial cleanups.

- It would, however, be fair to compare current Method A standards with the proposed Method B.

2539 - Site "B' is not, in any way, a typical petroleum LUST site. Based on Ecology's data, the cost of cleanup at Site "B" under the current rule is approximately $1,240,000 (18,984 kg of TPH*65.2/kg of TPH removal = $1.24 M). In PLIA's experience, the average cost of cleanup of a LUST site with contaminated soil and ground water, will be approximately $200,000 to $400,000.

2540 - Ecology chose to employ a "dual-phase extraction" to remediate the soil and ground water simultaneously. Dual-phase extraction couples soil vapor extraction with ground water pump-and-treat by applying a vacuum on a sealed recovery well.

- Assuming normal removal efficiency (How To Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites, EPA 510-B-95-007, May 1995) of 90% or less for soil vapor extraction, it is very questionable whether "dual-phase extraction" can possibly achieve the proposed cleanup standards.

  – Benzene would require 98.6% and 96% removal efficiency for soil and ground water.

  – TPH would require 98.2% removal efficiency.

2541 - As noted in the critique of Example A (Soil Cleanup Cost Calculations), the use by Ecology of a constant rate of average unit cost data for soil cleanup is not valid.

2542 3. The Site "B" scenario presented in the Cost-Benefit Analysis used the proposed Method B to calculate cleanup levels under the best assumptions. As it turned out, however, the cleanup levels under proposed Method B were almost identical, or less than, to proposed Method A levels. This demonstrates that the flexibility Ecology stresses under Method B does not really exist. The use of Method B in this example, as well as for most LUST sites, results in no benefit to the property owner, just a huge expense for analytical testing and risk analysis just to find out if Method B will indeed provide a more favorable cleanup level.

4. The approach Ecology has taken to compute the incremental cost calculation of soil and groundwater cleanup is not valid. Therefore, the result of the calculations regarding Site "B" are likewise not valid.

EXAMPLE D: Probable Benefits of the Proposed Method A Soil Cleanup Levels (Chapter 4)

2543 1. Ecology "has determined that the probable benefits of adopting the more stringent cleanup levels are significant in comparison with the probable costs. The probable avoided cost of even a single incidence of these health effects range from $6,000 to $200,000. If these adverse health effects should result in a single death, the probable avoided cost increases to about $18.1 million...." Table 4-24 attempts to provide statistical back up for the conclusion.

- This is not a valid conclusion! Ecology's conclusion is valid only if approximately 3.1 million persons in Washington have been drinking, are drinking, and will be drinking badly contaminated water (for example, water that contains 88.8 µg/L of Benzene). See page 65, Table 4-5.

- For Benzene (equation 740-2), the realistic health benefit due to reduced soil cleanup levels results in a decramementel cancer risk of $1.36x10^{-8}$ of less ingestion of chemicals in soil. Assuming 6,000,000 people in Washington, the number of persons with potential to contract cancer in a lifetime is 0.082 persons. Based on the cost of a single incident of cancer ($6,000 to $200,000), the health benefit to be saved is really only $1200 to $16,400 for the entire state for a lifetime.

2544 2. The Lawrence Livermore Study data base of 30,000 cases shows only 0.7% of the total open LUST sites actually affect drinking water wells. Most of the affected wells are shallow, private, on-site domestic wells in close proximity to the LUST sites.

2545 3. Ecology bases all analyses on the assumption the concentration of petroleum at the point of release is exactly the same as the concentration that will reach groundwater, no matter the actual distance between the two.....whether 8 feet or 80 feet in depth. As with the Four-Phase Model, this assumption fails to consider the natural attenuation phenomena, one of the most important factors related to benzene or gasoline release sites.

- This assumption is fundamentally flawed. Ecology refuses to calculate the effect of natural attenuation in the application of the Four-Phase Model, and compounds the error by applying the same faulty logic to attempt to demonstrate benefit in the Cost-Benefit Analysis.

- As noted in our basic comments on the proposed rule, it is noteworthy and indeed ironic that Ecology's staff is actively promoting and advocating the use of natural attenuation as a preferred method for petroleum marketers to deal with cleanups. They advocate the use of natural attenuation while denying its existence in both the Four-Phase Model and the Cost-Benefit Analysis.

4. Ecology's attempt to compute the probable benefits of the proposed Method A soil cleanup levels is flawed and is not valid.

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October 27, 2000

Trish Akana, Rules Coordinator
Toxics Cleanup Program
Post Office Box 47600
Olympia, Washington 98504-7600

Dear Ms. Akana:

This letter conveys comments by the Washington State Department of Health on the proposed amendments to the Model Toxics Control Act Cleanup Regulation (MTCA), Chapter 173-340 WAC, as published in the Washington State Register, Issue 00-16. In general, the revised rule appears to be in line with the spirit of the recommendations of the Policy Advisory Committee. The people who developed the revisions should be commended.

2562 The one section that raises concerns is WAC 173-340 360, *Selection of cleanup actions.* Specifically, it is not clear how a disproportionate cost analysis, as described in WAC 173-340 360(3)(e) (pages 385-386), is intended to be used when selecting a cleanup action. The way "practicable" is defined (WAC 173-340 200, page 370) and used in WAC 173-340 360(3)(e) suggests that cost may be given undue consideration in comparison to other factors that are evaluated when choosing a cleanup action. It is important for Ecology to clarify whether cost is an overriding factor, or whether Ecology intends for cost to be but one factor among many equally important aspects considered when selecting a cleanup action from among appropriately protective alternatives.

2563 We recognize that, unfortunately, this revision does not address how MTCA applies to radionuclides. At present, MTCA does not adequately address radionuclides and is inconsistent with other state and federal regulations pertaining to radioactive material. We encourage the agency to concentrate on this issue in the near future. We commit to supporting Ecology in resolving this challenge.

Suggestions for specific minor changes to the proposed rule include:

p. 347, first bullet statement (The proposed amendments clarify...). The second sentence, "Currently, ecology (sic) uses mostly qualitative assessment of the residual risk." This is not true, as the residual risk from attaining Method B and C cleanup levels is quantified, and the

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residual risk from attaining Method A cleanup levels can be quantified. Perhaps the idea you're getting at is that it may be possible in some instances to develop quantitative risk estimates that may be more accurate than those calculated using Methods B and C.

2564 p. 366, definition for "Carcinogen." It might be more accurate to replace the second "and" with the word "or" since the last criterion defining a carcinogen (i.e., any substance that causes a significant increased incidence of benign or malignant tumors...) is a separate criterion, and not cumulative with the first criterion (i.e., it's on EPA's A or B list of carcinogens).

2565 p. 368, definition for "Lowest observed adverse effect level." Add the word "exposed" immediately prior to the word "population."

2566 p. 368, definitions for "Maximum contaminant level" and "Maximum contaminant level goal." Also see p. 371, and the definition for "Secondary maximum contaminant level." It is unclear why the phrase "as presently promulgated or subsequently amended or repromulgated" was deleted from these definitions. The Policy Advisory Committee concluded that it was important to use the best reliable scientific information when evaluating health hazards. In keeping with this, it would be appropriate to recognize the new science in new or amended MCLs and MCLGs as they are promulgated by EPA.

2567 p. 370, definition for "Reference dose." The definition states that the reference dose is a "benchmark dose." Since the MTCA regulation was initially written, the term "benchmark dose" does not necessarily imply a generic term that it appears to be intended in the definition, but has come to refer to a measure of toxicity calculated according to a specific procedure. A clearer definition might include EPA's statement, "the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime."

2568 p. 372, definitions for "Upperbound on the excess estimated cancer risk of one in one hundred thousand," and "Upperbound on the excess estimated cancer risk of one in one million." There should be consistency between the two definitions in the use of "ninety-fifth percent" or "95th percent."

2569 p. 379, WAC 173-340 350(9)(a). Change "in each media" to "in each medium."

2570 p. 380, WAC 173-340 355(2). Change the two instances of the word "media" to "medium."

2571 p. 410, WAC 173-340 700(5). Change "media" to "medium."

2572 p. 410, WAC 173-340 700(5)(a). This appears to be the first use of the abbreviation "ARARs," and it is not defined until later in the section (WAC 173-340 700(6)(a) on p. 412).

2573 p. 414, WAC 173-340 702(7). It might be useful to add a phrase such as "resulting in exposure to people, animals and plants" to the end of the first sentence to clarify what the cleanup actions are supposed to accomplish (i.e., prevent or reduce exposure to living things). In a risk assessment context, "pathway" is concerned with how the contaminant gets from the environment to the receptor in addition to the way it gets into the environment.

2574 p. 422, WAC 173-340 708(10)(b)(i)(B) Remove the first word (Are) because it repeats the last word from WAC 173-340 708(10)(b)(i).

Thank you for the opportunity to comment on the proposed changes to the regulation.

Sincerely,

Jim White

Jim W. White
Toxicologist

cc: Debra McBaugh
James O. White

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October 25, 2000

Dept. of Ecology, Toxics Cleanup Program
Attn: Trish Akana, Rules Coordinator
P.O. Box 47600
Olympia, WA 98504-7600

To Whom It May Concern:

In response to the proposed rule and amendments to the Model Toxics Control Act clean - up regulations.

2575 We request that you leave the Method A cleanup standards where they are!

You are increasing my potential cost of cleanups by placing more stringent requirements in place and you have failed to show how current standards are non protective of human health and the environment. Thank You.

Sincerely,

Gary McLaughlin
President

HARTMAN OIL INC.
285 WEST 5th • P.O. BOX 6
COLVILLE, WASHINGTON, 99114
TEL. (509) 684-6461 • FAX: (509) 684-7909

OCTOBER 25, 2000

TRISH AKANA, RULES COORDINATOR
DEPARTMENT OF ECOLOGY, TOXICS CLEANUP PROGRAM
P. O. BOX 47600
OLYMPIA, WASHINGTON 98504-7600

DEAR TRISH,

2576 I AM WRITING TODAY IN OPPOSITION TO THE DEPARTMENT OF ECOLOGY LOWERING THE CLEANUP LEVELS OF PETROLEUM CONTAMINATION LEVELS. DEPARTMENT OF ECOLOGY HAS FAILED TO SHOW A NEED FOR THE CHANGES AND CURRENT LEVELS ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

THE DEPARTMENT HAS NOT CONSIDERED THE ADDITIONAL COSTS AND BURDENS THAT THESE LOWER LIMITS WILL PLACE ON THE OWNERS, THE INDUSTRY AND THE PUBLIC. THE DEPARTMENT HAS CONTINUED TO MOVE AHEAD TO IMPLEMENT THE NEW CLEANUP LEVELS WITHOUT RESPONDING TO THE INDUSTRY. THESE NEW CLEANUP LEVELS WILL ULTIMATELY CAUSE INSURANCE PREMIUMS TO BE MUCH HIGHER AND COULD MAKE BORROWING MONEY HARDER.

I WOULD FAVOR LEAVING THE METHOD A CLEANUP STANDARDS IN PLACE. BY CHANGING THE STANDARDS ECOLOGY WILL POTENTIALLY CAUSE CLEANUP COSTS TO GO UP WHILE FAILING TO DEMONSTRATE HOW THE CURRENT STANDARDS ARE NON PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

CORDIALLY,

H. L. HARTMAN
HARTMAN OIL INC.

CC: GOVERNMENTAL REFORM AND OVERSIGHT COMMITTEE
REP. KATHY McMORRIS
REP. BOB SUMP
REP. BOB MORTON

Hottest Brand Going

Colony Insurance Company
Preferred National Insurance Company
Front Royal Insurance Company

October 26, 2000

Ecology Toxics Cleanup Program
Attn: Tish Akana, Rules Coordinator
300 Desmond Drive
Lacey, WA 98504-7600

Re: **Proposed Amendments – Model Toxics Control Act Cleanup Regulation**

Dear Ms. Akana:

This letter provides The Colony Group's comments on the proposed changes to the MTCA Cleanup Regulations.

As we indicated in our earlier comments, The Colony Group consists of three insurance companies, including Front Royal Insurance Company, Colony Insurance Company and Preferred National Insurance Company. The Colony Group has been writing underground storage tank liability insurance since 1989, and Front Royal Insurance Company was formed specifically to write this coverage. We write UST insurance in Washington with Colony Insurance Company and currently insure over 3,300 underground tanks in your state.

As we indicated previously, corrective action costs represent approximately two-thirds of the total loss costs of our Underground Storage Tank Pollution Liability policies, and any increase in these costs must result in a direct increase in premiums to our insureds.

Following are our additional comments regarding the proposed changes to cleanup regulation:

2577

- The proposed changes will be expensive. The proposed Method A cleanup levels for gasoline are far more stringent than current cleanup levels.

    1. The Ecology Small Business Impact Statement estimates a 20% increase in cleanup costs; the Pollution Liability Insurance Agency (PLIA) estimates an increase of 40% to 50% for soil cleanups and 20% for groundwater cleanups.

    2. Even if PLIA's estimates are high, a 20% increase in cleanup costs represents a significant increase in the cost of each claim.

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Front Royal Companies

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2578 • The proposed changes create uncertainty.

1. The generally more conservative cleanup standards will result in increased costs, which we estimated above. But we will not know the actual cost of the increase until we have several years of experience. If the costs are substantially higher than anticipated, insurers may increase premiums again or withdraw from the market. Some of the unknowns are the additional expenses from third party claims and lawsuits; increased loss adjustment expenses; increase in diminution of property value claims; increased internal loss adjustment expenses due to claims being open for years longer than originally anticipated; and suits due to "grandfathered" claims being re-evaluated by Ecology.

2. Over the past 10 years, we have collected and evaluated data regarding the costs of cleanups and third party claims arising out of petroleum releases. That data has allowed us to reduce our premiums as these costs became more predictable, and a downward premium trend during this period has resulted. The proposed changes again make the costs unpredictable and significantly reduce the value of our loss data.

2579 • The proposed institutional controls will not reduce costs for many of our insureds.

1. Institutional controls may result in use restriction on a property, which in effect will act as a deed restriction. A significant number of our insureds are small businesses, which frequently sell their properties. Burdened with a use restriction, many will be unable to do so, which in turn will result in demands for increasingly aggressive cleanup measures, the efficacy of which may be elusive.

2. The proposed institutional controls are not a cost effective substitute for ASTM risk based corrective action procedures which have been implemented in other states.

2580 • The proposed changes run counter to the cleanup trends in other states.

1. Most states have recognized that their cleanup standards are adequate to protect human health and the environment. Many of those states have cleanup standards that are less stringent than the current MTCA cleanup regulations. The proposed MTCA changes will make cleanups more difficult and costly, which runs counter to the trend in other states.

2. We do not believe that Ecology has demonstrated that the existing regulations are not protective of human health and the environment.

As we commented previously, all state of Washington claims we have handled in the past and are currently handling are subject to the oversight of the Department of Ecology, and we believe that protection of human health and the environment has been and will continue to be achieved with the involvement of Ecology with the current regulations in place. As such, we highly recommend that the existing cleanup standards for petroleum products be retained.

Sincerely,

Arthur Davis, AU
Assistant Secretary
Environmental Division

AGD/

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October 27, 2000

Ms. Trish Akana
Rules Coordinator
Toxics Cleanup Program
Department of Ecology
P.O.Box 47600
Olympia, WA 98504-7600

Re: Northwest Pulp & Paper Association Comments on Proposed Amendments to the Model Toxics Control Act Cleanup Regulation

Dear Ms. Akana:

Thank you again for the opportunity to comment on this version of amendments to the Model Toxics Control Act Cleanup Regulation that were proposed in August 2000. The Northwest Pulp and Paper Association (NWPPA) represents the majority of pulp and paper mills in Washington State. Our members have conducted cleanups pursuant the Model Toxic Control Act Cleanup Regulations, participated in various committees on redrafting the rules, and will be impacted by the revisions as currently proposed.

NWPPA also endorses the comments submitted by The Weyerhaeuser Company and the Association of Washington Business. Because there have been few substantive changes from the November 1999 proposed draft, we hereby incorporate by reference the comments we submitted in January 2000 together with those presented below. We trust that all our comments; both past and present will be addressed by Ecology in its responsiveness summary.

2581

I. NWPPA's Position

A. The rule must meet all requirements of a Significant Legislative Rule pursuant to RCW 34.05.328 including an adequate analysis of estimated costs and benefits and the consideration of alternative versions of the rule that are the least burdensome. NWPPA recommends that AWB's 1998 draft MTCA language be considered as an alternative to the presently proposed rule.

#108

B. The PAC recommendations have not been consistently integrated into these proposed regulations. Instead, this proposal still promotes staff recommendations, which attempt to circumvent the intent of the PAC negotiated rule process and the PAC recommendations themselves. NWPPA recommends that Ecology modify the proposed amendments to accurately reflect the PAV recommendations or again withdraw the proposed rule.

C. These regulations still do not meet regulatory reform requirements that rules be easier to understand and apply. NWPPA believes Ecology needs to dedicate itself to producing clearer and more understandable rules that can be applied by a reasonably educated affected party.

2582 **II. Significant Legislative Rule**

A. RCW 34.05.328(1)(d) requires that Ecology look at alternatives to the rule being proposed to determine that the adopted version is "...the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated under (a) of this subsection." NWPPA does not believe the August proposal is the least burdensome version of the rule. In 1998, AWB submitted a proposed draft that closely followed the PAC recommendations and more adequately meets the standard set forth in this law.

B. The draft document of estimated costs and benefits for the proposed MTCA amendments is inadequate to meet the requirement in RCW 34.05.328 (1) (c). This section requires that the probable benefits of the rule are greater than its probable costs. The way Ecology has subjectively chosen model site characteristics and amendments to analyze is insufficient to qualify as an adequate cost benefit analysis.

2583 **III. Incorporation of PAC Recommendations**

A. ESHB 1810 directed Ecology to establish the Policy Advisory Committee (PAC) to provide Ecology and the legislature advice on how to implement the Model Toxics Control Act. The PAC was to operate on a consensus basis or make broadly supported recommendations on how to revise MTCA. Ecology indicated that it would incorporate PAC recommendations into the rule language. Instead, Ecology has proposed rules that still fail to reflect PAC recommendations. The department must redraft the rules to better reflect PAC recommendations.

2584 **IV. Rules Do Not Meet Stated Goal**

A. From the beginning of the effort to revise the MTCA regulation in 1995, the stated goal has been to make environmental cleanups "fairer, easier to understand, more flexible, less ambiguous and less expensive." Ecology has restated this goal many times in its various public documents including its most recent fact sheets. These revisions do not meet any of the stated goals.

B. We do not believe that this draft is any easier to use or understand than previous proposals. The use of confusing terrestrial ecology provisions, lack of consistency with PAC recommendations, and insertion of more regulatory language is counter productive. In essence, implementing all provisions of this new draft is virtually impossible. The Governor's Executive Order 97-02, states that *"...rules be written and organized so they may be easily understood and used by people who are affected by them."* As with the prior draft, this version of the rule still does not conform to regulatory reform objectives in that it is not understandable, extremely complex, and is virtually impossible to apply as currently written.

C. The draft regulations are long, ambiguous, inflexible, unclear, and fraught with arbitrary determinations made by Ecology. The drive to adopt these regulations as currently written will promote misunderstandings and increase the possibility of legal challenges in the future. This is especially true in light of the fact that few changes were made from the November 1999 draft to this one, and no responsiveness summary was provided for the November regulations.

D. Rules in Washington must achieve two basic tenants; these are: (1) understand-ability, and (2) the ability of a reasonable person to ascertain what is expected. The MTCA revisions are so confusing and unwieldy that experienced environmental managers will be hard pressed to understand, let alone implement these revisions unless they have been members of the PAC or Science Advisory Committee for several years. Even those people will be hard pressed to see the resemblance between their recommendations and what is currently being proposed.

NWPPA appreciates this opportunity to again submit comments.

Sincerely,

Cathy Poole
Environmental Affairs Manager

CC Jim Pendowski

Akana, Trish Alicia

From: Wilhelm, Leon
Sent: Monday, October 30, 2000 2:46 PM
To: Akana, Trish Alicia
Subject: FW: http://www.ecy.wa.gov/laws-rules/activity/wac173340.html

Just wanted to assist ensure that you received this O.K.

-----Original Message-----
From: Wilson Rich - Contractor [mailto:wilsonr@lewis.army.mil]
Sent: Monday, October 30, 2000 2:27 PM
To: akat461@ECY.WA.GOV
Cc: Leon Wilhelm (E-mail)
Subject: FW: http://www.ecy.wa.gov/laws-rules/activity/wac173340.html

Comments from Ft Lewis, WA

> Subject: RE:
http://www.ecy.wa.gov/laws-rules/activity/wac173340.html
> There is one area that I believe a comment from Fort Lewis is warranted.
> That is in the area of financial assurance. I do not believe the
> proposed changes make the existing requirement worse, but I believe we
> have the opportunity to improve what now creates insurmountable legal
> concerns when it is applied to sovereign governments, particularly federal
> and state, because of laws and fiscal restrictions.
>
> WAC 173-340-440(11) in its amended form provides specific mechanisms for
> satisfying financial assurance requirements. They are a trust fund, a
> surety bond, a letter of credit, financial test, guarantee, standby trust
> fund, local government bond rating test, local government financial test,
> local government guarantee, local government fund or financial assurance
> mechanism required by another law. As one can plainly see, considerable
> thought was given to ensuring that adequate private sector and local
> government mechanisms are covered, but there does not appear to have been
> any thought given to the question of how the federal and state governments
> are going to comply. With the exception of the "financial test"
> mechanism, all of the mechanisms provided are unavailable to the federal
> government. They are either limited to local government or laws and
> fiscal restrictions prohibit the expenditure of appropriated funds to
> acquire them.
>
> The "financial test" exception seems broad but completely undefined. Most
> financial tests of which I am aware start with assets, subtract
> liabilities and could not easily be adapted for governments that primarily
> rely on taxes and annual legislative appropriations. There is also a
> general exemption for PLPs that "can demonstrate that sufficient financial
> resources are available and in place to provide for the long-term
> effectiveness of engineered and institutional controls adopted." With

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> respect to the Federal government, we would have difficulty making or
> supporting that statement because under Federal law, funds are not
> "available" until they have been appropriated by Congress. Even if
funds
> were appropriated they are only available for a specific period of
time.
> Therefore, they would not be "in place" for very long (usually one to
five
> years). Using appropriations in a manner contrary to these
restrictions
> could carry criminal penalties.
>
> I would recommend adding a separate and blanket exemption that applies
to
> Federal and state government entities. Basically the state would then
be
> relying on the full faith and credit of the United States and the
State of
> Washington. This is a provision that is generally found in federal
> financial assurance regulations. This would eliminate the legal
concerns.
> Another, less straightforward alternative would be to provide, at the
end
> of the list of mechanisms, a general statement such as "or other
financial
> assurance mechanisms as the Department may approve." This would allow
> Ecology the flexibility to deal with these federal and state PLPs on a
> case-by-case basis.
>
> Thanks,
> Steve
>

OHI

Oil Heat Institute of Washington
3820 Stone Way North
Seattle Washington 98103
telephone 206 548-1500 fax 206 548-1515

October 27, 2000

Mr. Curtis Dahlgren
Toxics Cleanup Program
Department of Ecology
PO Box 47600
Olympia, WA 98504

Dear Curtis:

Thank you again for meeting with us on September 26 to discuss interpretations of the MTCA rules which we believe could be critical to heating oil dealers and their customers. And I also want to thank you for taking the time a few days ago to talk on the telephone to me about our letter to you of September 29.

We are still very concerned that some parts of the proposed rules, that have not yet been clarified, have the potential of increasing costs and severely jeopardizing our Heating Oil Pollution Liability Insurance Program, that has so successfully protected heating oil customers in this state for some years.

To ease these concerns and perhaps prevent misunderstandings down the road, we would greatly appreciate it if you would send me a written response to confirm your verbal responses to our 4 points raised in our September 29 letter.

Also, we understand that the MTCA regulations will go into effect on January 19, 2001. We would like to meet with you as soon as possible before then to work on mechanisims for implementation that will not damage our program and detrimentally affect the 200,000 users of heating oil in the state.

2586 **Our 4 points of concern are:**

1. c. Terrestrial Ecological Point of Compliance

Is it agreed that the intent of the proposed rule is that in the case of a routine

OIL HEAT
Summer Comfort - All Winter Long!

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heating oil cleanup site with only contaminated soil, an institutional control will not be required if the contamination is at least 6 feet below the ground surface? *(I understood your response to this question to be that you are still working on it.)*

2587 **2.b. Terrestrial Ecological Evaluation Tier I Exclusion**

We request that the guidance document for diesel organic ranges address one of 2 options:

(1) The total area of soil contamination at the site (the area in which contamination is above the Method A cleanup level of 2000 ppm for human health protection) is not more than 350 square feet;

(2) The total area of contamination at the site (the area in which contamination is above the 460 mg/kg screening level for diesel for terrestrial ecological evaluation) is not more than 500 square feet. *(I understood your response to this to be that PLIA has not yet provided information to back up the request in (2) about 500 square feet, and also that there might be other exclusions that would operate in this situation.)*

2588 **3.b. Documentation of Terrestrial Ecological Evaluations**

Is it agreed that the intent of the proposed rule is that in the case of a routine heating oil cleanup with only contaminated soil, documentation of an exclusion from a terrestrial ecological evaluation will not be required for every site? *(I understood your response to be that the scope of documentation would depend on the site, and that it would take 15 to 30 minutes, unless there are substances other than heating oil found at the site.)*

2589 **4.b. Additional Analytic Testing Requirements**

Is it agreed that routine heating oil cleanup sites with only contaminated soil could be treated as a category, and testing for naphthalenes and carcinogenic PAH's will not be required at every site? *(I understood your response to be that the rule already states that this testing is required for No. 2 heating oil only if other substances are found at the site.)*

We await your written responses to these points, and to our request for a meeting to review rules implementation. Thanks for all your work on this, we appreciate it.

Sincerely,

Glenda J. Thomas

Glenda J. Thomas, OHI Managing Director

Cc OHI Board of Trustees

PUD #1 of Clallam County

Michael McInnes, General Manager

2431 East Highway 101
Post Office Box 1090
Port Angeles, WA 98362

(360) 452-9771
FAX 452-9338

Commissioners
William McCrorie, District No. 1
Hugh Haffner, District No. 2
Ted Simpson, District No. 3

October 27, 2000

State of Washington Department of Ecology
Post Office Box 47600
Olympia, WA 98504-7600

Attention: Trish Akana, Rules Coordinator

Re: NOTICE OF PROPOSED RULE AMENDMENTS TO CHAPTER 173-340 WAC

Ladies and Gentlemen:

The District's concern with the proposed amendments to Chapter 173-340 WAC is that they will lead to fewer cleanups that will be more complex, lengthy, costly, and less permanent.

The proposed rule amendments to Chapter 173-340 WAC will lead to the same problems that have plagued the CERCLA process; i.e., that cleanups are too costly, too slow, and that more money is spent on administrative cost than is spent on cleanup.

2590 The proposed rule amendments would require that a remedial investigation and feasibility study be required for every site. Many sites are small, single-contaminant sites, where removal and treatment of the contamination would be faster and cheaper than conducting the remedial investigation and feasibility study. There should be an exemption for these routine cleanups. The costs associated with these studies have not been included in the Estimates of the Probable Costs and Benefits of the Proposed Rule Amendments.

2591 The proposed amendments to Chapter 173-340 WAC would limit the use of Method A to sites that have few hazardous substances and are exempt under WAC 173-340-7491. The Method A cleanup levels are ultra conservative so that they can be applied to any site without threat to human health and the environment. Instead of limiting the use of the Method A cleanup level, the Department of Ecology should encourage the use of Method A cleanup levels,

#111

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which will result in sites being cleaned up to low levels and at less cost because less money will be spent on study and analysis and more money on the cleanup.

2592 The proposed amendments will also require that a terrestrial ecological evaluation be conducted on every site. The cost and benefit analysis for the proposed rule states that most sites will obtain an exclusion from conducting an ecological evaluation. The reason that most sites will be exempt from conducting an evaluation is that the contaminated area will be paved and this exclusion requires a deed restriction; i.e., institutional control.

If institutional controls are required for the ecological exemption, then less permanent cleanup actions will be employed at the site because a deed restriction will be a known requirement. To avoid this situation, the terrestrial ecological evaluation requirements being proposed should be deleted.

The proposed amendments will not only lead to less permanent and slower cleanups, but will also make them more costly. These additional costs are not analyzed in the costs and benefits associated with the proposed rule amendments. The cost and benefit analysis oversimplifies and omits many of the costs associated with the proposed rule. The District's concerns with the cost and benefit analysis are not simple mathematical errors, but basic flaws in the analysis.

2593 The first of these errors is to assume that the entire site is at the same level of contamination. In actuality, the level of contamination will decrease with depth and horizontal distance from the source of the contamination. This means that the concentration of contamination will also decrease with depth and horizontal distance from the source of contamination. Therefore, the cost to remove and treat a given quantity of contamination will increase with depth and horizontal distance from the source of the contamination.

2594 The second basic error is in the cost of groundwater cleanup, where it is assumed that all of the additional contamination will be transported to the groundwater. This is simply not physically possible. As stated in the District's earlier comments, the current Method A cleanup levels for soils are conservative and protective of groundwater. If this is not true, how many sites that have been cleaned up to Method A levels for soil have then contaminated the

groundwater to the level of concern without direct contact of the contaminant with the groundwater?

2595 For contaminants where the Department of Ecology does not currently list a cleanup level in the Method A table, the cost estimate uses the PQL for the current cleanup level. The cost analysis then shows the proposed rule as resulting in a decrease in cleanup level and no increase in cost. However, the corresponding decrease in benefits and increase in health risk is never discussed; only the increase in benefits is discussed and the associated decrease in health risks. The cost analysis also assumes that the current cleanup level for naphthalene is 0.4 ppm. This is based on the assumption that diesel contains 0.2 percent naphthalene and the current 200-ppm cleanup level for diesel is 200 ppm. If this approach is taken to the logical limit that diesel could contain a higher percentage of naphthalene, then any concentration of naphthalene could be used as the current cleanup level up to 200 ppm.

2596 The cost analysis uses both water rights and water rates to determine the value of groundwater. The cost of water rights is based on a source that is not representative; moreover, the use of only one source is not adequate. The water rates are based on multiple sources, which would be adequate; however, they are not accurate, because they do not consider the maintenance, operational, financial, and depreciation costs that are incurred in these rates.

2597 In Chapter 4 of the cost analysis, the estimate of reduced morbidity is based on 3.1 million people in the state of Washington being exposed to contaminated groundwater a portion of their lives, while the risk factors used for this analysis are based on a lifetime of exposure (i.e., 75 years).

2598 The Method A cleanup cost analysis in Chapter 5 does not seem to be representative of most sites. What is the basis for assuming that the maximum depth of the contamination is 12 feet?

2599 The Method B cleanup cost analysis in Chapter 5 uses the 4-phase equilibrium partitioning model to determine soil concentrations that are protective of groundwater, which is not correct because the model assumes a minimum depth to groundwater of 20 feet. The maximum depth of the groundwater at the site is 12 feet.

The District's final comment regarding the Probable Cost and Benefits of the Proposed Rule Amendments to Chapter 173-340 WAC concerns the timeframe. A copy of the analysis was ordered as soon as the District received notice that the analysis was available. The cost analysis was not received until Monday, October 23, 2000, which reduced the comment period to four days. Four days to prepare comments on a 151-page technical document is just not adequate.

This opportunity to comment, even though brief, is greatly appreciated.

Sincerely,

Ken Morgan
Transmission and Substation
Systems Manager

KRM:mt

October 31, 2000

Ms. Trish Akana
Rules Coordinator, Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Comments on Proposed Amendment to the Model Toxics Control Act Regulation – Additional Analytical Method & MTBE Monitoring Requirements

Dear Ms. Akana,

The Western States Petroleum Association (WSPA) appreciates the opportunity add the following to our comments submitted on October 26, 2000. WSPA is a trade association whose members conduct much of the production, refining, transporting and marketing of petroleum and petroleum products in the Western United States.

2600 It came to our attention that the Proposed MTCA regulation contains specific monitoring requirements for additional constituents which are not specifically listed in the current rules. Many of the proposed constituents will require testing by methods that are not currently required, at significant additional cost. As an example, Method 8260 testing is approximately three times as expensive as 8015/8020 testing. Our industry has extensive history and data on the cleanup of gasoline contaminated sites in Washington and other states. We believe that many of the additional testing requirements simply increase testing costs without leading to better cleanup decisions. We also believe that minor modifications to the currently required tests can be made to provide useful data at a reasonable cost. For example, we believe use of Method 8015/8020 is a far more useful cost effective method in assessing MTBE contamination.

2601 Analysis by one major oil company shows MTBE data conservatively measured by Method 8015/8020, was, in nearly all cases, substantially less than aromatic hydrocarbon concentrations for which testing requirements already exist. The data do not suggest that adoption of an MTBE testing requirement will lead to better or more informed corrective action decisions because the occurrence of MTBE is typically associated with substantially higher concentrations of aromatic hydrocarbons.

For the purpose of assessing the occurrence and magnitude of MTBE in Washington's groundwater, Method 8015/8020 is believed to be a robust measurement technique as the results are subject to false positive measurements (i.e. 8020 tends to report higher MTBE concentrations than 8260 testing). Where BETX concentrations do not exceed applicable action/cleanup levels and MTBE is present at concentrations above action levels, testing by Method 8260 is recommended.

WSPA members request Ecology remove the Method 8260 monitoring reference from them from the regulation and evaluate appropriate monitoring requirements after dialogue with the affected industry.

Thank you for the opportunity to comment.

Sincerely,

#112

Document # 5i

Akana, Trish Alicia

From: Dan Riley [driley@wspa.org]
Sent: Tuesday, October 31, 2000 4:56 PM
To: TAKA461@ecy.wa.gov
Cc: Dick Bremer; Chuck Hutchens; Tim Johnson; Jeff Goold; Ann Marie Johnson (Dockstader); Scott Hooton; Ralph Moran; Robbie Ettinger; Rob Gronewold; Mike Gillett; Gene Ketchum; Mike Whelan; Brett Hunter; Miki Ensman
Subject: MTCA Comments

mtca analytical methods.doc

Trish, please accept the following additional comments on the MTCA regulation from the Western States Petroleum Association.

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Akana, Trish Alicia

From: Hooton, Scott T [HootonST@bp.com]
Sent: Tuesday, October 31, 2000 4:17 PM
To: 'Trish Akana'
Cc: 'Steve Robb'; 'Dan Riley'
Subject: MTCA Comments

mtca.doc

Original to follow by reg. us mail.

Thank you for giving consideration to these comments. <<mtca.doc>>

Scott Hooton
BP Exploration & Oil, Inc.
295 SW 41st Street
Bldg. 13, STE "N"
Renton, WA 98055
425-251-0689
425-251-0736 (fax)
hootonst@bp.com

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Scott T. Hooton
Portfolio Manager

BP Exploration & Oil Inc.
295 SW 41st Street
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Renton, Washington 98055

Phone: (425) 251-0689
Fax: 425-251-0736
Internet: hootonst@bp.com

A BP Amoco Group Company

October 31, 2000

Ms. Trish Akana
Rules Coordinator, Toxics Cleanup Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Comments on Proposed Amendment to the Model Toxics Control Act Regulation - Additional Analytical Method Requirements & MTBE at Gasoline Release Sites.

Dear Ms. Akana:

This responds to the recommendations contained in the October 2000 Washington State Department of Ecology report titled *Occurrence of Methyl Tertiary-Butyl Ether (MTBE) in Groundwater at Leaking Underground Storage Tank Sites in Washington* (Study Report). I apologize for not submitting these comments prior to the close of the comment period, but I just recently became aware of the publication of the Study Report on the Washington DOE web site. This also includes comments regarding the proposed additional laboratory testing requirements at gasoline release sites.

The Study Report offers recommendations based on a single sample obtained from 70 different LUST sites. The Study Report concludes that these data are insufficient to ascertain the severity of potential MTBE impacts to drinking water sources in Washington. The collection of additional MTBE data was recommended to support further recommendations for regulatory action.

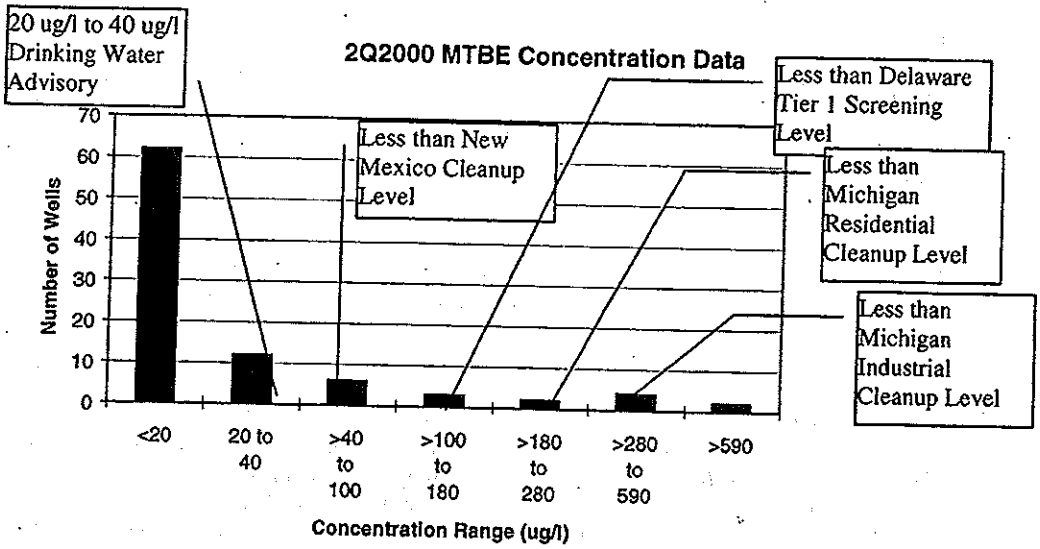
2602

Since 1996, BP has been reporting MTBE groundwater concentration data from all 26 Corrective Action sites[1] to the Washington Department of Ecology. These data provides useful context for Study Report conclusions, and the associated recommendations. Following is a presentation of data for 23 former BP sites where MTBE was detected during 2Q00, and discussion of how these data compare to the Study Report.

Attached are figures showing concentrations and groundwater elevation measurements from the BP sites where MTBE was detected in at least one sample. All samples were tested by US EPA Methods 8015 &

[1] It is noted that BP acquired retail assets from Mobil Oil Corporation in 1989, and EXXON Corporation in 1992. BP divested all of the retail assets in Washington State to Tosco in 1993. For the most part, BP retained responsibility for Corrective Action at the former Mobil Oil Corporation retail facilities, with EXXON Corporation retaining responsibility for Corrective Action at the former Exxon retail facilities. Since BP has not been monitoring the former Exxon facilities, BP has not obtained MTBE concentration data.

8020. Below is a graphic summarizing the numbers of wells where MTBE was detected along with associated concentration data.



All of these sites are located in Pierce and King Counties. Other MTBE action/cleanup levels are provided for context.

It is noted that:

1. MTBE, quantified by Method 8015/8020; was typically found at concentrations below lower threshold of the USEPA 'Drinking Water Advisory' (20 µg/l).
2. MTBE concentrations greater than lower threshold of the USEPA 'Drinking Water Advisory' (20 µg/l) were detected in samples obtained from 12 of the 23 sites.
3. Where MTBE was detected at concentrations above the lower threshold of the Drinking Water Advisory, benzene was also detected in most (88%) of the samples (compares with 96% in the Study Report). Benzene concentrations were substantially higher than MTBE concentrations – particularly when expressed as a multiple existing or proposed cleanup levels.
4. MTBE concentrations greater than the upper threshold of the Drinking Water Advisory' (40 µg/l) were detected in samples obtained from 8 of the 23 sites. Substantially higher concentrations of benzene are associated with all (100%) of these samples.
5. The highest MTBE concentrations are typically associated with the highest benzene concentrations at a site. The 2Q00 monitoring data does not support a conclusion that downgradient wells are generally at the tail end of the plume. In nearly every case, assessment sufficient to delineate aromatic concentrations also delineates MTBE concentrations to the range of the Drinking Water Advisory.
6. Method 8015/8020 data is sufficient to define the extent of MTBE.
7. Concentrations of aromatics are substantially higher (when expressed as a multiple of existing cleanup levels) and are expected to drive the corrective action at all of these sites. The MTBE data is inconsequential in virtually every case.

Below is a table comparing 2Q2000 monitoring data to the Study Report data (following the format of Study Report Table 3. Statistical Summary of BTEX and MTBE Concentrations and Detections). Note that the BP

data consists of the results of 124 wells (from 23 sites) as compared to 70 wells from 70 sites in the Study Report. The MAX BP 2Q Data is based on the highest concentration reported at each site; the AVERAGE 2Q2000 Data is a summary of each well with detectable concentrations of MTBE by Method 8015/8020 during 2Q00.

WDOE Study Report	B	T	E	X	MTBE
Total Detections>Threshold Concentration	55	41	38	42	26
Average Concentration, mg/l [sic]	1,992	3,943	657	2,251	441
Maximum Concentration, mg/l [sic]	43,000	68,000	6,300	22,400	7,150
Median Concentrations, mg/l [sic]	151	18	86	87	13
MAX BP 2Q2000 Data	B	T	E	X	MTBE
Total Detections>Limit of Detection at 23 sites	87	73	79	90	96
Average of Max Concentration from 23 sites, µg/l	3,496	5,589	1,033	5,533	467
Maximum Concentration from 23 sites, µg/l	24,000	31,000	3,700	22,000	9,400
Median Maximum Concentration, µg/l	640	1,300	760	3,100	24
AVERAGE 2Q2000 Data	B	T	E	X	MTBE
Average Concentration from wells, µg/l	1375	1894	421	1991	200
Median Maximum Concentration, µg/l	35	8.3	71	82	6.8

The WDOE Study was, understandably, biased towards collecting samples from wells where hydrocarbons were likely to be present. Since the Study Report median and average concentrations fall between the MAX and AVERAGE 2Q2000 median and average concentration data, statistical testing would most likely prove out that the BP and the WDOE data are not significantly different.

2603

Discussion & Recommendations

The MTBE data provided to the WDOE since 1996 provides useful context to the Study Report. In general, the 2Q200 data provided by BP shows that MTBE concentrations, conservatively measured by Method 8015/8020, are, in nearly all cases, substantially less than aromatic hydrocarbon concentrations for which legal testing requirements already exist. The data do not suggest that adoption of a MTBE testing requirement will lead to better or more informed corrective action decisions because the occurrence of MTBE is typically associated with substantially higher concentrations of aromatic hydrocarbons. It seems prudent to evaluate existing MTBE data (particularly to the extent that these data may lend support to corrective action requirements which would not otherwise be required in the absence of MTBE data) at the present time.

For the purpose of assessing the occurrence and magnitude of MTBE in Washington's groundwater, Method 8015/8020 is believed to be a robust measurement technique as the results are subject to false positive measurements (i.e. 8020 tends to report higher MTBE concentrations than 8260 testing). Where BETX concentrations do not exceed applicable action/cleanup levels ***and*** MTBE is present at concentrations above action levels, testing by Method 8260 is recommended.

Adoption of the WDOE recommendation for 8260 testing would have increased actual analytical costs during 2Q00 from $3,844 to $11,656. These additional costs does not appear to be proportional to benefits that 8260 testing provide.

It is also noted that the proposed amendments would require testing for additional constituents at gasoline sites which are not specifically listed in the current regulations (n-Hexane, 1,2-Dibromoethane (EDB), 1,2-Dichlororethane (EDC), Naphthalenes, and VPH). It is BP's experience that gasoline cleanup actions are driven by data that can reliably be obtained by Method 8015/8020 testing (i.e. MTBE, benzene, toluene, ethylbenzene, total xylenes, and to a lesser extent, TPH). Many of the proposed constituents (e.g. EDB and EDC) will require laboratory testing by other methods, at significant additional cost. It is not apparent how the cost of obtaining these additional data has been weighed against the benefit these data will provide with respect to corrective action/cleanup decision to be made at a gasoline release site. BP believes that a cost

benefit analysis[2] is necessary and warranted for additional constituents that cannot already be reported by Methods 8015/8020 before they are required for testing at gasoline release sites.

Please feel free to contact me with questions.

Sincerely,

Scott Hooton

attachments

cc: Steve Robb, Washington Department of Ecology, 300 Desmond Drive, PO Box 47600, Olympia, WA 98504-7600
Dan Riley, Western States Petroleum Association, 2201 Sixth Avenue, STE 1105, Seattle, WA 98121-1832
Arden Ahnell - MES
Chris Winsor - WEST

[2] Ref. RCW 34.05.328(1)(c).

BEFORE THE WASHINGTON DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON

In the matter of:)
)
Proposed Changes to the)
Model Toxics Control Act)
Cleanup Regulation.)
)

OFFICIAL TRANSCRIPT OF PROCEEDINGS

TAKEN ON SEPTEMBER 6, 2000 - 6:00 P.M.

SEATTLE, WASHINGTON

Reported by:

Roger G. Flygare, CCR

CCR No. FLYGARG513C7

COPY

Pgs 114 -> 117

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APPEARANCES:

FOR THE WASHINGTON STATE DEPARTMENT OF ECOLOGY:

DAWN HOOPER, Hearing Facilitator
CURTIS DAHLGREN
PETE KMET
STEVE ROBB
JERRY THIELEN
BOB WARREN
NORM PECK

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HYUN LEE..... 14 #55
CHARLIE BROWN..... 20 #56

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BE IT REMEMBERED that the hearing in the matter of Proposed Amendments to Toxic Waste Cleanup was held on September 6, 2000 at the hour of 6:00 p.m., at Seattle, Washington, before Roger G. Flygare, CCR, Notary Public in and for the State of Washington, residing at Auburn, Washington;

Whereupon, the following proceedings were had, to-wit:

* * * * *.

MS. HOOPER: Good evening. I would like to welcome you on behalf of the Department of Ecology to today's public hearing on the proposed rule changes.

My name is Dawn Hooper and I will be the hearings officer for the meeting tonight and we're here to talk about the proposed rule revisions and we will have three main parts to this meeting.

First of all, Curtis will start off just giving a brief presentation to explain the proposal and then we will open it up for a question and answer period and see how long we need, but we won't go more than 20 minutes on that, and then we take a short break so you can have a chance to decide whether you would like to give public testimony and if you haven't filled out one of the cards, you'll have a chance to fill out a card and give it to me, and also if you have any questions you want to ask

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me or an Ecology representative individually you will have an opportunity to check in with them after the break. After that, we will start the formal testimony portion of the hearing. This is the part of the meeting where your comments for the public record will be recorded.

We asked that you publish your comments on the changes being proposed to the rules and we've provided comments registration cards for the rule admissions and those cards are in the back as well.

Let the record show that is 6:03 p.m., September 6, 2000, and this hearing is being held in Seattle at the Mountaineers Building. Legal notices of this hearing were published in the Washington State Register on or about August 16, 2000, paid notices were also published on or about Wednesday August 30, 2000, in the Seattle Times, PI, Spokesman Review, and the Yakima Herald, and also legal notice in the Olympian Newspaper.

In addition, notices of the hearing were mailed to about 500 interested people and many of you may have received that notice.

As tonight's hearing officer, I have two main responsibilities. One is to make sure that everybody who would like to comment has an opportunity to do so and to make sure that Ecology obtains a clear record of the hearing and we have a court reporter recording the hearing

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tonight so that we have it all recorded.

So, a few ground rules just to make sure that we can get a good record of the meeting and everybody has a chance to comment.

First of all, when we get to the formal portion of the meeting, I will call you up to speak in the order that your cards were received, and if you would when you come up to turn to the microphone so you can use it, you will state your name and address for the record, and one person speaks at a time, and in the formal comment part of meeting we don't respond to your questions, but it's your opportunity to give us your comment or state a question for the record. So, I will ask you to step up to the microphone to comment at that time.

And, secondly, if you could please limit your formal testimony to five minutes or less that would be great, it would give everybody a chance to comment and then we can come back with additional comments if you have additional comments that you want to make after that.

You can – you are welcome to summarize your comments if you are planning to also send in written testimony, you are welcome to summarize it if you would like and we do need to receive your comments in writing if that's how you're going to send them by the close of business on September 15, 2000, by 5:00 p.m.

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And, let's see, a question, I've already mentioned that through formal testimony you have an opportunity to state comments, we won't be answering comments or questions at that time, but earlier on during the question and answer part of the meeting, we do have time for discussion, if you like.

After the written comment period is over after September 15th, Ecology will prepare a written responsiveness summary that identifies questions and comments received and you'll receive a copy of those written responses if you have given us your name and address at the back of the room.

And as people are talking and asking questions, if you could remember not to have sidebar conversations that really makes sure that we get the record of the meeting and everybody gets to hear what is happening.

Okay, so a quick introduction: Curtis Dahlgren will be presenting the proposal, he's unit supervisor in the Ecology Cleanup Program.

We also have other Ecology staff here: Pete Kmet in the back of the room, one of rule writers; Steve Robb, right up here; Norm Peck, he's at the Northwest Office; and then we have Bob Warren and Jerry Thielen here as well.

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Okay, I think we're ready to get going.

(Off the record - informal discussion at 6:07 p.m. and back on the record at 6:45 p.m.)

MS. HOOPER: Okay, we will go ahead and get started with the formal testimony portion of the meeting tonight. I have cards from you. I will go ahead and call you up. When you come up, please remember to state your name and who you are representing and your address and then we will take your statement for the record.

So first we have Bill Bellman and second will be Marsha Beery.

MR. BELLMAN: Thank you and I want to commend Ecology for your providing of the amendments and your rewriting of the amendments and your rewrite of the rewrite of the amendments. I hope we're through; at least, for rewriting the amendments.

My comments are taken as I understand the rules and talked to you about and so I will get a response from you I am sure on some of these. I have reviewed the latest proposed amendments to the Model Toxic Control Act and have the following comments:

The members of the Washington Oil Marketers Association are among the most affected by the changes Ecology is recommending to the rules. Our members have

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cleaned up sites across the State of Washington under the current rules and to our knowledge and the knowledge of the community where we live and operate our businesses, these cleanups have been protective to human health and environment under the current standards. Ecology has changed the Method A cleanup standards in writing or verbally four times in the last couple of years and your latest amendments have two cleanup standards depending on whether it's weathered gasoline or new gasoline.

You have placed the benzene level allowed in weathered gasoline so low, it ensures everyone has to use a more stringent standards required for new gasoline. You state the latest change in benzene level is due to a misapplication of the model in 1999. You've added MTBE testing to the mix. You now require ground water cleanup levels to be as stringent as the concentrations established for protecting surface water.

I do not pretend to understand the ramifications of all of the changes that have been made, but believe, although well intended, you made the issue of cleanup much more complicated costly and ambiguous.

Washington Oil Marketers Association must again ask for proof that current cleanup standards under Method A are not protecting human health and environment. We asked for this in our letter of January 12, 2000 and

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have not received a response.

In your briefing paper, you have all but negated the grandfather clause that was previously in the amended rules. We do not feel that the grandfather rule protected property owners who had cleaned up their sites under the current standards and wanted to refinance or sell a site. Ecology's statement that further cleanup can be required on a site to ensure protection of human health and environment is understandable. Tying that to more stringent cleanup standards causes the problem. Lenders will want sites cleaned up to the standard in effect at the time of the loan before they will lend money on them. 2605

You have made petroleum cleanup much more costly, more complicated, and more stressful on the property owner and you did it without proof that changes were necessary based on cleanups previously done. To quote from one of the letters Ecology previously received on this rule, "This rule is not fair as the new requirement and cleanup levels are not associated with an improvement in the environment."

The proposed rule is not easy to understand. The proposed rule is far more expensive to the small business owner. Ecology has failed to meet the recommendations of the Policy Advisory Committee which was to focus on making the rules fair and easy to understand

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and more flexible and less expensive.

At this point, it appears that the rule amendments need to be set aside and review of the original task be made to determine how the PAC recommendations can become a part of the rule making process. If this is not feasible, leave the Method A cleanup levels on gasoline where they currently are.

Thank you.

MS. HOOPER: Marsha. State your name and address.

MS. BEERY: I just want to thank Ecology for the opportunity to comment and my name is Marsha Beery and I am with the Fluor Hanford Company. Although, my office is in Olympia, I'm here on behalf of the contractors for the Department of Energy at the Hanford site. We at Hanford continue to have major concerns with the proposed the MTCA rule. I will talk about four areas tonight, but we will be including others in our formal comments.

No. 1 is: We continue to have major concerns with the complexity of the soil to ground water standards in WAC 173-340-747. These provisions are still so technically involved that they are difficult to read. This, we feel, is contrary to Ecology's stated goal with rule making and with Governor Locke's Executive Order 97-02 that the rule be easier to understand, fairer, less 2606

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expensive, less ambiguous, and more flexible. These provisions are clearly not easier to understand. We recommend Ecology revise -- excuse me -- revise this provision to make it more readable, and we will be making more specific recommendations in our formal comment.

I didn't want to go into specifics here at the formal testimony because we only have five minutes.

No. 2 is: We also continue to have major concerns with the ecological risk assessment provision of WAC 173-340-7490 through 7494. It seems that Ecology is still using the preferred "Robin/Earthworm Model" even though it does not apply to a major portion of the State, particularly Eastern Washington. While we recognize that Ecology has provided for the use of other models in these provisions, it still puts all of the elements on the regulated community to demonstrate applicability of an alternative food web model. 2607

And in our experience with working with Ecology over the last three years to attempt to make this demonstration, we found it to be a difficult undertaking and given that a large portion of the state should be using a different model the onus should be on Ecology to develop a second food web model.

Again, this is contrary to Ecology's stated goal with the rule making and Governor Locke's Executive

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Order to make the rule fairer. We therefore recommend that Ecology put the rule making on hold for these provisions until a second food web model is developed.

No. 3 is: We have major concerns about the use of the Land's Method in provision WAC 173-340-740(7)(d)(i)(A). 2608

As noted in the comments on the previous proposed rule, EPA has evaluated the use of Land's Method and concluded that the method should not be used in environmental cleanup application. The EPA evaluation indicated that this methodology would hide contamination rather than reveal it. In light of this information, we recommend that Ecology revise this provision to identify appropriate statistical method.

And, finally, No. 4, we continue to have concerns, major concerns, with provision WAC 173-340-7490(2). 2609

As written, this provision would require that an exclusion be documented or a terrestrial ecological evaluation be done in the event of any release of hazardous substance to the soil at a site. Is it Ecology's intent that such documentation be maintained even for minor releases such as few drips of antifreeze in a parking lot or spillage of a few grains of salt? We hope not. This provision clearly does not allow for de

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de minimis releases and should, so we recommend Ecology provide for those de minimis releases.

In conclusion, we have a number of significant concerns with this rule, a few of which I have discussed here and others which we will be including in our formal comment. Based on these concerns, we feel that a major revision of the proposed rule is necessary before Ecology finalizes the rule and in the case of the ecological risk assessment provisions we recommend that the rule be reproposed after a second appropriate food web model is developed.

Again, thank you for the opportunity to comment.

MS. HOOPER: Thank you. Next is Hyun Lee. State your name and address.

MR. LEE: My name is Hyun Lee and I am with Heart of America Northwest at 1305 - 4th Avenue, No. 208, Seattle, Washington 98101.

I would also like to thank Ecology for the chance to make comment.

Heart of America Northwest urges Ecology to move to a speedy adoption of the proposed amendments. Following a lengthy and positive heralded market MOTCA Policy Advisory Committee process, Ecology issued a draft rule reflecting the specific areas where tentative

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consensus had been reached and the overall proposal to allow site specific risk assessment, which had agreement from all parties except several dissenting public interest and environmental groups who viewed the public participation requirement as too weak to enable effective protection of community concerns and highly complex risk and remedial action decision. We supported the agreement and recommendation of the MOTCA-PAC and urge Ecology to adopt the rules the reports of MOTCA-PAC. We supported this delicate agreement to provide for site specific risk assessment, clarification of criteria for industrial standard application, public notice and participation improvements, and ecological risk assessment.

We do add a note of caution, however, that extensive time has been allowed to elapse prior to these rules being adopted has shown concerns about substitution of site specific risk assessment would occur without adequate public notice of how public concerns for future resource use would be impacted and without consideration of those concerns.

The delicate agreement of the MOTCA-PAC needs to be preserved by Ecology by specifically honoring the following commitments and taking the following recommendations actions to reflect that agreement.

First, there will be no change in degree of

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protectiveness of human health embodied in the current rule standards for carcinogen risk at sites with either unrestricted public access or where an adult industrial worker is the reasonable maximum exposure scenario or primary exposure. Ecology can't agree to a relaxed carcinogen risk standard allowing public exposure to carcinogenic residual hazardous substances, including radionuclides.

Actually, I submitted a lot of these in writing, so I will kind of summarize as much as possible for you.

One of our concerns is that the Department of Health has now proposed to Ecology that the two agencies enter into a "Memorandum of Understanding" to allow the use of a residual radionuclide exposure, expressed as a dose, that results significantly in a higher carcinogen risk than one in one hundred thousand for adults under a reasonable maximum exposure scenario. The proposal doesn't calculate risk for the most exposed, children. Health recently adopted a rule for this residual radionuclide dose, which is based on federal NRC, Nuclear Regulatory Commission, standards for closure of licensed sites. MOTCA requires the use of health based standard which is more protective than the federal standard. There is no equivalency between the MOTCA standard and the

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Health standard. For adults, EPA and NRC calculations showed Washington Health standard would result in carcinogen risk five times greater than permissible under MOTCA, without following MOTCA requirements for risk assessment and reasonable maximum exposure scenario. Indeed, the Health rule will allow the adult cancer risk to grow to at least 20 times the MOTCA standard in the event of failure of institutional controls, whereas the proposed MOTCA rules make clear that the reasonable maximum exposure scenario must result in a cleanup and remediation level that protects the public from cancer risk.

Generally, Ecology must not enter into any "Memorandum of Understanding," with another agency to allow the use of a different cleanup standard for radionuclides if it results in doses with health risks in excess of a couple -- cumulative carcinogen risk, which is stated in here.

Secondly, the agreement to allow use of site specific risk assessment was based upon specific agreements to improve public participation in highly technical decisions. The rule should specify that the approval of the use of a site specific risk at any site is a determination of the Department, which must be based on compliance with the public notice and involvement

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requirements and the access to technical assistance and grants provided for in the current law and proposed rule. If Ecology or the legislature acts to restrict public involvement including funding for or access to the PPG, Public Participation Grants, for hazardous substance release site affected citizen groups and the technical adviser, the rule should specify that Ecology will not be able to approve the use of these site specific risk assessments that vary important default assumptions or which could result in significant restriction on public access to land or resources.

2613

Third, the rule should be amended to specify that additional exposure pathways may exist, particularly for carcinogenic radionuclides and appropriate models must be utilized to determine the carcinogen risk consistent with the existing sections of the rule. However, the rule must continue to explicitly require that use of such models must be subject to scientific approval requirements and that they shall utilize the default assumptions for risk assessment. Except as provided for in Section B and C in this subsection and in WAC 173-340-720 through 173-340-760. These default values shall not change for individual hazardous substances or sites; and, they shall not be modified if the requirements for notice and public participation plans pursuant to WAC 173-340-600 have not been complied with.

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Fourth, we believe that consistent with the MOTCA-PAC discussion, persons who engage in independent remedial actions should have notice provided in the rule that they can not vary from the default assumptions for risk assessment or utilize alternative reasonable maximum exposure scenarios which continue or create new land use restrictions without fully complying with the notice and public participation requirements of WAC 173-340-600.

In the MOTCA-PAC, it was discussed that the desire to utilize site specific risk assessment would be a motive for potentially liable parties to come under the Ecology program umbrella. This now seems unlikely to occur once the liable parties understand that they run substantial risk of not having their risk modification approved at a later date for failure to notify and properly involve the public.

MS. HOOPER: Thank you. And next is Charlie Brown. Would you like to make a comment?

MR. BROWN: Thank you. My name is Charlie Brown. I work with the Washington Oil Marketers Association. My address is PO Box 4430, Tumwater, Washington 98501.

Thank you for the opportunity to address this group. I will be submitting some written comments later on.

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I just want to emphasize the fact that in the small business economic impact statement the statement does state, and I quote, "As a result of the," and out of quote 'this rule,'" Ecology concludes that small businesses are more likely to face disproportionately higher costs than large businesses."

As you know, the Washington Oil Marketers Association does represent a number of small businesses across the state.

In your own employment statistics category in Table 1 of the small business economic impact statement, it suggests that there are around 1,448 gasoline stations that are going to be impacted likely by this rule and of those 1,443 are owned by businesses of an employment size of one to 49. These are very small businesses.

The cost of this rule as pointed out by Bill Bellman by changing the Method A soil numbers are going to be substantial for these small business owners, all of whom have probably had quite a bit of experience with petroleum cleanup in the past and they still are unhappy of the fact that the Department of Ecology has not come forward with information suggesting that the current cleanup levels are not currently protective of human health and the environment, but rather take the soil

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Method A cleanup levels for the proposed rule and base that on a model rather than what truly is happening out there in the environment.

I do want to emphasize that Ecology has made a commitment to work with gasoline station owners in the development of a model remedy. I do think that this will help alleviate or diminish some of the costs for these small gasoline station owners, and it is recognizing the small business economic impact statement, I appreciate that.

We do look forward to working with you, but we do stand in opposition to adoption of this rule for the basic fact that this rule seems more directed towards very large cleanup sites, very large corporations who have the resources to cleanup those sites, and fails to recognize the fact that a number of the smaller businesses are going to be disproportionately impacted and has failed to do anything in the rule to actually mitigate the costs for those businesses.

I will follow up with written comment. Thank you.

MS. HOOPER: Thank you. Is there anyone else who would like to submit formal testimony tonight?

Okay, we will go ahead and close the meeting at this point, and I have a few things to say, and

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actually we will stick around and see if there are any other questions that you would like to discuss a little bit.

So, if you would like to send Ecology written comments the address is included in the meeting handout at the end of the meeting please send those to us so that we receive them by September 15th, you may e-mail them if you would like. And the next step then after this comment period and Ecology has had a chance to consider your comments and make appropriate revisions to the rule will be adoption of the rule. The agency director or his designee will look at public comments and responsiveness summary and staff recommendations and will make a decision about adopting the proposal. Adoption is currently scheduled for November 22, 2000. If the proposed rule should be adopted that day and filed with the Code Revisor, it will go in to effect 31 days later. I think there was a mistake in the overhead where it said 30 days, but it is a 31-day period.

If we can be of further help, please don't hesitate to ask. Steve made the offer that if you have specific questions, please do call us, as we're happy to talk with you about those items at any time particularly during this comment period. On behalf of the Department of Ecology, thank you for coming tonight and over this

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long period. We appreciate your cooperation and participation.

Let the record show that this hearing adjourned at 7:08 p.m. on September 6, 2000. Thank you very much.

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In Re: Proposed Changes to the model Toxics Control Act Cleanup Regulation.

AFFIDAVIT

I, Roger G. Flygare, CCR, do hereby certify that the foregoing transcript prepared under my direction is a full and complete transcript of proceedings held on September 6, 2000, at the hour of 6:00 p.m., at Seattle, Washington.

COPY

ROGER G. FLYGARE, CCR
CCR No. FLYGARG513C7

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Department of Energy
Richland Operations Office
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01-RCA-024

Mr. Curtis Dahlgren
Toxic Cleanup Program
State of Washington
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504

Dear Mr. Dahlgren:

COMMENTS ON THE PROPOSED AMENDMENTS TO THE MODEL TOXIC CONTROL ACT REGULATIONS

Thank you for the opportunity to comment on the State of Washington Department of Ecology proposed amendments to the Model Toxics Control Act regulations. The U.S. Department of Energy, Richland Operations Office comments are being submitted electronically as a Microsoft Word file for your consideration. They are also being submitted in hard copy via U.S. mail.

Please direct any response to these comments to Clifford E. Clark, of my staff, at the address shown in the letterhead. You may call him at (509) 376-9333, if you have any questions.

Sincerely,

Steven H. Wisness, Acting Director
Regulatory Compliance and Analysis Division

RCA:CEC

Attachment

cc w/attach:
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M. A. Beery, FHI

#118

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Page 1 of 12

HANFORD SITE COMMENTS ON PROPOSED CHANGES TO MODEL TOXICS CONTROL ACT (MTCA) CLEANUP REGULATION

General Issues

1. Rule development process: The Washington State Department of Ecology (Ecology), the regulated community, and numerous public interest groups have spent a good deal of time and effort on this MTCA rulemaking endeavor. Ecology's dissemination of the preproposal draft version of the rule changes in late 1998 presented a valuable opportunity to consider the adequacy of the contemplated changes. Ecology received a large number of significant comments from various quarters. These comments identified a number of serious concerns with the rulemaking language. Although Ecology made revisions in the initial (November 1999) proposed rule in an attempt to address some of these issues, many of the concerns raised on the draft rule remained. In this version of the proposed rule Ecology has attempted to address additional issues. Nevertheless, many significant problems previously brought to Ecology's attention remain. The August 16, 2000, letter on this rulemaking effort states that comments submitted on the November 1999 proposal do not need to be resubmitted. In order to clearly delineate the issues that RL believes Ecology has not adequately addressed, RL is resubmitting many of the same comments, along with a few new comments based on the most recent proposed rule. As a consequence, this comment package may be viewed as comprehensive, and Ecology may ignore the November 1999 Hanford Site comment package in preparing the Responsiveness Summary.

2619

2. **Overall evaluation:** Contrary to Ecology's stated intention, the proposed MTCA rule will *not* make the business of environmental cleanups fairer, easier to understand, more flexible, and less ambiguous and less expensive. For instance, on the criteria of:

   Fairness. Ecology has added new requirements for providing notice to local government and nearby property owners that is over and above the existing public notice requirements and at the discretion of Ecology personnel. It has included new language in the independent cleanup section, which gives the agency unrestricted control over these types of cleanup by requiring all releases and independent cleanups to be reported. Additionally, while the ecological risk assessment provisions allow for substitute receptor species, Ecology has included a catchall statement which will basically force the potentially liable person to comply with Ecology's food-web model if the agency doesn't like the substitute values or species proposed. Finally, Ecology concludes in the Small Business Economic Impact Statement that there will be a disproportionate impact on small businesses.

   Easier to understand. Ecology has attempted – and to some degree succeeded – in clarifying certain aspects of the remedy selection process in this reproposal. Nevertheless, the reproposal still represents a reduction in clarity and readability from the current rule. Also, the soil to ground water provisions are still so technically involved as to be unreadable.

Flexible. While Ecology has provided options in risk management such as natural attenuation, there is no clear direction on how to use this or the other options. Also, Ecology has provided more options for risk assessment but these are difficult to find in the text.

Less Ambiguous. Ecology has created ambiguity by not including a description of how to do a disproportionate cost analysis. Also, there is ambiguity in the ecological risk assessment provisions, as stated above, wherein Ecology has included a catchall statement which basically forces the potentially liable person to comply with Ecology's food web model if the agency doesn't like the substitute values or species proposed. Ecology could, and should, provide clear, unambiguous criteria for the selection of substitute values or species, not leave it to the judgment of individual staff personnel.

Less expensive. Ecology has shown in the Small Business Impact Statement that there will be a significant increase in costs for certain small businesses. This clearly indicates that the proposed rule is not less expensive. Furthermore, from this analysis, it can be concluded that there will undoubtedly be a significant increase for large businesses as well.

It is clear from the above that Ecology has not followed through on the standard they set for this rulemaking which was to make it fairer, easier to understand, flexible, less ambiguous, and less expensive. It is also clear that Ecology has not followed the directive in Governor Locke's Executive Order 97-02, which states that "rules be written and organized so they may be easily understood and used by people who are affected by them." Due to the lack of clarity, much of the regulation will be left to individual Ecology personnel to interpret and implement, resulting in inconsistent application throughout the state and a strong likelihood that cleanup decisions will be based on the preference of individual regulators rather than defensible remedies resulting from balanced and objective evaluations.

Ecology has also still not addressed a number of issues that are of concern to facilities. These issues were raised in a series of meetings with Ecology's facilitator and mid level management in the Toxic Cleanup Program as well as Ecology senior level management. While certain stakeholders present at these meeting felt they had reached agreement, Ecology did not follow through on its commitments and hence, these issues have never been resolved. We continue to have major concerns about the proposed rule and recommend that Ecology put the rulemaking on hold pending resolution of these concerns.

2620 3. **Land-use planning authority:** Land use is an important factor in implementing MTCA cleanup actions, particularly with regards to establishing cleanup levels for industrial-zoned properties. The current and proposed regulation acknowledges the authority of cities and counties in land-use planning. To clarify for the regulated community, does Ecology assert any independent land-use planning authority in making MTCA cleanup decisions, or will Ecology always accept local land-use planning efforts? E.g., if a city planning pursuant to the Growth Management Act (GMA) zones a property as industrial, does Ecology nevertheless reserve the right to require cleanup to a residential standard? If so, what criteria would Ecology use to reject the city's GMA authority? Please clarify the Ecology position on this matter in the Responsiveness Summary for this rulemaking effort.

2621 4. **Relationship to Federal Cleanup Program:** The MTCA revisions should be modified to state that a cleanup action selected under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) *will* be deemed to satisfy the requirements of

MTCA *provided* that the cleanup action incorporates and complies with the substantive provisions of MTCA, as acknowledged by Ecology signature on the decision document for the CERCLA cleanup action. This would eliminate the jeopardy faced by potentially responsible parties of completing an approved cleanup action under the federal cleanup law only to face the possibility of a subsequent cleanup action imposed pursuant to MTCA. This concept could be included in the MTCA regulations by making changes to the language proposed in WAC 173-340-380(4) or –702(10).

2622 5. **Intended Impact on Cleanup Actions:** The proposed rule continues to be unclear regarding the intended impact Ecology foresees from the new requirements. To address this matter, please provide answers to the following questions in the Responsiveness Summary for this rulemaking effort:

- From an historical perspective, approximately what percentage of MTCA cleanups have attained the fully "unrestricted land use" cleanup levels rather than using containment, institutional controls, or relying upon a different exposure/use scenario?
- Is it Ecology's belief that the proposed regulation would result in a higher, lower, or about the same percentage of cleanups to fully unrestricted land use levels?

2623 6. **Use of individuals rather than populations in ecological risk:** In the preproposal draft of WAC 173-340-7490 through -7494, Ecology built their premise of significant adverse affects from contaminants on impacts to **populations**, except in the case of threatened and endangered species. This was the correct ecological approach and was consistent with environmental law and guidance established by EPA under 43 CFR 11. It appears that the proposed rule has changed the level of significant effect to the point where non-threatened and non-endangered species are treated the same as threatened and endangered species so that impacts to an individual would be considered unacceptable. The preproposal stated that "the significance of an adverse effect is evaluated relative to an impacted local population of species of concern." It also went on to consider significant impacts as those that would alter "important structural or functional characteristics or components of the affected ecosystem." It appears that Ecology has removed the reference to population effects in order to justify more stringent soil cleanup standards. This is inappropriate. With the exception of threatened or endangered species, the ecological protection provisions of the rule should be revised to focus on protection of populations.

2624 **Specific Issues**

1. **WAC 173-340-120(3)(a):** The language in this section states that Ecology will notify the public "if the department decides that no further action is required." From the Responsiveness Summary for the February 1991 amendments to WAC 173-340 it is clear that Ecology does not require site listing or cleanup in all situations, even if a cleanup level is exceeded. (E.g., see *Responsiveness Summary on the Amendments to the Model Toxics Control Act Cleanup Regulation – Chapter 173-340;* Part B, Issue #10, page 33.) Please identify, in the regulation, the specific criteria that Ecology will use to decide that no further action is necessary at a site.

2625 2. **WAC 173-340-120(8)(b):** This section allows for independent remedial actions. The proposed changes to the rule require that such actions be reported to Ecology, with no threshold below which such reporting would not be required. This is a significant change

from the existing rule, which requires reporting in accordance with WAC 173-340-300. The current regulation at WAC 173-340-300 requires reporting only of those releases that the facility owner/operator determines to present a threat to human health or the environment. Under the proposed language of WAC 173-340-120(8)(h) and WAC 173-340-515, arguably every release and independent cleanup action would require reporting. Is it really Ecology's intent that, for example, a cleanup of a small leak of antifreeze from a fleet motor vehicle be reported as an independent cleanup action? If so, the proposed standard represents an entirely unrealistic and non-implementable requirement. If this is not the intent, the regulatory language needs to be revised to establish the threshold above which reporting would be required. It is suggested that Ecology maintain the approach taken in the current regulation; i.e., reporting is required pertaining to the discovery and cleanup of releases that the facility owner/operator determines to pose a threat to human health and the environment.

2626 3. **WAC 173-340-200, "natural attenuation" definition:** In order to properly reflect the viability of natural attenuation in certain circumstances, the following sentence should be added to the end of the proposed definition: "However, natural attenuation could represent an appropriate remediation method provided it is protective of human health and the environment and it is capable of achieving cleanup objectives that are reasonable compared to more active remedial measures."

2627 4. **WAC 173-340-300(2)(b):** The proposed language provides "examples" of situations where a release "generally" would require reporting as a potential threat to human health or the environment, subject to the facility owner/operators best professional judgment. Although providing examples is helpful, care must be taken to ensure that the list is not misconstrued by individual Ecology regulators as enforceable regulatory requirements that automatically trigger reporting in every instance. Please confirm, in the Responsiveness Summary for this rulemaking effort, that the rule does not necessarily require reporting in every instance where one of the "examples" is encountered. Additionally, item (viii) in the list of examples ("sites where hazardous substances have leaked or been dumped on the ground") should either be deleted or clarified and reproposed. What quantity of hazardous substance must be present before reporting under this item would be expected? A drip of oil or antifreeze? Or only a quantity that the facility owner/operator determines poses a threat? If the latter, the item should be deleted; reporting of such releases are already required under this section, and this unqualified and unquantified example merely adds confusion.

2628 5. **WAC 173-340-310(6)(a):** New language in this section would give Ecology the authority to determine, on a case-by-case basis, "the method and nature of the notification" to be given to people in the potentially affected vicinity. This appears to give Ecology unconstrained authority on this matter, leaving implementation to the whim of individual Ecology personnel. This is inappropriate. Instead, the regulation should propose fairly specific criteria and requirements for the sort of notifications Ecology may typically impose, with a case-by-case allowance for a more extensive notification effort if approved by the Manager of Ecology's Toxic Cleanup Program.

2629 6. **WAC 173-340-350(8)(c)(ii)(B)(II):** The word "possible" should be changed to "practicable."

2630 7. **WAC 173-340-350(8)(c)(ii)(B)(III):** The criteria for determining that the cost of a permanent alternative "is so clearly disproportionate that a more detailed analysis is not necessary" needs to be better defined. As currently written, the determination still appears to be largely a subjective "we'll know it when we see it" judgement. To promote a consistent

application statewide, the regulation should be revised to identify, at a minimum, some "rules of thumb" criteria for determining "clearly disproportionate" cost. Additionally, Ecology should consider establishing a statewide remedy review board (similar to EPA's National Remedy Review Board) in an effort to ensure statewide consistency in remedy selection.

2631 8. **WAC 173-340-355:** The addition of this section, with examples, is helpful in distinguishing what is meant by a "cleanup level" vs. a "remediation level." The language is, however, still somewhat confusing in distinguishing between cleanup levels, cleanup actions, cleanup standards, and remediation levels. For example, WAC 173-340-355(2) is entitled "relationship to cleanup levels and cleanup standards," but provides no clarification as to what a "cleanup standard" is relative to a "remediation level."

2632 9. **WAC 173-340-360(2)(e)(iii):** This section specifies that cleanup actions shall not rely primarily on institutional controls and monitoring if it is technically "possible" to use a more permanent action. The term "possible" should be changed to "practical." The term "shall" should be change to "should" or the language should indicate that this is a "strong preference." There may be instances where it would be most beneficial to simply implement institutional controls. For example, if an area is a designated wildlife habitat and the only unacceptable risk would be to a year-around residential user (i.e., contaminant levels do not present a risk to wildlife), it might be better in terms of avoiding disruption to the wildlife to implement institutional controls and monitoring.

2633 10. **WAC 173-340-360(3)(f)(vi):** The term "technically possible" should be changed to "technically practicable." Some fairly absurd cleanup actions would be technically possible.

2634 11. **WAC 173-340-360(4)(b)(iv):** The language in this item should be revised to refer to "potential *reasonable* future use" or some other terminology indicating that the intent is to consider reasonably anticipated or expected future land use.

2635 12. **WAC 173-340-360(4)(e):** Under CERCLA, a waiver is allowed if it can be demonstrated that cleanup to a certain level is technically impracticable. The proposed MTCA regulation states that the action cannot be finalized and must be considered interim in situations where attainment of the cleanup level is technically impracticable. However, a technical solution may never exist in a "reasonable time frame." A provision should be added to this section allowing an action to be "final" if it is demonstrated that is technically impracticable to meet a cleanup level. It is also unclear why the exception for cleanup levels that are below technically "possible" concentrations would be allowed only for Method C. Please clarify.

2636 13. **WAC 173-340-360(3)(c):** Based on the referenced definition of "permanent cleanup action" in WAC 173-340-200, how does Ecology compare containment in an on-site disposal unit with containment of cleanup waste – with no treatment - in an off-site disposal unit? Are both considered equally permanent or impermanent? Or does Ecology somehow consider off-site containment to be more permanent? If so, what is the basis for this belief?

2637 14. **WAC 173-340-380(4)(a):** How will the determination be made that a cleanup action selected under federal law "meets the requirements under WAC 173-340-360? Does Ecology intend a separate administrative process to evaluate this requirement? If so, the expectation is contrary to the Congressionally-mandated exemption from administrative requirements establish in Section 121(e) of the Comprehensive Environmental Response, Compensation, or Liability Act (CERCLA). Instead, the requirement in WAC 173-340-380(4)(a) should be expanded to explain exactly what *substantive* provisions of WAC 173-340-360 Ecology

believes need to be considered in selecting cleanup actions under CERCLA.

2638 15. **WAC 173-340-390(2):** What is the process Ecology intends to use for establishing a model remedy? Will an opportunity for public comment be afforded? Or will Ecology unilaterally establish model remedies with no formal public input? It is recommended that the rule be revised to identify the process Ecology will use for establishing model remedies. Public comment should be an integral part of the model remedy process.

2639 16. **WAC 173-340-440(6):** The language in this item should be revised to refer to "technically practicable" cleanup actions rather than "technically possible" actions.

2640 17. **WAC 173-340-515:** This new section establishes various standards for conducting independent remedial actions, including requirements for submitting written reports to Ecology. There is no threshold established for when reporting would be unnecessary. Does Ecology really intend that the facility owner/operator prepare and submit a written report to document cleanup of a few drops of hazardous substance (e.g., a leak of antifreeze from a fleet automobile)? Or is the intent that reporting is required only when the owner operator concludes that the release presented a threat to human health or the environment (presumably considering, among other things, the "examples" shown in WAC 173-340-300(2)(b))? The latter approach is clearly more appropriate. However, as currently written, the regulation identifies no lower threshold for reporting independent cleanup actions. This places an unreasonable burden on the regulated community. The rule should be revised to indicate that reporting is required only is situations where the release represents a threat to human health or the environment.

2641 18. **WAC 173-340-702(10):** This section should be revised to state that cleanup actions selected under the federal cleanup law which (1) incorporate substantive provisions of MTCA and (2) are approved (or co-approved in conjunction with EPA) by Ecology shall be deemed to satisfy the requirements of MTCA. This would eliminate the jeopardy of completing an approved cleanup action under the federal cleanup law only to face the possibility of a subsequent cleanup action imposed under MTCA. In essence, Ecology should be held accountable for standing by their agreements, including agreement with CERCLA cleanup decisions as signified by Ecology approval of the CERCLA decision document.

2642 19. **WAC 173-340-702(10):** The language in this section attempts to define legal applicability of certain sections of MTCA under the Federal Cleanup Law (CERCLA). In reality, the State of Washington lacks the authority to define applicability in this manner. Applicability under CERCLA means that the law would be legally applicable if a response action were undertaken outside of CERCLA jurisdiction. (See 46 Federal Register 8742.) State-only cleanup laws with no federal authorization would be legally applicable to federal facilities only if the U.S. Congress has unequivocally expressed a waiver of sovereign immunity. (E.g., see *Mayo v. United States,* [1943]; also *United States v. Mitchell* [1980]). Neither a State nor even a federal agency (such as the U.S. Environmental Protection Agency or the Department of Energy) has the authority to waive sovereign immunity; this is a power reserved for the U.S. Congress. Thus, the purported identification of MTCA sections as "legally applicable" under CERCLA in this manner is meaningless. Additionally, it should be noted that when a law is "applicable" under CERCLA, it is generally applicable in its entirety. (See 53 Federal Register 51437, EPA's *RCRA ARARs: Focus on Closure Requirements,* OSWER Directive 9234.2-04FS, October 1989.) In contrast to requirements that are "relevant and appropriate," the ability to "pick and choose" certain sections for applicability (as the proposed language in WAC 173-340-702(10) attempts to do) does not

exist for laws that are "applicable." In light of these problems, it is recommended that WAC 173-340-702(10) be revised to identify which substantive requirements within the specified MTCA subsections are to be considered "relevant and appropriate" requirements under CERCLA.

2643 20. **WAC 173-340-705(2)(c), various other locations:** In order to be consistent with current Ecology policy (e.g., see Ecology's MTCA *Implementation Memo No. – Guidance on the Use of MCLs as Cleanup Levels,* dated March 15, 1993) as well as the language in the draft rule at Section 705(5), add a statement to this section indicating that cleanup levels under applicable state and federal law shall be considered sufficiently protective provided the associated cancer risk does not exceed one in one hundred thousand or a hazard index of one. Similar statements need to be included at various other locations in the regulation. Without such language, the regulation could be interpreted to require Method B cleanup to a one in one million cancer risk (being the most stringent limit) in situations where a state or federal cleanup limit represents a cancer risk in excess of one in one million, but less than one in one hundred thousand. (Note that the regulatory language requires that Method B cleanup levels be at least as stringent as *all* the listed criteria, implying that calculated cleanup levels would take precedence over levels based on applicable law when the former are more stringent.)

2644 21. **WAC 173-340-706(1)(a)(i):** Language retained in this section states that "[w]here Method A or Method B cleanup levels are below area background concentrations, Method C cleanup levels may be established at concentrations that are equal to area background concentrations, but in no case greater than concentrations specified in subsection (2) of this section." Subsection (2), however, specifies a hazard quotient no greater than 1 and carcinogenic risk no greater than one in one hundred thousand. This provision could require use of a cleanup level that is, in certain situations, below background levels. For example, the statewide groundwater background level for arsenic (5 μg/L) represents a cancer risk of 8×10^{-5}, eight times greater than the one in one hundred thousand maximum risk allowed by Method C. Does Ecology really intend to cap cleanup levels at the Method C limit when background levels represent a risk that is almost an order of magnitude greater? Is the regulated community expected to remediate to levels below the statewide background? In contrast to the Section 706(1)(a)(i) provisions, Sections 700(6)(e) and 706(6) merely (and reasonably) provide that Method B and Method C cleanup levels do not need to be set below background levels. It is recommended that the unreasonable requirement in Section 706(1)(a)(i) be deleted.

2645 22. **WAC 173-340-720(5)(b)(ii):** This new item states that a demonstration that a hazardous substance is not likely to reach surface water "must be based on factors other than implementation of a cleanup action at the site." This requirement may be appropriate for setting cleanup levels; however, please confirm that a demonstration considering the elements of a cleanup action may be used in establishing a remediation level for a site.

2646 23. **WAC 173-340-720(7)(b):** The proposed language appears to require a downward adjustment of cleanup levels based on applicable state or federal law in situations where such levels exceed a cancer risk of one in one hundred thousand or a hazard index of one. This allowance appears to presuppose that the applicable state/federal law standards may be used in lieu of the *calculated* MTCA carcinogen and noncarcinogen cleanup levels, even when the latter are more stringent. This approach would be consistent with Ecology policy embodied in MTCA *Implementation Memo No. – Guidance on the Use of MCLs as Cleanup Levels,* which allows for use of MCLs in certain situations, even if the MTCA calculated value is more stringent. Yet the regulatory provisions (e.g., at WAC 173-340-720(4)(b)) require that cleanup levels be "at least as stringent as *all*" of the applicable or calculated values,

indicating that the more stringent standard would always establish the cleanup level. Thus, a cleanup level based on applicable state or federal law could not be used if the calculated MTCA cleanup level was lower. In order to accommodate use of applicable standards in lieu of more stringent calculated levels (presuming the former do not exceed the one in one hundred thousand/hazard index of one criteria), the requirements in section (4) need to be revised. For example, a sentence could be added stating that cleanup levels based on applicable state or federal law may be used in lieu of MTCA calculated values *provided* the applicable standards do not represent a cancer risk in excess of one in one hundred thousand or a hazard quotient in excess of one.

2647 24. **WAC 173-340-720(9)(d)(iii).** There is a concern that the standards given in the revised MTCA tables are derived using a flawed method. Additionally, the presumption that groundwater levels exceed cleanup levels (definition of "null hypothesis" in 173-340-200) is flawed. While this approach is appropriate when the cleanup levels are concentration-based, the MTCA amendments shift the cleanup levels to background levels in some cases. It is inappropriate to assume that the groundwater contains more than background levels as a starting hypothesis.

Cleanup levels are based on risks, ARARs, ecologically protective levels, etc. The statistical test is one-sample test (i.e. evaluating the site data versus a constant or fixed value). However, when the cleanup levels are based on background, the statistical test is two-sample case (i.e. evaluating the site data versus background data). Currently, the default method [as specified the compliance monitoring (WAC 173-340-720(9)] uses a single numerical value as the cleanup standard, to which site data is compared. To treat background-based cleanup levels as constants (known without error) will make it more difficult to simultaneously achieve a desirable (low) false positive error rate and a high statistical power to detect residual contamination if background data sets are highly variable (i.e. highly skewed distributions). Alternative distribution testing methods (e.g. the Wilcoxon Rank Sum test and Quantile test) should be specified in WAC 173-340-720(9)(d)(iii).

2648 25. **WAC 173-340-740(7)(d)(i)(A):** This item would require use of Land's method in calculating the 95% upper confidence limit for log normally distributed data. As noted in comments submitted by the Department of the Navy on the previous proposal, EPA has evaluated the use of Land's method and concluded that, although theoretically sound, the method should not be used in environmental cleanup applications. (See *The Lognormal Distribution in Environmental Applications*, EPA/600/R-97-006, December 1997.) The EPA evaluation found that this methodology would "tend to hide contamination rather than revealing it." Thus, the following recommendation appears in this detailed study: *"Do not use the UCL based on the H-statistic* [Land's method], *especially if the number of samples is less than 30."* (Emphasis present in original.) In light of this information, the continued identification of Land's method in this proposal as the default statistical method is incomprehensible. Please review the EPA evaluation and revise this section to identify an appropriate statistical method. This comment also applies to identification of Land's method in WAC 173-340-720(9)(d)(i)(A) as well.

2649 26. **WAC 173-340-745(5)(b)(iii)(A):** This section requires that contaminants left in industrial soil not cause groundwater to exceed cleanup levels established under WAC 173-340-720. Which –720 groundwater cleanup levels are being referred to, Method C levels (corresponding to use of Method C for establishing industrial soil standards) or Method B levels (unless, under the –720 criteria, Method C levels can be justified)? The language in WAC 173-340-745(1)(b)(iv) appears to imply that the latter situation may apply, but it seems

natural to associate Method C industrial soil cleanup levels with the Method C groundwater cleanup levels. Please clarify in the text of the regulation.

2650 27. **WAC 173-340-747:** This section establishes a variety of methods for establishing soil cleanup concentrations for groundwater protection. Although there are certain limitations identified regarding use of some of the methods, it is generally unclear which methods are to be used in a given situation, and who makes the decision. Who decides which method to apply? More importantly, what are the criteria for making this decision when more than one method could apply? The regulation should be revised to address this issue and reproposed for public comment.

2651 28. **WAC 173-340-747(7):** Guidance should be included on the types and number of samples to be used when employing the leach test procedure.

2652 29. **WAC 173-340-747(7)(c)(i and ii):** Most of the metals listed in these sections have TCLP detection limits far above the MTCA B groundwater standards. For example, a typical TCLP detection limit for cadmium is 1 mg/l; the Method B groundwater limit 0.008mg/L. The situation for arsenic is much more disparate. Either these criteria should be revised or these metals should be excluded from the leach tests.

2653 30. **WAC 173-340-7490(2):** As written, this item would require that an exclusion be documented or a terrestrial ecological evaluation be in the event of any release of hazardous substance to the soil at a site. Does Ecology really intend that such documentation be maintained for very minor releases, such as a few drips of antifreeze in a parking lot or spillage of a few grains of salt (a hazardous substance under MTCA) to the ground? Such a requirement seems obviously inappropriate, but the language as written provides no latitude for application of common sense. This section should be revised to provide an exception for de minimis spills or (preferably) the requirement to document an exclusion or perform an ecological evaluation should apply only when the facility owner/operator determines that a release represents a threat to human health or the environment. This latter determination should be based on the examples provided in WAC 173-340-300(2)(b).

2654 31. **WAC 173-340-7490(3) Goal:** This paragraph remains vague in its definition of significant adverse effects to species other than the threatened and endangered species. It appears that some undefined, sub-lethal effect to an individual could be construed as a significant effect that could drive a cleanup standard. Also, please define what is meant and which laws are being referred to in the statement "other applicable laws that extend protection to individuals of a species."

2655 32. **WAC 173-340-7493(2)(a)(i):** At the end of this paragraph is a caution statement that says the ecological indicator concentrations found in Table 749-3 are "not cleanup levels." Later in this subsection under 7493 (3), it says that the concentrations given in Table 749-3 "may be used as the cleanup level" at the discretion of the person conducting the evaluation. Explain the inconsistency.

2656 33. **WAC 173-340-7493(3):** An additional subsection is appropriate to help guide the evaluation and use of the results obtained. For instance, the ecological relevance of the concentrations of contaminants to the local ecosystem and the potential ecological effects of the cleanup should be weighed. A cleanup action may cause more damage than it resolves and alternate mechanisms for dealing with the site may be preferable. Performing mitigation at another site, rather than remediating relatively low levels at the subject site, could be more useful to

the habitat and wildlife. Innovative ways to approach each problem should be encouraged.

2657 34. **WAC 173-340-7493(3)(b)(i):** Revise the last sentence to read as follows: "Other bioassay tests approved by the department may also be used *and may be preferable for ecological reasons (e.g., soil types at the site are unsuitable for the earthworms).*"

2658 35. **WAC 173-340-7493(7)(f):** This paragraph says that to account for uncertainties associated with substitute receptor species, Ecology may require use of toxicity reference values based on no observed adverse effects levels (NOAELs), use of uncertainty factors to account for extrapolations of toxicity or exposure parameter values between species, or use of a hazard index approach to account for additive toxic effects. This appears to be the catchall statement that says if Ecology doesn't like the substitute values or species proposed, (even though they are just as valid and substantiated as the ones they selected in their model) they will force the potentially liable person to comply with the food-web model provided. If any of these measures (NOAELs, uncertainty factors, or hazard index) are applied, the resultant cleanup level will be lowered by at least a factor of 10; making the whole exercise of proposing surrogate species and input parameters futile. This represents a double standard because Ecology didn't apply these extra-conservative measures (which are not scientifically based) in the development of their standard food-web model and shouldn't be allowed to impose them just because they don't like the results of a proposed modified model. Item "f" should be deleted from this subsection.

2659 36. **WAC 173-340-7494(2):** This paragraph is unclear. It is not clear what is meant by "protection of wildlife for industrial and commercial land uses, and upon protection of plants and animals for other land uses." Is there a difference between the reference to wildlife and the reference to plants and animals? It would be more clear to say "Table 749-2 shall be based on protection of wildlife and terrestrial receptors for commercial land uses and other land uses."

2660 37. **WAC 173-340-900:** It would be more user-friendly to present the tables in the sections where they are actually used.

2661 38. **WAC 173-340-900, Table 720-1, Total chromium entry:** Footnote "f" indicates that the 50 µg/L total chromium standard is based on use of Equation 720-1 and an assumption of hexavalent chromium. According to the footnote, a cleanup level of 100 µg/L may be used if just chromium III is present. Some allowance should be made for situations where a mixture of hexavalent and trivalent chromium is present. Otherwise, the 50 µg/L cleanup level would apply if, for example, the groundwater exhibited a hexavalent chromium level of 5 µg/L and a trivalent chromium concentration of 48 µg/L. It is recommended that a two-part cleanup level be established for use in the case of mixtures of chromium: 50 µg/L for hexavalent chromium, with the total chromium level not to exceed 100 µg/L. This approach is generally reflected in Table 740-1, wherein separate standards are identified for hexavalent and trivalent chromium.

2662 39. **WAC 173-340-900, Table 740-1, "Method A Soil Cleanup Levels for Unrestricted Land Uses," lead entry:** The 250 mg/kg cleanup level for lead is purportedly based on "preventing unacceptable blood lead levels." This appears to be an outdated value. Ecology has used EPA's Integrated Exposure Uptake Biokinetic (IEKBK) Model to establish lead cleanup levels for MTCA cleanups. (E.g., see memo, Mr. Mike Blum (Ecology) to Messrs. Vern Moore (Weyerhaeuser Company) and Jack Frazier (DuPont Company), *Re: Residential Soil-Lead Cleanup Standards for Former DuPont Works Site*, dated October 1, 1997.) This

model was specifically designed to identify levels of lead in the environment that could result in unacceptable blood lead levels in children (the most susceptible population). Using the conservative default values in the IEUBK model, a soil cleanup level of 353 mg/kg is derived for residential soil. This value should be reflected in Table A in lieu of the archaic 250 mg/kg cleanup level.

2663 40. **WAC 173-340-900, Table 747-3:** This table presents default metal Kd values to be used in establishing soil cleanup levels for protection of groundwater. Please confirm that these represent conservative Kd values intended for use on a statewide basis. Additionally, WAC 173-340-747 should be revised to establish the criteria and process that Ecology will use if a decision is made to use a more restrictive Kd than the default values presented in this table. In such instances, Ecology should be required to provide a technical justification for use of a more stringent value based upon site-specific conditions.

2664 **WAC 173-340-900, Table 749-3:** The intended use of the plant and soil biota concentrations in Table 749-3 is unclear. Will Ecology choose to use the lowest concentration for a chemical in the table similar to the selection process for the reported concentration from the wildlife exposure model? If so, there needs to be an explanation of how the plant and soil biota concentrations were selected from the Oak Ridge documents, so the regulated community can assess the applicability of those values to their waste sites.

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October 30, 2000

Department of Ecology
Attn: Tish Akana, Rules Coordinator
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by Fax (360-407-7154) and Regular Mail

RE: MTCA Clean-up Regulations

Dear Ms. Akana;

2665 This letter is in reference to the proposed cleanup levels for petroleum included in the Proposed Amendments to the Model Toxics Cleanup Regulation, and the very probable impact of those proposed amendments on Pollution Liability Insurance. We wrote to you in January of this year and are writing again as we strongly feel that tightening the standard will cause an undue financial burden to the small businessperson.

Just to refresh your background on Kemper Environmental, we are an insurer for the Washington State Pollution Liability Insurance Agency's Underground Storage Tank Program. We also provide Pollution Legal Liability Insurance in every other state. We have been writing this line of insurance for Kemper since 1997 but many of our underwriters have been environmental underwriters since the late 80's.

We remain alarmed that the discussion on tightening the cleanup standard is still an issue. I'm sure you realize that if cleanup levels become more stringent, the cost of petroleum based cleanups will substantially increase. With more time and effort needed to remediate pollution conditions to a higher standard, insurance costs are certain to increase as well. This ultimately means that the small business owner would be placed in much more difficult position financially. The existence of the Washington State reinsurance program has saved the small businessperson from paying exorbitant insurance premiums. If more stringent cleanup levels are adopted and clean up costs increase, those savings will quickly dissipate.

We would like to see and strongly recommend that the Department of Ecology withdraw the proposed cleanup levels. We further recommend keeping the existing cleanup standard, as is, for petroleum products.

I truly hope you consider our position before taking action.

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Sincerely,

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