Setting New Air Quality Standards In Hanford's Tank Farms

Responsiveness Summary

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Department of Ecology
Nuclear Waste Program
3100 Port of Benton Blvd.
Richland, WA 99354

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RESPONSIVENESS SUMMARY

Prepared by:

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Washington State Department of Ecology

Nuclear Waste Program

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Introduction

The Washington State Department of Ecology encouraged the public to comment on the proposed modification of two air permits for Hanford's Tank Farm operations during a public comment period from June 25 through July 25, 2007.

The proposed action was to modify each of Orders DE05NWP-001 and DE05NWP-002 to identify standards and limitations for newly identified or anticipated pollutants from their operations.

This responsiveness summary addresses comments received during the public comment period. We received one collaborative comment from Ecology's Air Quality Program Toxicologist, one comment from the Permittee, and six comments from the public on the proposed permit approval. They commented upon the following issues:

- Current toxicology data for pollutants emitted from the sources.
- Field sampling techniques for ammonia.
- Adequacy of sampling and pollutant identification.
- Worker exposure.

Responsiveness Summary

1. **Comment**: Despite the fact that OCS is listed as a Federal HAP in the CAA, I can find no risk-based concentration limit for it in the literature. Because it is a HAP, I have been directed to develop an ASIL for it anyway.

The EPA Chemical Summary for Carbonyl Sulfide prepared by Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency, 749-F-94-009a, August 1994, states "Only limited information is available on the pharmacokinetics of carbonyl sulfide. It is likely that carbonyl sulfide is metabolized to hydrogen sulfide and carbon dioxide. Hydrogen sulfide is thought to be responsible for many of the reported adverse effects associated with exposure to carbonyl sulfide."

On that basis, I am proposing that AQP promulgate the RELs published for H2S by OEHHA (Acute REL 42-µg/m3, 1-h TWA; Chronic REL 10-µg/m3, 1-yr TWA) as the new ASILs for OCS.

Response: Ecology agrees. The purpose of public comment upon the establishment of Screening Levels within site-specific permits is to ensure that appropriately protective standards are established in consonance with current toxicology data. The California Office of Environmental Health Hazard Assessment (OEHHA) data does appear to represent current toxicology information and protective standards for Carbonyl Sulfide (OCS) based upon hydrogen sulfide effects.

Current regulation of toxic air emissions under Washington Administrative Code (WAC) 173-460 establish standards based upon chronic (annual) and acute (24-hour) exposure to carcinogenic and toxic pollutants. OCS is classified as a toxic pollutant under 24-hour

exposure considerations within WAC 173-460-160. Should Ecology choose to apply the OEHHA one-hour time weighted average cited, it would do so by dividing the 42 $\mu g/m^3$ value by a factor of 24 to achieve a daily exposure limitation of 1.75 $\mu g/m^3$. This exposure allowance is considered overly protective as the toxicology data indicates that limitation to an annual average exposure of 10 $\mu g/m^3$ adequately meets protective standards. For this reason, Ecology will establish a Screening Level of 10 $\mu g/m^3$ for OCS within the Double-Shell Tank Waste Ventilation permit, DE05NWP-001.

The request for comments did encompass the establishment of a Screening Level for Carbonyl Sulfide (OCS) within the Double-Shell Tank Waste Ventilation permit. The Permittee had not requested emissions increases for OCS with the Single-Shell Tank Waste Retrieval Ventilation permit, DE05NWP-002, Rev. 1, so the existing Screening Level of 19 $\mu g/m^3$ for OCS within that permit will remain unchanged until requested by the permittee or WAC 173-460 revisions establishing an acceptable source impact level (ASIL) for OCS.

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2. **Comment**: Comment on June 7th 2007 Determination of Complete Application, Double-Shell Tank Farms

Please update approval order to allow for use of other ammonia field sampling techniques besides Draeger tube. There are a number of commercially available meters that are more quantitative then the Dreager tube method.

Section 3.1 Baseline Assessment, 2nd paragraph (red text) as we do have available a direct meter unit which can be used.

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes or equivalent to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

Section 3.2 Bi-Annual Emission Assessment, 2nd paragraph (red text)

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes or equivalent to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

[underlines added to indicate “red text” changes proposed by the commenter]

Response: Ecology offers the following: Changes of ammonia emission measurement techniques were neither requested by the Permittee within their May 16, 2007, application nor within the scope of the public comment period. Should the Permittee

wish to request administrative amendment of Order DE05NWP-001, Ecology will gladly consider and promptly act upon such a request.

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3. **Comment**: **Please indicate how Ecology knows that the characterization conducted to date is complete per WAC 173-460. The data needed to safely permit the Single and Double-Shell Tanks is clearly not complete for a variety of reasons**:

The tank farm operations are not a standard industrial process where the chemical and physical basis for the emissions is well understood. In fact, at this time the knowledge of tank farms toxic emissions is still in its infancy. For example, I asked a well known Radiation Chemist employed at one of the few Radiation Chemistry labs in the nation, commonly contracted by DOE to conduct experiments related to radiolytic flammable gas generation the following question:

"*…can selenium, arsenic, and sulfur hydrides, or other gaseous selenium, arsenic, or sulfur compounds form in certain layers, in certain tanks where selenium, arsenic, and/or sulfur are concentrated in layers when in proximity to other substances and radionuclides? Could these gases form directly in the gaseous state within the non-convective solid layers in the SST or DSTs containing sludge? Also, could processes such as hydroxide addition, waste evaporation, or violent mixing of the waste promote chemical reactions leading to such compounds; and/ or are there other conditions under which these chemicals can form?"*

I received the following response:

"***The chemistry that may be occurring in waste tanks appears to be quite complicated and barely understood****…*" He further states, "***There is sufficient energy deposition in radiolysis that virtually any reaction is possible****. In other words, normal chemistry as driven by thermodynamics rarely applies to the radiolytic process itself. Energy is deposited by ionizing radiation to the components of the medium in proportion to their electron density. The relative scarcity of sulfur, selenium and arsenic would suggest that their direct radiolytic decomposition is not important unless they are concentrated in regions of high radiation intensity."*

Contrast the expert's response above with what the tank farm contractor says (from RPP-22491, Rev A-1 DRAFT, Industrial Hygiene Chemical Vapor Technical Basis, dated 9/2004):

"*The origin of headspace gases and vapors is understood and can be related back to original chemicals placed into tank farms and the continuing degradation chemistry*."

These somewhat paradoxical statements make sense because no one has asked the right questions to the right people, i.e., the Radiation Chemists were not asked about the generation of toxic gas, but mainly only address flammable gases. The contractor, on the other hand, is financially motivated to move ahead regardless of whether the emissions

are adequately characterized for safe operations. Therefore, there's a tendency to oversimplify the tank chemistry and to rely on potentially incomplete information.

With regard to which statement is more accurate: even disregarding the contractor's apparent conflict of interest, the Radiation Chemist has direct experience with the waste chemistry via experimentation, while the CHG chemists are speculating based on a potentially incomplete data and probably without the benefit of direct experience.

There may be substantial evidence supporting the presence of undetected toxic compounds: conventional chemistry argument, unknown source(s) of hydrogen sulphide or "sulphurous" emissions, and the inexplicability of symptoms experienced by exposed workers. The Radiation Chemist quoted above tends to negate the conventional chemical argument, however, I cannot see why the series of nitrogen compounds reflecting the progressive reduction of nitrates, to nitrite, NO_2, nitrous oxide, nitrogen, to ammonia is not replicated by sulphur, selenium, and tellurium.

Theoretical electrochemical potential versus hydrogen ion concentration diagrams for the reduction of nitrates at a high pH are virtually identical to the diagrams of sulphur and selenium. It is often stated that the HS^- ion would dominate, rather than hydrogen sulphide; this is true, but the important word is **dominate**, that is, the equilibrium is shifted over towards the presence of HS^- doesn't mean that hydrogen sulphide will not exist at all. In addition, there are several complications to this oversimplified picture: the high ionic strength makes it difficult to guess the behavior and activity of the competing ions, and whether certain compounds would form directly into a gaseous phase. Gaseous formation might also inhibit diffusion from the nonconvective sludge layers through the convective liquid layers into the tank's headspace; thus headspace characterization might not easily pick up these compounds. The relative scarcity of these compounds would also disfavor diffusion compared to gases like hydrogen or nitrous oxide.

For over 20 years workers have suffered inexplicable health problems that many believe are related to emissions, probably from tank farms. The exposures have occurred both inside and outside of the tank farms "control boundary" or usually the fence line. Serious exposures have occurred as far away as 1500 feet from the nearest tank, but the symptoms were otherwise similar to tank farm exposures. Ecology needs to find out if ORP is able to relate the emissions, from whatever source, to the symptoms and medical problems experienced by the workers. If not, then only several explanations arise: the workers are part of a nearly multi-generational conspiracy involving lies about their exposures, the combination of toxic compounds is much worse than the individual toxins taken separately, the workers are "sensitive," or they were exposed to something not yet identified and/or at concentrations higher than any that so far have been seen.

Of the 4 possibilities, the only realistic ones are that the combination of toxins is much worse than the individual toxins taken separately, and/ or the concentrations are higher; and/ or the toxins responsible for the exposures have not been identified. Any one or all of the remaining hypotheses are issues that also impact these air permits.

In 1989 or 1990 a worker was exposed to a disabling airborne sulphur compound at C-Farm. At the time, the theory was sulphuric acid fumes from a lead-acid battery. After a few other exposures DOE conducted a review documented in the "Independent Technical Review of the Hanford Tank Farm Operations," DOE/EM-0095P, July '92, by USDOE Office of Environmental Restoration and Waste Management. As I recall, soon after the review, tank farms was declared an "uncontrolled waste site" per the OSHA meaning of the phrase. Tank headspace sampling ensued to identify air contaminants responsible for the exposures but nothing was found that could explain them. Eventually the level of protection required to enter tank farms was reduced eventually to no respiratory protection by the time saltwell pumping of the flammable gas watch list tanks began.

What followed was another period of unexplained exposures, eventually leading to workers being placed on Level A PPE. Sampling resumed, largely still confined to headspace, even though the realization that the evolution of gas from the waste was the likely cause of the new exposures. This sampling revealed a number of new compounds not seen before, including some that are very toxic. Compounds such as dimethyl mercury can explain some, but not all of the symptoms the workers experienced. To my knowledge, even now the tank farms contractor and ORP claim the concentrations are below permissible levels. ***These newly discovered compounds were not part of the existing permits that were based on the same data as the industrial hygiene sampling. Therefore, these permits were not correct as to the type or concentration of the contaminants listed in these permits. Because the contractor claims the new data still does not explain the physical effects experienced by workers, then it is still incorrect with regard to either type or concentration, or the health risk associated with the toxic mixture. <u>Therefore, it follows that the air permits based on this same data are incorrect</u>.***

Several times there were massive releases in 200 East, as documented in "Odor keeps Hanford workers indoors," *published Thursday, May 18th, 2000*, Tri-City Herald by staff writer John Stang –and- "Health fears have workers at Hanford seeking answers," by Hal Bernton, Seattle Times-PI, May 7, 2004. Several Ecology employees also experienced these odors, sometimes as far away as ¼ mile or so from 200 East. These odors were both described as "rotten egg" odor, probably indicative of hydrogen sulphide and/ or other sulphur compounds. In both instances deleterious health effects were noted. The source of these emissions is unknown; these emissions are not listed in any permit. ***<u>These unlisted emissions give Ecology cause to question the Air Operating Permit as it applies to 200 East</u>. Particularly since the same odors are known to be associated with proximity to tank farms. Even if the source were wells in the area exhaling due to barometric pressure changes, I would think Ecology still needs an explanation.***

All said, it seems there is enough ***credible evidence*** to indicate the basis of the permits are flawed and require more detail than present in the permit. Independent data validation of the existing sampling and analysis data needs to be done. Ecology needs to question expert radiation chemists and expert analytical chemists on the quality of the existing sampling and analysis data.

Response: Ecology offers the following. To paraphrase and summarize your comment, you have stated that you believe that insufficient information is available to understand the sources and emission rates of toxic and carcinogenic air pollutants from these sources and that unknown compounds or combinations of compounds are deleteriously affecting on-site workers.

You expressed concern with worker exposure. The Washington Department of Ecology is dedicated to protecting the environment in which we all live and work. To this end, we are establishing standards to the limit available under law for public exposure. However, we have no Clean Air Act derived authority under law dealing with occupational exposure, illness, or injury. As such, worker exposure components of your comment have no bearing upon the proposed action.

Ecology agrees that there remains much to be learned about emissions from these sources. To that effect, existing conditions of the permits (SST Order DE05NWP-002, Rev. 1, Conditions 1.2.4, 1.3.5.2, 3.4, and 3.5; DST Order DE05NWP-001, Conditions 1.2.3, 2.4, 2.5, and 3.0) directly address such uncertainty. These conditions require compliance with existing or established standards for known pollutants, require sampling and identification to measure emissions, require recordkeeping of sampling and analysis, and require reporting identification of newly identified pollutants subject to WAC 173-460. Additionally, provisions of WAC 173-400-110 impose a requirement for permit application should a facility become a source of new toxic pollutants. The proposed action of establishing standards within these Orders is the direct result of identification and quantification of new pollutants through sampling and application for approval. Changes to the subject Orders beyond the establishment of standards for the newly identified pollutants were neither requested by the Permittee within their applications nor within the scope of the public comment period and have no bearing upon the proposed action.

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4. **Comment: The monitoring required by the permits is not adequate to pick up the worst-case acutely toxic emissions. These likely happen during a gas release event or GRE, induced by mixing, by reducing the liquid level, or spontaneously. The permit should be changed to reflect the recommendation to monitor during the release of gas. Because the waste is heterogeneous, as described in the first comment, sampling should be conducted continuously for each tank. Ecology should carefully participate in the sampling and analysis and ensure the data quality.**

The available anecdotal information on more serious exposures as manifested by actual symptoms rather than only just "smelling something," indicates that true acute exposures are relatively rare events. Serious exposures may only occur once in every 3 man-years (this is a guess). If so, then limited monitoring will not detect these events. The monitoring as planned will only address continuous emissions rather than episodic events. All the data available indicates the releases endangering human health are episodic rather than continuous.

A spreadsheet mass balance calculation was done on the dome space concentration of 1,3-Butadiene in a ventilated tank and in a hypothetical non-ventilated tank. The spreadsheet data was obtained from the only tank (SY-101) out of 30 sampled and analyzed for constituents of the trace gas fraction of the trapped gases. This data was combined with release rate history of a GRE event to estimate the instantaneous concentration of 1,3-Butadiene in the dome space, and the mass emission rate (e.g., grams per second) as a function of time exiting the stack. **The dome space concentrations estimated this way showed a headspace concentration in the tank that was *two orders of magnitude higher than the concentration measured in any tank's quiescent headspace from the EXCEL spreadsheet: TAPS-11.XLS, an Excel spreadsheet documenting chemists review of the full-range of Toxic Air Pollutants (Taps) regulated under WAC 173-460, dated 4/23/96, by JLH.*** Please note that this spreadsheet was key to the development of many existing tank farms permits. I do not have access to the most recent data, so I could not compare this estimate with more recent data. Nevertheless, and despite limited available data, it is clear that Ecology should require measurements during the release of gas, not just at any time.

Response: Ecology offers the following. Existing conditions of the permits (SST Order DE05NWP-002, Rev. 1, Conditions 1.2.4, 1.3.5.2, 3.4, and 3.5; DST Order DE05NWP-001, Conditions 1.2.3, 2.4, 2.5, and 3.0) directly address such uncertainty in toxic emissions. These conditions require compliance with existing or established standards for known pollutants, require sampling and identification to measure emissions, require recordkeeping of sampling and analysis, and require reporting identification of newly identified pollutants subject to WAC 173-460. Additionally, provisions of WAC 173-400-110 impose a requirement for permit application should a facility become a source of new toxic pollutants. The proposed action of establishing standards within these Orders is the direct result of identification and quantification of new pollutants through sampling and application for approval. Standards existing in regulation or proposed in this action are supported by toxicology which demonstrates that the standards are protective of the public and that exposures at such concentrations are not injurious. Changes to the subject Orders beyond the establishment of standards for the newly identified pollutants were neither requested by the Permittee within their applications nor within the scope of the public comment period and have no bearing upon the proposed action.

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5. **Comment**: **The permit writer needs to check if commitments were made, as required by OSHA, to apply the mixture rule when considering the overall chemical makeup of the emissions. *If* the mixture rule indicates the combination of toxins is much more potent than the individual compounds, which by the way has been stated and calculated by several toxicologists and never adequately rebutted; *then* Ecology would be hard pressed to explain why WAC 173-460-110(3)(a) was not implemented since the data was available AND in consideration that the toxins, taken individually, do not explain the symptoms or the magnitude of health damage experienced by exposed workers. *Therefore, it is preliminary to issue the permit now until***

CHG and ORP have fulfilled their OSHA requirement of determining the health risk of the mixture.

A health risk assessment, "Health Risk Assessment for Short- and Long-term Worker Inhalation Exposure to Vapor Phase Chemicals from the Single –Shell Tank 241-C-103," A.D. Maughan, et al, March 1997, PNNL /DOE contract DE-AC06-76LO 1830. Indicated a high cancer risk associated with the ***known*** emissions from this source. The rebuttal, "A critique of the PNNL Draft Report… " By the Worker Health and Safety SubTAP, August 20, 1997, makes some significant points about rescinding the PNNL assessment. However, one of the main rebuttal points was the unrealistic exposure duration; although the PNNL report did include, for some reason, a resident exposure scenario rather than an occupational one, the rebuttal letter also was in error by not considering that many other tanks in addition to C-103 also emitted toxins. Neither the subTAP, nor any other risk assessment was ever done to my knowledge. I believe that as part of the resolution to the new round of worker exposures ORP was supposed to have another risk assessment done. ***Before approving any permits Ecology should wait for the assessment. When it is completed Ecology should have it independently reviewed. Even if Ecology will not establish an ASIL for the mixture, consideration should be given to its higher level of toxicity, i.e., since Ecology NWP is establishing its own ASILs essentially, it can also establish a mixture ASIL.***

Response: Ecology offers the following. You expressed concern with worker exposure; the Washington Department of Ecology is dedicated to protecting the environment in which we all live and work. To this end, we are establishing standards to the limit available under law for public exposure. However, we have no Clean Air Act derived authority under law dealing with occupational exposure, illness, or injury. As such, worker exposure components of your comment have no bearing upon the proposed action.

Standards established within the authority of WAC 173-460 are primarily based upon exposure to individual pollutants. No statutory provision of the Revised Code of Washington (RCW) 70.94.331 requires application of a mixture rule but WAC 173-460-110 exposure standards existing within WAC 173-460 have been prepared in consideration of all aspects of WAC 173-460-110. As evidenced by review and comment from the Ecology Air Quality Program toxicologist, standards proposed within this action are consistent with both current Ecology practices and regulations and upcoming proposed revisions of WAC 173-460. We encourage the commenter to participate in the upcoming revisions of WAC 173-460.

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6. **Comment**: **Check the acute risk assessment for non-cancerous toxins. The mass of the exposed individual should be less (child or baby?) not an adult mass. An Ecology expert should review the risk assessment.**

Response: Ecology offers the following. As evidenced by review and comment from the Ecology Air Quality Program toxicologist, standards proposed within this action are consistent with both current Ecology practices and regulations and upcoming proposed

revisions of WAC 173-460. We encourage the commenter to participate in the upcoming revisions of WAC 173-460.

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7. **Comment**: **WAC 173-400-040(5) says, "No person shall cause or allow the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property or business." The permit writer needs to clarify the meaning of this requirement, particularly in the context of §112(r) of 40 CFR Part 68 Clean Air Act Amendments of 1990, General Duty Clause.**

I do not think it is legal for Ecology to issue a permit for processes that are detrimental to safety. RCW 70.94.011 says, "It is the intent of this chapter to secure and maintain levels of air quality that protect **human** health and safety, including the most sensitive members of the population, to comply with the requirements of the federal clean air act, to prevent injury to plant, animal life. It seems that the other RCW provisions related to workers and ambient air, and which agency has jurisdiction over what comes secondary to the fundamental purpose of the Clean Air Act to protect human health.

Response: Ecology offers the following. RCW 70.94.030 defines the scope of regulation under the Washington Clean Air Act to be that of the ambient air. The ambient air does not, by definition, include the air within a facility. You expressed concern with worker exposure; the Washington Department of Ecology is dedicated to protecting the environment in which we all live and work. To this end, we are establishing standards to the limit available under law for public exposure. However, we have no Clean Air Act derived authority under law dealing with occupational exposure, illness, or injury. §112(r) of the Clean Air Act does establish a duty of owners and operators to identify and assess risks of accidental release and exposure, and to take such actions necessary to minimize worker injury, consistent with Occupational Safety and Health Administration (OSHA) requirements. Provisions of this statute have not been delegated to the State of Washington. As such, worker exposure components of your comment have no bearing upon the proposed action.

Standards existing in regulation or proposed in this action are supported by toxicology which demonstrates that the standards are protective of the public and that exposures at such concentrations are not injurious.

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8. **Comment**: **Regardless of WAC 173-400-040 (5), or the duty and obligations of the signatory professional engineer under WAC 173-400 or other provisions of the Washington Clean Air Act and implementing regulations, approving or allowing such emissions, which are and have been detrimental to health, and are detrimental to safety (i.e., not compatible with OSHA), is a violation of RCW 18.235.130 Unprofessional conduct involving moral turpitude.**

Response: Ecology offers the following. You expressed concern with worker exposure; the Washington Department of Ecology is dedicated to protecting the environment in

which we all live and work. To this end, we are establishing standards to the limit available under law for public exposure. However, we have no Clean Air Act derived authority under law dealing with occupational exposure, illness, or injury.

Ecology agrees with the commenter's citation of WAC 173-400-040(5), however, the application of the standards under WAC 173-400 remains limited to the ambient air and does not include worker exposure within a facility nor to be in reference to OSHA. Further, the standards existing in regulation or proposed in this action are supported by toxicology which demonstrates that the standards are protective of the public and that exposures at such concentrations are not injurious. Pollutant standards proposed in this action include ambient standards for carbonyl sulfide, n-nitrosomethylethylamine, and n-nitrosodi-n-propylamine. Current OSHA standards do not address these materials; however, Ecology regulation does define them as toxic air pollutants but have not yet established exposure standards. Incomplete development of standards within WAC 173-460 has led to this action to establish standards to protect the public from excessive exposure to these pollutants.

The commenter suggested that issuance of air emission permits for these sources would represent unprofessional conduct involving moral turpitude on the part of the signatory Professional Engineer under Washington's Uniform Regulation of Business and Professions Act (RCW 18.235). The duties and responsibilities of a Professional Engineer in Washington, working for the Department of Ecology, are detailed in WAC 196-25-080 with reference to RCW 18.43 and particularly to RCW 18.43.105. RCW 18.43.105 provides discipline authority to the Board of Registration for Professional Engineers and Land Surveyors (BORPELS). Paragraph 10, of RCW 18.43.105 provides for BORPELS discipline in the case of:

> (10) Committing any other act, or failing to act, which act or failure are customarily regarded as being contrary to the accepted professional conduct or standard generally expected of those practicing professional engineering or land surveying.

Ecology has examined the information contained within the permittee's applications for approval. Ecology has prepared the proposed permit modifications in consonance with the standards and regulations of the State of Washington, particularly those of WAC 173-460. Ecology has provided for public review and comment of the proposed permits in compliance with public involvement requirements of WAC 173-400-171. Ecology will issue the permit modifications with standards which have been demonstrated to not be injurious to the public in compliance with WAC 173-400-110(7). Issued permits may be subject to appeal under provisions of WAC 173-400-110(8). Ecology believes that our actions are entirely consistent with accepted professional conduct and standards expected of those practicing professional engineering.

Summary of Public Involvement Actions

We mailed a focus sheet (legal notice) to approximately 900 highly interested members of the public. We sent an email to the Hanford Listserv to announce the comment period and direct readers to the Ecology website for more information. We placed a notice of the comment period in the Ecology events calendar. We placed a legal classified advertisement in the Tri-City Herald to announce the comment period. The advertisement ran on June 24, 2007. We sent the proposed permits and focus sheet to the Hanford Information Repositories. We also announced the comment period in a number of meetings with regional stakeholders. We did not schedule a public hearing, nor did we receive any request to do so.

Attachments

Comments Received
Public Announcement Classified Ad
Focus Sheet
Hanford-Info Listserv Notice
Copy of issued Permit Modifications

Unknown

From: Kadlec, Matthew (ECY)
Sent: Thursday, June 28, 2007 11:58 AM
To: Hendrickson, Douglas (ECY)
Cc: Cross, Steve (ECY)
Subject: RE: Screening Limits in public comment period

Doug,

All the screening concentrations mentioned in your email below are still slated to become the new ASILs in the coming update of 173-460 except the one for carbonyl sulfide.

Despite the fact that OCS is listed as a Federal HAP in the CAA, I can find no risk-based concentration limit for it in the literature. Because it is a HAP, I have been directed to develop an ASIL for it anyway.

The EPA Chemical Summary for Carbonyl Sulfide prepared by Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency, 749-F-94-009a, August 1994, states "Only limited information is available on the pharmacokinetics of carbonyl sulfide. It is likely that carbonyl sulfide is metabolized to hydrogen sulfide and carbon dioxide. Hydrogen sulfide is thought to be responsible for many of the reported adverse effects associated with exposure to carbonyl sulfide."

On that basis, I am proposing that AQP promulgate the RELs published for H2S by OEHHA (Acute REL 42-µg/m3, 1-h TWA; Chronic REL 10-µg/m3, 1-yr TWA) as the new ASILs for OCS.

- Matt

From: Hendrickson, Douglas (ECY)
Sent: Thursday, June 28, 2007 10:14 AM
To: Kadlec, Matthew (ECY)
Cc: Cross, Steve (ECY)
Subject: Screening Limits in public comment period

Matt:

With your recommendations in hand (<< Message: RE: Request for screening values >>), we started a public comment period on two permits at Hanford that would establish screening limits for TAPs which do not have ASILs. You were electronically copied on the distribution of the draft permits issued on June 7.

During the comment period which extends through July 25th, I would like you to briefly review the standards we have proposed to ensure that they remain consistent with forecast approaches and 'future ASILs'. The comment period notice is at: http://www.ecy.wa.gov/programs/nwp/commentperiods.htm

The drafted permits are hyperlinked therein as:
DST: http://www.ecy.wa.gov/programs/nwp/pdf/aop/Tank%20Farms/Determination%20of%20Completeness%20and%20DE05NWP-001%20Rev%201%20draft%20060707%20Olinger.pdf

SST: http://www.ecy.wa.gov/programs/nwp/pdf/aop/Tank%20Farms/Determination%20of%20Completeness%20and%20DE05NWP-002%20Rev%202%20draft%20060707%20Olinger.pdf

Each of these are permit modifications, meaning each already had some screening limits which have gone through this process already and are not part of the comment cycle. New TAPs with screening values (data references in permit drafts) are:

DST:

Carbonyl Sulfide	463-58-1	19 (24-hr average)	Applying, under WAC 173-460-110(3)(a), Toxics release toxicity data of this material with RfD of 5.5 µg/Kg-day, for average adult of 70 Kg weight and inhaled air of 20 m^3, results in a value of: << OLE Object: Microsoft Equation 3.0 >> Assessment rounded to two significant digits.

n-Nitrosomethylethylamine	10595-95-6	1.6E-04 (Annual average)	Unit cancer unit risk factor of 6.3E-03/µg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: << OLE Object: Microsoft Equation 3.0 >> Assessment rounded to two significant digits.
n-Nitrosodi-n-propylamine	621-64-7	5 E-04 (Annual average)	Unit cancer unit risk factor of 2E-03/µg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: << OLE Object: Microsoft Equation 3.0 >> Assessment limited to one significant digit.

SST:

n-Nitrosomethylethylamine	10595-95-6	1.6E-04 (Annual average)	Unit cancer unit risk factor of 6.3E-03/µg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: << OLE Object: Microsoft Equation 3.0 >> Assessment rounded to two significant digits.
n-Nitrosodi-n-propylamine	621-64-7	5 E-04 (Annual average)	Unit cancer unit risk factor of 2E-03/µg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: << OLE Object: Microsoft Equation 3.0 >> Assessment limited to one significant digit.

I would appreciate getting your review and response - the carbonyl sulfide was present in the SST permit before - but perhaps your approach and screening level has changed for this pollutant.

Thank you.

Doug Hendrickson, P.E.
Nuclear Waste Program
Washington State Department of Ecology
509.372.7983
(c) 509.531.0727

Unknown

From: Faust, Toni L [Toni_L_Faust@RL.gov]
Sent: Thursday, July 19, 2007 3:40 PM
To: Brown, Madeleine (ECY)
Subject: Comment on June 7th 2007 Determination of Complete Application, Double-Shell Tank Farms

Please update approval order to allow for use of other ammonia field sampling techniques besides Draeger tube. There are a number of commercially available meters that are more quantitative then the Dreager tube method.

Section 3.1 *Baseline Assessment,* 2nd paragraph (red text) as we do have available a direct meter unit which can be used.

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes or equivalent to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

Section 3.2 Bi-Annual Emission Assessment, 2nd paragraph (red text)

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes or equivalent to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

thank you
Toni L_2 Faust

Unknown

From: cheery@charter.net
Sent: Thursday, July 26, 2007 12:11 AM
To: Hendrickson, Douglas (ECY)
Subject: Comments on Tank Farms AN/ AW Exhauster NOC and SST Retrieval Ventilation NOC

Attachments: Air Comment.doc

Air Comment.doc

To: Doug Hendrickson

From: Steve Lijek
4510 Desert Drive
Pasco, WA 99301

Subject: Comments on Tank Farms AN/ AW Exhauster NOC and SST Retrieval Ventilation NOC

See Attached.

You are welcome to contact me regarding specific details on these comments.

First Comment: Please indicate how Ecology knows that the characterization conducted to date is complete per WAC 173-460. The data needed to safely permit the Single and Double-Shell Tanks is clearly not complete for a variety of reasons:

The tank farm operations are not a standard industrial process where the chemical and physical basis for the emissions is well understood. In fact, at this time the knowledge of tank farms toxic emissions is still in its infancy. For example, I asked a well known Radiation Chemist employed at one of the few Radiation Chemistry labs in the nation, commonly contracted by DOE to conduct experiments related to radiolytic flammable gas generation the following question:

"*…can selenium, arsenic, and sulfur hydrides, or other gaseous selenium, arsenic, or sulfur compounds form in certain layers, in certain tanks where selenium, arsenic, and/or sulfur are concentrated in layers when in proximity to other substances and radionuclides? Could these gases form directly in the gaseous state within the non-convective solid layers in the SST or DSTs containing sludge? Also, could processes such as hydroxide addition, waste evaporation, or violent mixing of the waste promote chemical reactions leading to such compounds; and/ or are there other conditions under which these chemicals can form?"*

I received the following response:

"***The chemistry that may be occurring in waste tanks appears to be quite complicated and barely understood****…*" He further states, "***There is sufficient energy deposition in radiolysis that virtually any reaction is possible****. In other words, normal chemistry as driven by thermodynamics rarely applies to the radiolytic process itself. Energy is deposited by ionizing radiation to the components of the medium in proportion to their electron density. The relative scarcity of sulfur, selenium and arsenic would suggest that their direct radiolytic decomposition is not important unless they are concentrated in regions of high radiation intensity."*

Contrast the expert's response above with what the tank farm contractor says (from RPP-22491, Rev A-1 DRAFT, Industrial Hygiene Chemical Vapor Technical Basis, dated 9/2004):

"*The origin of headspace gases and vapors is understood and can be related back to original chemicals placed into tank farms and the continuing degradation chemistry*."

These somewhat paradoxical statements make sense because no one has asked the right questions to the right people, i.e., the Radiation Chemists were not asked about the generation of toxic gas, but mainly only address flammable gases. The contractor, on the other hand, is financially motivated to move ahead regardless of whether the emissions are adequately characterized for safe operations. Therefore, there's a tendency to oversimplify the tank chemistry and to rely on potentially incomplete information.

With regard to which statement is more accurate: even disregarding the contractor's apparent conflict of interest, the Radiation Chemist has direct experience with the waste chemistry via experimentation, while the CHG chemists are speculating based on a potentially incomplete data and probably without the benefit of direct experience.

There may be substantial evidence supporting the presence of undetected toxic compounds: conventional chemistry argument, unknown source(s) of hydrogen sulphide or "sulphurous" emissions, and the inexplicability of symptoms experienced by exposed workers. The Radiation Chemist quoted above tends to negate the conventional chemical argument, however, I cannot see why the series of nitrogen compounds reflecting the progressive reduction of nitrates, to nitrite, NO_2, nitrous oxide, nitrogen, to ammonia is not replicated by sulphur, selenium, and tellurium.

Theoretical electrochemical potential versus hydrogen ion concentration diagrams for the reduction of nitrates at a high pH are virtually identical to the diagrams of sulphur and selenium. It is often stated that the HS^- ion would dominate, rather than hydrogen sulphide; this is true, but the important word is **dominate**, that is, the equilibrium is shifted over towards the presence of HS^- doesn't mean that hydrogen sulphide will not exist at all. In addition, there are several complications to this oversimplified picture: the high ionic strength makes it difficult to guess the behavior and activity of the competing ions, and whether certain compounds would form directly into a gaseous phase. Gaseous formation might also inhibit diffusion from the nonconvective sludge layers through the convective liquid layers into the tank's headspace; thus headspace characterization might not easily pick up these compounds. The relative scarcity of these compounds would also disfavor diffusion compared to gases like hydrogen or nitrous oxide.

For over 20 years workers have suffered inexplicable health problems that many believe are related to emissions, probably from tank farms. The exposures have occurred both inside and outside of the tank farms "control boundary" or usually the fence line. Serious exposures have occurred as far away as 1500 feet from the nearest tank, but the symptoms were otherwise similar to tank farm exposures. Ecology needs to find out if ORP is able to relate the emissions, from whatever source, to the symptoms and medical problems experienced by the workers. If not, then only several explanations arise: the workers are part of a nearly multi-generational conspiracy involving lies about their exposures, the combination of toxic compounds is much worse than the individual toxins taken separately, the workers are "sensitive," or they were exposed to something not yet identified and/or at concentrations higher than any that so far have been seen.

Of the 4 possibilities, the only realistic ones are that the combination of toxins is much worse than the individual toxins taken separately, and/ or the concentrations are higher; and/ or the toxins responsible for the exposures have not been identified. Any one or all of the remaining hypotheses are issues that also impact these air permits.

In 1989 or 1990 a worker was exposed to a disabling airborne sulphur compound at C-Farm. At the time, the theory was sulphuric acid fumes from a lead-acid battery. After a few other exposures DOE conducted a review documented in the "Independent Technical Review of the Hanford Tank Farm Operations," DOE/EM-0095P, July '92, by USDOE Office of Environmental Restoration and Waste Management. As I recall, soon after the review, tank farms was declared an "uncontrolled waste site" per the OSHA meaning of the phrase. Tank headspace sampling ensued to identify air contaminants responsible for the exposures but nothing was found that could explain them. Eventually the level of

protection required to enter tank farms was reduced eventually to no respiratory protection by the time saltwell pumping of the flammable gas watch list tanks began.

What followed was another period of unexplained exposures, eventually leading to workers being placed on Level A PPE. Sampling resumed, largely still confined to headspace, even though the realization that the evolution of gas from the waste was the likely cause of the new exposures. This sampling revealed a number of new compounds not seen before, including some that are very toxic. Compounds such as dimethyl mercury can explain some, but not all of the symptoms the workers experienced. To my knowledge, even now the tank farms contractor and ORP claim the concentrations are below permissible levels. ***These newly discovered compounds were not part of the existing permits that were based on the same data as the industrial hygiene sampling. Therefore, these permits were not correct as to the type or concentration of the contaminants listed in these permits. Because the contractor claims the new data still does not explain the physical effects experienced by workers, then it is still incorrect with regard to either type or concentration, or the health risk associated with the toxic mixture. Therefore, it follows that the air permits based on this same data are incorrect.***

Several times there were massive releases in 200 East, as documented in "Odor keeps Hanford workers indoors," *published Thursday, May 18th, 2000*, Tri-City Herald by staff writer John Stang –and- "Health fears have workers at Hanford seeking answers," by Hal Bernton, Seattle Times-PI, May 7, 2004. Several Ecology employees also experienced these odors, sometimes as far away as ¼ mile or so from 200 East. These odors were both described as "rotten egg" odor, probably indicative of hydrogen sulphide and/ or other sulphur compounds. In both instances deleterious health effects were noted. The source of these emissions is unknown; these emissions are not listed in any permit. ***These unlisted emissions give Ecology cause to question the Air Operating Permit as it applies to 200 East. Particularly since the same odors are known to be associated with proximity to tank farms. Even if the source were wells in the area exhaling due to barometric pressure changes, I would think Ecology still needs an explanation.***

All said, it seems there is enough ***credible evidence*** to indicate the basis of the permits are flawed and require more detail than present in the permit. Independent data validation of the existing sampling and analysis data needs to be done. Ecology needs to question expert radiation chemists and expert analytical chemists on the quality of the existing sampling and analysis data.

2nd comment: The monitoring required by the permits is not adequate to pick up the worst-case acutely toxic emissions. These likely happen during a gas release event or GRE, induced by mixing, by reducing the liquid level, or spontaneously. The permit should be changed to reflect the recommendation to monitor during the release of gas. Because the waste is heterogeneous, as described in the first comment, sampling should be conducted continuously for each tank. Ecology should carefully participate in the sampling and analysis and ensure the data quality.

The available anecdotal information on more serious exposures as manifested by actual symptoms rather than only just "smelling something," indicates that true acute exposures are relatively rare events. Serious exposures may only occur once in every 3 man-years (this is a guess). If so, then limited monitoring will not detect these events. The monitoring as planned will only address continuous emissions rather than episodic events. All the data available indicates the releases endangering human health are episodic rather than continuous.

A spreadsheet mass balance calculation was done on the dome space concentration of 1,3-Butadiene in a ventilated tank and in a hypothetical non-ventilated tank. The spreadsheet data was obtained from the only tank (SY-101) out of 30 sampled and analyzed for constituents of the trace gas fraction of the trapped gases. This data was combined with release rate history of a GRE event to estimate the instantaneous concentration of 1,3-Butadiene in the dome space, and the mass emission rate (e.g., grams per second) as a function of time exiting the stack. **The dome space concentrations estimated this way showed a headspace concentration in the tank that was *two orders of magnitude higher than the concentration measured in any tank's quiescent headspace from the EXCEL spreadsheet: TAPS-11.XLS, an Excel spreadsheet documenting chemists review of the full-range of Toxic Air Pollutants (Taps) regulated under WAC 173-460, dated 4/23/96, by JLH.*** Please note that this spreadsheet was key to the development of many existing tank farms permits. I do not have access to the most recent data, so I could not compare this estimate with more recent data. Nevertheless, and despite limited available data, it is clear that Ecology should require measurements during the release of gas, not just at any time.

Comment 3: The permit writer needs to check if commitments were made, as required by OSHA, to apply the mixture rule when considering the overall chemical makeup of the emissions. *If* the mixture rule indicates the combination of toxins is much more potent than the individual compounds, which by the way has been stated and calculated by several toxicologists and never adequately rebutted; *then* Ecology would be hard pressed to explain why WAC 173-460-110(3)(a) was not implemented since the data was available AND in consideration that the toxins, taken individually, do not explain the symptoms or the magnitude of health damage experienced by exposed workers. *Therefore, it is preliminary to issue the permit now until CHG and ORP have fulfilled their OSHA requirement of determining the health risk of the mixture.*

A health risk assessment, "Health Risk Assessment for Short- and Long-term Worker Inhalation Exposure to Vapor Phase Chemicals from the Single –Shell Tank 241-C-103," A.D. Maughan, et al, March 1997, PNNL /DOE contract DE-AC06-76LO 1830. Indicated a high cancer risk associated with the ***known*** emissions from this source. The rebuttal, "A critique of the PNNL Draft Report… " By the Worker Health and Safety SubTAP, August 20, 1997, makes some significant points about rescinding the PNNL assessment. However, one of the main rebuttal points was the unrealistic exposure

duration; although the PNNL report did include, for some reason, a resident exposure scenario rather than an occupational one, the rebuttal letter also was in error by not considering that many other tanks in addition to C-103 also emitted toxins. Neither the subTAP, nor any other risk assessment was ever done to my knowledge. I believe that as part of the resolution to the new round of worker exposures ORP was supposed to have another risk assessment done. ***Before approving any permits Ecology should wait for the assessment. When it is completed Ecology should have it independently reviewed. Even if Ecology will not establish an ASIL for the mixture, consideration should be given to its higher level of toxicity, i.e., since Ecology NWP is establishing its own ASILs essentially, it can also establish a mixture ASIL.***

Comment 4: Check the acute risk assessment for non-cancerous toxins. The mass of the exposed individual should be less (child or baby?) not an adult mass. An Ecology expert should review the risk assessment.

Comment 5: WAC 173-400-040(5) says, "No person shall cause or allow the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property or business." The permit writer needs to clarify the meaning of this requirement, particularly in the context of §112(r) of 40 CFR Part 68 Clean Air Act Amendments of 1990, General Duty Clause.

I do not think it is legal for Ecology to issue a permit for processes that are detrimental to safety. RCW 70.94.011 says, "It is the intent of this chapter to secure and maintain levels of air quality that protect **human** health and safety, including the most sensitive members of the population, to comply with the requirements of the federal clean air act, to prevent injury to plant, animal life. It seems that the other RCW provisions related to workers and ambient air, and which agency has jurisdiction over what comes secondary to the fundamental purpose of the Clean Air Act to protect human health.

Comment 6: Regardless of WAC 173-400-040 (5), or the duty and obligations of the signatory professional engineer under WAC 173-400 or other provisions of the Washington Clean Air Act and implementing regulations, approving or allowing such emissions, which are and have been detrimental to health, and are detrimental to safety (i.e., not compatible with OSHA), is a violation of RCW 18.235.130 Unprofessional conduct involving moral turpitude.

Classified Legals

office at 1411 waive minor irregularities. (2 Thick ACP) 275 S.Y. Ave. Sunnyside, Washing- Re-roofing at the Fair- effective immediately fol-
Street, Pasco, Determinations of whether Curb Opening Inlet 21 EA ton, 98944. grounds. lowing the day after its pub-
on Thursday, or not any irregularity is mi- Removing and Resetting Submittals shall be ad- 4. Fairgrounds Im- lication in the official news-
at 2:00 p.m. nor shall be the sole Pedestrian Ramp 2 EA dressed to the Director of provement Fund No. paper of the City.
reserves the responsibility of the City of Ductile Iron Pipe for Water Public Works, City of Sunn- 0123-101, in the amount of Robert A. Welch, Mayor

all five cities and Bent
County. The estimated ti
needed to complete the
port is approximately
days. At a minimum

SETTING NEW AIR QUALITY STANDARDS IN HANFORD'S TANK FARMS

Public Comment Period: June 25 - July 25, 2007

The Washington State Department of Ecology invites you to comment on two proposed air emission permits. Proposed permit approvals would set new standards for certain toxic and carcinogenic pollutants for the ventilation systems in Hanford2s tank farms.

One notice of construction application is for a new ventilation system in the AN and AW double-shell tank farms in Hanford2s 200 East Area. The existing treatment and ventilation equipment dates back to the 1970s. The U.S. Department of Energy, Office of River Protection (ORP), is replacing this equipment." Before using the new equipment, ORP should update its air pollutant permit.

The second notice of construction application is for the operating ventilation systems ORP uses when retrieving wastes from single-shell tanks.

The updated permits are needed to include limits for nitrosoamines and to recognize the emission of pollutants, which have been found through analysis or are expected when ORP transfers wastes from single-shell tanks to double-shell tanks. We will need to set standards in these permits for nitrosoamine emissions.

The permittee is the U.S. Department of Energy, Office of River Protection, P.O. Box 450, Richland WA 99352.

How to learn more about the proposals: The documents related to the proposals are available online at http://www.ecy.wa.gov/programs/nwp/commentperiods.htm. You can review them at Ecology2s Nuclear Waste Program Resource Center. For a viewing appointment call 509-372-7920. You can also review the proposals at Hanford2s Public Information Repositories.

Portland
Portland State University
Branford Price Millar Library
1875 SW Park Avenue
Attention: Don Frank
503-725-4132

Richland
U.S. DOE Public Reading Room
Pacific Northwest National Laboratory
Consolidated Information Center (WSU T-C)
2770 University Drive, Room 101L
Attention: Janice Parthree
509-372-7443

Seattle
University of Washington
Suzzallo Library
Government Publications Division
Attention: Eleanor Chase
206-543-4664

Spokane
Gonzaga University
Foley Center
101-L East 502 Boone
Attention: Linda Pierce
509-323-3834

Ecology has not planned to hold a public hearing, but will consider all requests. If you have further questions, or to request a hearing, please contact Madeleine Brown, 509-372-7936 or mabr461@ecy.wa.gov. You can also phone the toll-free Hanford cleanup line, 800-321-2008.

How do you make a comment? Indicate if your comments relate to the single-shell tank farm notice or the double-shell tank farm notice, or both. Send all comments by Wednesday, July 25, 2007 to:

Doug Hendrickson,P.E.
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Blvd
Richland Washington 99354
Phone 509-372-7983
Fax 509-372-7971
Dohe461@ecy.wa.gov

8478 6/24

STATEMENT OF QUALIFICATIONS

Public Comment Period

SETTING NEW AIR QUALITY STANDARDS IN HANFORD'S TANK FARMS

June 25 through July 25, 2007

The Washington State Department of Ecology invites you to comment on two proposed air emission permits. Proposed permit approvals would set new standards for certain toxic and carcinogenic pollutants for the ventilation systems in Hanford's tank farms.

Suction duct work for new ventilation system in the AW Tank Farm (expansion joint not yet installed)

One notice of construction application is for a new ventilation system in the AN and AW double-shell tank farms in Hanford's 200 East Area. The existing treatment and ventilation equipment dates back to the 1970s. The U.S. Department of Energy, Office of River Protection (ORP), is replacing this equipment. Before using the new equipment, ORP should update its air pollutant permit.

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Ecology has not planned to hold a public hearing, but will all consider requests. If you have further questions, or to request a hearing, please contact Madeleine Brown, 509-372-7936 or mabr461@ecy.wa.gov. You can also phone the toll-free Hanford cleanup line, **1-800-321-2008.**

How do you make a comment?
Indicate if your comments relate to the single-shell tank farm notice or the double-shell tank farm notice, or both. Send all comments by Wednesday, July 25, 2007 to:

Doug Hendrickson, P.E.
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd
Richland Washington 99354
Phone 509-372-7983
Fax 509-372-7971
Dohe461@ecy.wa.gov

HANFORD PUBLIC INFORMATION REPOSITORIES

Richland
U.S. Department of Energy
Reading Room
Consolidated Information Center, Room 101-L
2770 University Dr.
Attn: Janice Parthree
509-372-7443

Seattle
University of Washington
Suzzallo Library
Government PublicationsDivision
Attn: Eleanor Chase
206-543-4664

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Gonzaga University
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502 E. Boone Ave.
Attn: Linda Pierce
509-323-3834

Portland
Portland State University
Branford Price Millar Library
1875 SW Park Ave.
Attn: Don Frank
503-725-4132

If you need this publication in an alternate format, please call the Nuclear Waste Program at 509-372-7950. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Publication Number 07-05-002

Public Comment Period

June 25 through July 25, 2007
SETTING NEW AIR QUALITY STANDARDS IN HANFORD'S TANK FARMS

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY
Nuclear Waste Program
3100 Port of Benton Blvd.
Richland, WA 99354

From: Brown, Madeleine (ECY)
Sent: Wednesday, May 09, 2007 12:05 PM
To: Hanford-Info@listserv.wa.gov
Subject: Advance notice for public comment period for changes to Hanford's air operating permit

This is a message from the Washington State Department of Ecology

Advance Notice

Hanford Site Air Operating Permit changes

Public Comment Period
June 13 through July 13, 2007

Hearing
July 12, 2006
Nuclear Waste Program
3100 Port of Benton Blvd.
Richland, WA 99354

The Washington State Department of Ecology (Ecology) invites you to comment on proposed changes to Hanford's Air Operating Permit (AOP). The AOP regulates air emissions on the Hanford Site. The changes are to clarify fee recovery practices for permitting and oversight under the AOP.

The public comment period will run from June 13 through July 13, 2007. We will hold a public hearing on Thursday, July 12, 2007.

The permittee is the U.S. Department of Energy, Richland Operations Office, PO Box 550, Richland, WA 99352.

How do I view related documents?

During the comment period, you can view the affected portions of the AOP at Ecology's Nuclear Waste Program, 3100 Port of Benton Blvd in Richland. To make an appointment to review the documents, call 509-372-7920. You can also view the documents online at www.ecy.wa.gov/programs/nwp/commentperiods.htm or at one of the public information repositories, http://www.hanford.gov/?page=80&parent=15.

After the public comment period, Ecology will issue a responsiveness summary. It will detail how comments affect the preparation of the proposed AOP.

Please contact Madeleine Brown at 509-372-7936 or mabr461@ecy.wa.gov for more information.

Madeleine C. Brown
Washington State Department of Ecology
Nuclear Waste Program
(509) 372-7936
mabr461@ecy.wa.gov

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950

July 31, 2007

Ms. Shirley Olinger, Acting Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Approval of Criteria and Toxic Air Emissions Notice of Construction (NOC) Application, Hanford Single-Shell Tank Waste Retrieval

References:
1. USDOE-RL Letter 07-ESQ-088, *Request for Modification to Criteria and Toxics Air Emissions Notice of Construction (NOC) Application for Operations of Waste Retrieval Systems in Single-Shell Tank (SST) Farms*, dated May 15, 2007
2. Ecology Letter, *Determination of Complete Application, Single-Shell Tank Farms*, dated June 7, 2007

Dear Ms. Olinger:

The United States Department of Energy - Office of River Protection petitioned for approval of a Notice of Construction modification for the ventilation of Hanford Single-Shell Tank Waste Retrieval Operations (Reference 1). Ecology determined that your application was complete and provided you a proposed ORDEr revision (Reference 2). This letter issues approval for ORDER revision and the petitioned operations.

Enclosed is ORDER No. **DE05NWP-002, Rev. 2**, authorizing the proposed operations. The enclosed ORDER may be appealed. Appeal procedures are described in the ORDER. Administrative revision of the Hanford Air Operating Permit, to incorporate provisions of this ORDER as requested in Reference 1, will follow this issuance.

This authorization can be modified, suspended, or revoked, in whole or in part, if Ecology finds that, due to inaccuracies in the petition request, compliance with ambient air quality standards is not ensured.

The proposed ORDER revision was subject to public review and comment from June 25, 2007, through July 25, 2007. No applicable comments were received adverse to the proposed ORDER. The Responsiveness Summary prepared to address comments will soon be available on the Ecology website at http://www.ecy.wa.gov/programs/nwp/currentnews.htm.

If you have any questions, contact Doug Hendrickson at 509-372-7983.

Sincerely,

Jane A. Hedges

Jane A. Hedges
Program Manager
Nuclear Waste Program

dh/pll
Enclosure

cc: Dennis Bowser, USDOE
Mary Jarvis, USDOE
Nancy Homan, FH
Lucinda Penn, CH2M
Chris Kemp, CH2M
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
John Martell, WDOH
Administrative Record: AIR Permits
Environmental Portal

NON-RADIOACTIVE AIR EMISSIONS
NOTICE OF CONSTRUCTION APPROVAL ORDER
CONDITIONS AND RESTRICTIONS

REGULATORY AUTHORITY:

Pursuant to the Washington State Department of Ecology General Regulations for Air Pollution Sources, Chapter 173-400 Washington Administrative Code (WAC), and Controls for New Sources of Toxic Air Pollutants, Chapter 173-460 WAC, Ecology now finds the following:

FINDINGS:

1. The United States Department of Energy proposes to modify their existing facility (Hanford) located in Richland, Washington.

2. A Notice of Construction (NOC) application was submitted on July 22, 2004. The application was found to be complete on September 8, 2004.

3. The NOC was supplemented on December 1, 2004, and September 1, 2005.

4. An NOC application to modify the ORDER to identify additional pollutants was submitted on May 15, 2007. Additional pollutants include n-Nitrosodi-n-propylamine, n-Nitrosodi-n-butylamine, and n-Nitrosomethylethylamine. The application was found to be complete on May 25, 2007.

5. Hanford is an existing major stationary source that emits more than 250 tons of a regulated pollutant per year.

6. The proposed project consists of installing and operating tank ventilation exhaust systems within the single-shell tank (SST) farms to support retrieval of tank waste over a period of approximately 22 years.

7. The proposed project has been supplemented to include active ventilation of tanks 241-C-101 through 241-C-112 when these tanks are not undergoing retrieval.

8. The proposed project has been supplemented to include:
   - Stack aggregation and relocation of the 241-C tank farm exhaust point outside of the tank farm with increased stack height.
   - Use of supplementary dispersion air after the exhaust has undergone emissions control.

9. SST vessels within the scope include vessels in each of the 12 SST farms:

- 241-A (6 of 6 tanks)
- 241-AX (4 of 4 tanks)
- 241-B (16 of 16 tanks)
- 241-BX (12 of 12 tanks)
- 241-BY (12 of 12 tanks)
- 241-C (16 of 16 tanks)
- 241-S (10 of 12 tanks)
- 241-SX (15 of 15 tanks)
- 241-T (16 of 16 tanks)
- 241-TX (18 of 18 tanks)
- 241-TY (6 of 6 tanks)
- 241-U (15 of 16 tanks)

10. SST vessels outside the scope of this project are: 241-C-106 during retrieval, 241-S-102, 241-S-112, and 241-U-107.

11. Hanford is located in a Class II Area designated as "attainment" for the purpose of NOC permitting for all pollutants.

12. Emissions of criteria pollutants from the proposed project are below the Prevention of Significant Deterioration Significant Emission Rates.

13. Criteria air pollutant emissions from the proposed project are below the *de minimus* levels in WAC 173-400-110(5)(d).

14. Acceptable Source Impact Levels (ASILs) do not exist for the Toxic Air Pollutants (TAPs) propionaldehyde, acetophenone, carbonyl sulfide, n-Nitrosomorpholine, n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine, which the proposed project may emit. Therefore, Ecology has developed Screening Levels for these pollutants as detailed in Table 1.

Table 1: Development of Screening Levels

Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [μg/m^3]	Basis for Screening Level (S.L.)
Propionaldehyde	123-38-6	160 (24-hr average)	The current ACGIH Threshold Limit Value (TLV) for this material is 20 ppm (TWA). At 25˚C and one atmosphere this TLV is 47,477.6 μg/m^3. Application of WAC 173-460-110(2)(b) divides the TLV by 300 resulting in a value of 158.26 μg/m^3 (24 hr average). Assessment rounded to two significant digits.
Acetophenone	98-86-2	350 (24-hr average)	Applying, under WAC 173-460-110(3)(a), IRIS general toxicity data of this material with RfD of 100 μg/Kg-day, for average adult of 70 Kg weight and inhaled air of 20 m^3, results in a value of: $S.L. = \frac{100\mu g}{Kg \cdot day} \bullet \frac{day}{20m^3 air} \bullet 70Kg = \frac{350\mu g}{m^3} \ (24hr\ average)$
Carbonyl Sulfide	463-58-1	19 (24-hr average)	Applying, under WAC 173-460-110(3)(a), Toxics release toxicity data of this material with RfD of 5.5 μg/Kg-day, for average adult of 70 Kg weight and inhaled air of 20 m^3, results in a value of: $S.L. = \frac{5.5\mu g}{Kg \cdot day} \bullet \frac{day}{20m^3 air} \bullet 70Kg = \frac{19.3\mu g}{m^3} \ (24hr\ average)$ Assessment rounded to two significant digits.
n-Nitrosomorpholine	59-89-2	5.3E-04 (Annual average)	Unit cancer unit risk factor of 1.90E-03/μg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1E+06} \Big/ \frac{1.9E-03\, m^3}{\mu g} = \frac{5.263E-04\mu g}{m^3} \ (Annual\ average)$

Table 1: Development of Screening Levels			
Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [μg/m^3]	Basis for Screening Level (S.L.)
			Assessment rounded to two significant digits.
n-Nitrosomethylethyl amine	10595-95-6	1.6E-04 (Annual average)	Unit cancer unit risk factor of 6.3E-03/μg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1E+06} \Big/ \frac{6.3E-03\, m^3}{\mu g} = \frac{1.587E-04 \mu g}{m^3}$ $(Annual\ average)$ Assessment rounded to two significant digits.
n-Nitrosodi-n-propylamine	621-64-7	5 E-04 (Annual average)	Unit cancer unit risk factor of 2E-03/μg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1E+06} \Big/ \frac{2E-03\, m^3}{\mu g} = \frac{5.0E-04 \mu g}{m^3}$ $(Annual\ average)$ Assessment limited to one significant digit.

References:

Propionaldehyde: ACGIH 2004, American Conference of Government Industrial Hygienists, *2004 TLVs® and BEIs®*, Cincinnati, Ohio.

Acetophenone: IRIS, Integrated Risk Information System, http://www.epa.gov/iris/subst/0321.htm

Carbonyl Sulfide: Bouwes, N. and Hassur, S., *Toxics Release Inventory Relative Risk-Based Environmental Indicators: Interim Toxicity Weighting Summary Document.* Economics, Exposure and Technology Division Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency. 401 M St., SW Washington, D.C. 20460. June 1997. (http://www.epa.gov/oppt/rsei/docs/toxwght97.pdf).

N-Nitrosomorpholine, n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine: California Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database (TCDB). (http://www.oehha.ca.gov/risk/ChemicalDB/index.asp)

15. The proposed project has no chlorinated dibenzo-*p*-dioxin or chlorinated dibenzofuran ambient impacts based upon submittal and supplement of the NOC application.

16. TAPs from the proposed project are below the ASILs of WAC 173-460-150 and WAC 173-460-160 or Screening Levels of Table 1.

17. Toxics Best Available Control Technology (T-BACT) for this project has been determined to be operation of the tank ventilation exhauster systems with moisture de-entrainment, pre-heater, and High Efficiency Particulate Air (HEPA) filtration in service in the treatment train.

18. The proposed project, if constructed and operated as herein required, will provide T-BACT.

19. The proposed project, if operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and Chapter 173-460 WAC, and the operation thereof will not result in ambient air quality standards being exceeded.

20. The project will have no significant impact on air quality.

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction application, and as detailed in emissions estimates and impact and control technology assessments submitted to the Washington State Department of Ecology in reference thereto, is approved for construction, installation, and operation, provided compliance with the conditions and restrictions described below. This ORDER shall be identified as NOC ORDER **DE05NWP-002, Rev. 2**.

1.0 GENERAL APPROVAL CONDITIONS

1.1 Effective Date

The effective date of this authorization shall be that as signed in Section 4.0. All references to procedures or test methods shall be to those in effect as of the effective date of this ORDER.

1.2 Emission Limits

1.2.1 Visible emissions from each tank ventilation exhauster stack or aggregated exhauster stack shall not exceed five percent.

1.2.2 Tank ventilation exhauster systems for the 241-C SST farm 100 series tanks (241-C-101 through 241-C-112) shall not exceed cumulative flow rates of 7,000 ft^3/min (standard temperature and pressure) for three exhausters individually limited to 1,000 ft^3/min, 3,000 ft^3/min, and 3,000 ft^3/min, respectively.

1.2.3 SST ventilation exhauster systems for the retrieval of wastes other than those of the 241-C tank farm 100 series tanks shall not exceed 1,000 ft^3/min (standard temperature and pressure).

1.2.4 All TAPs, as submitted in the permittee's NOC Application, shall be below their respective ASIL or Screening Level of Table 1.

1.3 Compliance Demonstration

1.3.1 Compliance with Approval Condition 1.2.1 shall be met by Tier 3 Visible Emissions Survey requirements of the Hanford Air Operating Permit.

1.3.2 Should visible emissions be observed which are not solely attributable to water condensation, compliance with Approval Condition 1.2.1 shall be met by performing an opacity determination utilizing 40 Code of Federal Regulations (CFR) Part 60, Appendix A, Method 9, providing that such determination shall not place the visible emission observer in hazard greater than that identified for the general worker.

1.3.3 Compliance with Approval Condition 1.2.2 shall be demonstrated by stack gas flow and temperature measurement.

1.3.4 Compliance with Approval Condition 1.2.3 shall be demonstrated by stack gas flow and temperature measurement.

1.3.5 Compliance with Approval Condition 1.2.4 shall be met by:

1.3.5.1 Operating the exhauster systems only when in accord with T-BACT emission controls found for this project.

1.3.5.2 Development and implementation of a sampling and analysis plan (SAP) for each tank retrieval. For each retrieval, the SAP shall address the emission of a minimum of the three TAPs with the highest potential ambient concentration relative to their ASILs of WAC 173-460-150 and WAC 173-460-160 or relative to their Screening Level of Table 1, above. The TAPs addressed in the SAP shall be identified from Table 2 and based upon best engineering judgment and most current tank content data. Analytical methods for the analyses shall be the United States Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Institute for Occupational Safety and Health (NIOSH) approved, or by approved equivalent method.

1.4 Manuals

Existing Operations and Maintenance (O&M) manuals for all equipment, procedures, and controls associated with the proposed activities that have the potential to affect emissions to the atmosphere shall be followed. Manufacturer's instructions may be referenced. The O&M manuals shall be updated to reflect any modifications of the process or operating procedures. Copies of the O&M manuals shall be available to Ecology upon request.

2.0 Notifications and Submittals

2.1 Addressing

Any required notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

2.2 Schedule

A schedule of installation and operation activities for these exhauster systems shall be submitted within 30 days of original issuance of this ORDER with a duration extending to 12 months after the effective date of this ORDER.

3.0 Notifications and Submittals

3.1 Addressing

Any required notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

3.2 Schedule

A schedule of installation and operation activities for these exhauster systems shall be submitted within 30 days of original issuance of this ORDER with a duration extending to 12 months after the effective date of this ORDER.

3.3 Operational Notice

Notification shall be made at least 10 days prior to initial operation of any exhauster system covered by this ORDER when installed to ventilate a tank not previously actively ventilated under this ORDER.

3.4 Recordkeeping

Specific records shall be kept on the Hanford Site by the permittee and made available for inspection by Ecology upon request. The records shall be organized in a readily accessible manner and cover a minimum of the most recent 60-month period. The records to be kept shall include the following:

1. Records of calibration of stack gas flow rate and temperature measurement devices.
2. Exhauster system stack flow rates and temperatures records.
3. All monitoring and operations records required to operate and maintain the emission control equipment which implements T-BACT as described in Section 1.0.
4. SAPs developed for compliance demonstration as described in Section 1.3.5.2.
5. Laboratory analysis result summaries of any samples undertaken after the effective date of this ORDER from SST tank farm tank headspaces or SST ventilation system exhaust which are examined for organic species or other TAPs.

3.5 Reporting

Visible emission surveys, conducted pursuant to Compliance Demonstration requirement 1.3.2, shall be submitted to Ecology within 30 days of completion of the survey with an assessment of the cause of visible emissions and a report of the maintenance conducted to maintain the subject exhaust system's T-BACT operations.

Identification of any TAP not previously identified within the NOC Application or Supplement emissions estimates as defined in Table 2 shall be submitted to Ecology within 90 days of completion of laboratory analyses which verify emissions of that toxic air pollutant from the project.

An annual schedule (Federal fiscal year basis) of anticipated operations and installations of exhauster systems under this ORDER shall be submitted by November first of each year following issuance of this ORDER.

4.0 APPROVAL ORDER AND RESTRICTIONS

Operation of the subject tank ventilation systems is intended for the storage and retrieval of waste contained in the tanks as described in the NOC application and supplement.

This Authorization may be modified, suspended, or revoked in whole, or in part, for cause including, but not limited to, the following:

1. Violating any terms or conditions of this authorization.
2. Obtaining this authorization by misrepresentation, or failure to fully disclose all relevant facts.

The provisions of this authorization are severable. If any provision of this authorization or application of any provisions of this authorization to any circumstance is held invalid, the application of such provision to their circumstances and the remainder of this authorization shall not be affected.

Any person aggrieved by this ORDER may obtain review thereof by application, within 30 days of receipt of this ORDER to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted thereunder.

DATED at Richland, Washington, this 31st day of July 2007.

REVIEWED AND PREPARED BY:

Doug Hendrickson, P.E.

DOUGLAS W. HENDRICKSON
STATE OF WASHINGTON
33907
REGISTERED PROFESSIONAL ENGINEER

EXPIRES 06/10/2009

APPROVED BY:

Jane A. Hedges
Program Manager
Nuclear Waste Program

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
n-Nitrosomethylethylamine	10595-95-6	A	0.00016			2.2E-06	1.9E-02	6.6E-04	2.0E-02
1,4-Dichlorobenzene	106-46-7	A	1.5	500	3.0E-05	1.0E-06	2.7E-01	3.6E-04	2.7E-01
Ethylene dibromide (dibromethane)	106-93-4	A	0.0045	0.5	4.2E-05	9.2E-06	4.5E-01	3.2E-03	4.5E-01
1,3-Butadiene	106-99-0	A	0.0036	0.5	1.8E-04	1.1E-03	1.1E+01	3.8E-01	1.2E+01
1,2-Dichloroethane (ethylene chloride)	107-06-2	A	0.038	10	2.0E-05	2.1E-04	2.0E+00	7.0E-02	2.0E+00
Acrylonitrile	107-13-1	A	0.015	10	6.5E-07		5.7E-03		5.7E-03
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	A	2.5	500	5.4E-07	2.5E-06	2.7E-02	8.8E-04	2.8E-02
1,4-Dioxane	123-91-1	A	0.032	10	2.0E-05	2.6E-04	2.5E+00	9.0E-02	2.6E+00
Perchloroethylene (tetrachloroethylene)	127-18-4	A	1.1	500	3.1E-04	5.4E-04	7.4E+00	1.9E-01	7.6E+00
Polychlorinated biphenyls (PCBs)	1336-36-3	A	0.0045	0.5	1.6E-05		1.4E-01		1.4E-01
Formaldehyde	50-00-0	A	0.077	20		4.3E-04	3.8E+00	1.5E-01	4.0E+00
Carbon tetrachloride	56-23-5	A	0.067	20	9.3E-04	5.9E-04	1.3E+01	2.1E-01	1.4E+01
n-Nitrosomorpholine	59-89-2	A	0.00053		5.3E-06		4.6E-02		4.6E-02
n-Nitrosodi-n-propylamine	621-64-7	A	0.0005			4.1E-07	3.6E-03	1.3E-04	3.7E-03
n-Nitrosodimethylamine	62-75-9	A	0.000071		1.8E-04		1.6E+00		1.6E+00
Chloroform	67-66-3	A	0.043	10	6.1E-05	4.9E-04	4.8E+00	1.7E-01	5.0E+00
Benzene	71-43-2	A	0.12	20	1.4E-03	2.5E-03	3.4E+01	8.6E-01	3.5E+01
Cadmium and compounds	7440-43-9	A	0.00056			7.3E-06	6.4E-02	2.5E-03	6.7E-02
Vinyl chloride	75-01-4	A	0.012	10	1.4E-05	2.5E-04	2.3E+00	8.8E-02	2.4E+00
Acetaldehyde	75-07-0	A	0.45	50	5.6E-04	1.9E-04	6.6E+00	6.7E+00	1.3E+01

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
Dichloromethane (methylene chloride)	75-09-2	A	0.56	50	2.4E-03	9.8E-02	8.8E+02	3.4E+01	9.2E+02
Ethylene oxide	75-21-8	A	0.01	10	5.5E-06		4.8E-02		4.8E-02
1,2-Dichloropropane	78-87-5	A	4	0.02	1.6E-05		1.4E-01		1.4E-01
Trichloroethylene	79-01-6	A	0.59	50	8.8E-05	4.1E-04	4.4E+00	1.4E-01	4.5E+00
n-Nitrosodi-n-butylamine	924-16-3	A	0.00063			7.1E-06	6.2E-02	2.2E-03	6.4E-02
Arsenic and inorganic arsenic compounds	C7440-38-2	A	0.00023			2.4E-05	2.1E-01	8.4E-03	2.2E-01
p-Nitrochlorobenzene	100-00-5	B	2	0.02	5.8E-07	2.7E-06	2.9E-02	9.0E-04	3.0E-02
Ethyl benzene	100-41-4	B	1000	5	3.1E-04	8.1E-04	9.8E+00	2.9E-01	1.0E+01
Styrene	100-42-5	B	1000	5	2.9E-04	1.3E-03	1.4E+01	4.4E-01	1.4E+01
Nitric oxide	10102-43-9	B	100	2	2.1E-03	4.8E-03	6.0E+01	1.7E+00	6.2E+01
Phenyl ether	101-84-8	B	23	0.2	2.0E-05		1.8E-01		1.8E-01
Ethyl butyl ketone	106-35-4	B	780	5	1.4E-03	9.0E-03	9.1E+01	3.2E+00	9.4E+01
1,2-Epoxybutane	106-88-7	B	20	0.2	2.9E-05		2.5E-01		2.5E-01
Butane	106-97-8	B	6300	5	5.6E-03	3.4E-02	3.5E+02	1.2E+01	3.6E+02
Acrolein	107-02-8	B	0.02	0.02	1.7E-06		1.5E-02		1.5E-02
Allyl chloride	107-05-1	B	1	0.02	3.6E-06		3.2E-02		3.2E-02
Allyl alcohol	107-18-6	B	17	0.2	1.1E-06		9.6E-03		9.6E-03
Methyl formate	107-31-3	B	820	5	2.1E-07	3.3E-05	2.9E-01	1.2E-02	3.0E-01
Methyl propyl ketone	107-87-9	B	2300	5	1.7E-03	5.5E-03	6.3E+01	1.9E+00	6.5E+01
1-Nitropropane	108-03-2	B	20	0.2	1.7E-05		1.5E-01		1.5E-01
Vinyl acetate	108-05-4	B	200	2.6	3.1E-07		2.7E-03		2.7E-03
Methyl isobutyl ketone (MIBK)	108-10-1	B	680	5	9.3E-04	2.9E-03	3.3E+01	9.9E-01	3.4E+01
Isopropyl ether	108-20-3	B	3500	5	4.7E-05		4.1E-01		4.1E-01
Methylcyclohexane	108-87-2	B	5400	5	1.1E-03	6.2E-04	1.5E+01	2.2E-01	1.5E+01
Toluene	108-88-3	B	400	5	3.1E-03	4.1E-03	6.3E+01	1.4E+00	6.5E+01
Chlorobenzene	108-90-7	B	150	2.6	2.8E-05	3.3E-04	3.1E+00	1.2E-01	3.3E+00

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
Cyclohexanol	108-93-0	B	690	5	2.3E-07		2.0E-03		2.0E-03
Cyclohexanone	108-94-1	B	330	5	2.2E-04	5.3E-04	6.5E+00	1.8E-01	6.7E+00
Phenol	108-95-2	B	63	1.2	3.0E-05	1.1E-03	1.0E+01	3.9E-01	1.0E+01
Pentane	109-66-0	B	6000	5	2.9E-03	5.0E-03	6.9E+01	1.8E+00	7.1E+01
Tetrahydrofuran	109-99-9	B	2000	5	4.4E-03	2.2E-02	2.3E+02	7.7E+00	2.4E+02
Methyl isoamyl ketone	110-12-3	B	780	5	5.8E-05	9.7E-05	1.4E+00	3.4E-02	1.4E+00
Methyl n-amyl ketone	110-43-0	B	780	5	9.0E-04	3.9E-03	4.2E+01	1.3E+00	4.3E+01
Hexane (n-Hexane)	110-54-3	B	200	2.6		8.8E-03	7.7E+01	3.1E+00	8.0E+01
n-Valeraldehyde	110-62-3	B	590	5	3.7E-04	1.0E-03	1.2E+01	3.6E-01	1.3E+01
Cyclohexane	110-82-7	B	3400	5	7.7E-04	2.3E-03	2.7E+01	8.0E-01	2.8E+01
Cyclohexene	110-83-8	B	3400	5	1.1E-06		9.6E-03		9.6E-03
Pyridine	110-86-1	B	53	0.6	2.9E-04	2.4E-04	4.6E+00	8.2E-01	5.5E+00
Octane	111-65-9	B	4700	5	9.6E-04	3.7E-03	4.0E+01	1.3E+00	4.2E+01
2-Butoxyethanol	111-76-2	B	400	5	1.1E-04	1.5E-06	9.8E-01	5.3E-04	9.8E-01
Nonane	111-84-2	B	3500	5	7.6E-04	3.2E-03	3.5E+01	1.1E+00	3.6E+01
1,2,4-Trichlorobenzene	120-82-1	B	120	2	3.6E-05	3.7E-04	3.5E+00	1.3E-01	3.6E+00
Diphenylamine	122-39-4	B	33	0.6	3.8E-05	1.5E-05	4.6E-01	5.3E-03	4.7E-01
Dipropyl ketone	123-19-3	B	780	5	3.2E-04	1.4E-03	1.5E+01	5.0E-01	1.5E+01
Propionaldehyde	123-38-6	B	160		1.1E-04	7.2E-04	7.3E+00	2.5E-01	7.5E+00
Isoamyl alcohol	123-51-3	B	1200	5	1.3E-05		1.1E-01		1.1E-01
n-Butyl acetate	123-86-4	B	2400	5	1.9E-03	1.3E-02	1.3E+02	4.2E+00	1.3E+02
Dimethylamine	124-40-3	B	60	1.2		1.0E-03	8.9E+00	3.5E-01	9.3E+00
Tributyl phosphate	126-73-8	B	7.3	0.02	1.9E-03	3.7E-03	4.9E+01	1.3E+00	5.0E+01
Methylacrylonitrile	126-98-7	B	9	0.02	1.2E-05	5.6E-05	6.0E-01	2.0E-02	6.1E-01
Dimethyl acetamide	127-19-5	B	120	2	5.4E-06	5.0E-03	4.4E+01	1.8E+00	4.6E+01
2,6-Ditert. butyl-p-cresol	128-37-0	B	33	0.6	5.5E-04	4.2E-03	4.2E+01	1.4E+00	4.3E+01
Xylenes (m-,o-,p-isomers)	1330-20-7	B	1500	5	1.7E-04	7.9E-04	8.4E+00	2.8E-01	8.7E+00
Ethyl acetate	141-78-6	B	4800	5	5.2E-03	5.3E-02	5.1E+02	1.8E+01	5.2E+02

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
Mesityl oxide	141-79-7	B	200	2.6	1.5E-05		1.3E-01		1.3E-01
Heptane (n-Heptane)	142-82-5	B	5500	5	2.4E-03	5.0E-03	6.5E+01	1.7E+00	6.7E+01
Cyclopentane	287-92-3	B	5700	5	1.2E-04	1.6E-05	1.2E+00	5.7E-03	1.2E+00
Crotonaldehyde	4170-30-3	B	20	0.2	2.4E-05	7.3E-03	6.4E+01	2.5E+00	6.7E+01
Carbonyl sulfide	463-58-1	B	19		1.0E-05		8.8E-02		8.8E-02
Ethyl amyl ketone	541-85-5	B	440	5		1.3E-04	1.1E+00	4.3E-02	1.1E+00
Methyl isopropyl ketone	563-80-4	B	2300	5	8.8E-04	4.0E-03	4.3E+01	1.3E+00	4.4E+01
Cyanides, as CN	57-12-5	B	17	0.2	6.2E-03	6.2E-02	5.9E+02	2.2E+01	6.2E+02
1,1-Dimethylhydrazine	57-14-7	B	4	0.02	1.2E-06	3.5E-04	3.1E+00	1.3E-01	3.2E+00
2-Hexanone (MBK)	591-78-6	B	67	1.2	8.5E-04	3.2E-03	3.5E+01	1.2E+00	3.7E+01
Methyl hydrazine	60-34-4	B	1.2	0.02	2.9E-07		2.5E-03		2.5E-03
Methyl isocyanate	624-83-9	B	0.16	0.02	4.8E-06		4.2E-02		4.2E-02
n-Propyl nitrate	627-13-4	B	360	5	3.0E-04	9.9E-03	9.0E+01	3.5E+00	9.3E+01
Ethyl alcohol	64-17-5	B	6300	5	5.9E-03	1.0E-02	1.4E+02	3.5E+00	1.4E+02
Acetic acid	64-19-7	B	83	1.2	2.4E-04	5.0E-02	4.4E+02	1.8E+01	4.6E+02
Methyl alcohol	67-56-1	B	870	5	8.5E-03	3.4E-02	3.7E+02	1.2E+01	3.9E+02
Isopropyl alcohol	67-63-0	B	3300	5	2.0E-03	1.3E-03	2.9E+01	4.4E-01	2.9E+01
Acetone	67-64-1	B	5900	5	2.6E-02	5.5E-02	7.1E+02	1.9E+01	7.3E+02
n-Propyl alcohol	71-23-8	B	1600	5	2.6E-03	1.0E-02	1.1E+02	3.7E+00	1.2E+02
n-Butyl alcohol	71-36-3	B	500	5	5.8E-02	1.7E-01	2.0E+03	5.9E+01	2.1E+03
Methyl chloroform (1,1,1-Trichloroethane)	71-55-6	B	6400	5	5.7E-05	3.2E-04	3.3E+00	1.2E-01	3.4E+00
Silver, Metal	7440-22-4	B	0.33	0.02		1.0E-05	8.8E-02	3.5E-03	9.2E-02
Tin, Metal	7440-31-5	B	6.7	0.02		7.0E-04	6.1E+00	2.4E-01	6.3E+00
Chromium (metal)	7440-47-3	B	1.7	0.02		4.8E-04	4.2E+00	1.7E-01	4.4E+00
Methyl bromide	74-83-9	B	5	0.02	2.4E-05	1.5E-05	3.4E-01	5.0E-03	3.5E-01
Methyl chloride	74-87-3	B	340	5	9.2E-05	2.3E-04	2.8E+00	1.0E-01	2.9E+00
Methylamine	74-89-5	B	43	0.6		7.0E-04	6.1E+00	2.4E-01	6.3E+00

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
Methyl acetylene	74-99-7	B	5500	5	1.5E-04	7.9E-04	8.2E+00	2.8E-01	8.5E+00
Ethyl chloride	75-00-3	B	10000	5	4.0E-05	2.3E-04	2.4E+00	8.1E-02	2.4E+00
Ethylamine	75-04-7	B	60	1.2		5.0E-05	4.4E-01	1.7E-02	4.6E-01
Acetonitrile	75-05-8	B	220	2.6	6.0E-03	2.7E-02	2.9E+02	9.0E+00	3.0E+02
Formamide	75-12-7	B	60	1.2	9.1E-07		8.0E-03		8.0E-03
Carbon disulfide	75-15-0	B	100	2	3.2E-04	1.4E-03	1.5E+01	4.8E-01	1.5E+01
1,1-Dichloroethane	75-34-3	B	2700	5	2.3E-05		2.0E-01		2.0E-01
Vinylidene chloride	75-35-4	B	67	1.2	5.8E-05	4.1E-04	4.1E+00	1.4E-01	4.3E+00
Dichlorofluoromethane	75-43-4	B	130	2.6	5.2E-05	4.2E-05	8.3E-01	1.4E-02	8.4E-01
Chlorodifluoromethane	75-45-6	B	12000	5	8.4E-04	4.8E-05	7.8E+00	1.7E-02	7.8E+00
Trimethylamine	75-50-3	B	80	1.2	1.8E-04	6.7E-02	5.9E+02	2.3E+01	6.1E+02
Nitromethane	75-52-5	B	830	5	1.6E-05		1.4E-01		1.4E-01
Propylene imine	75-55-8	B	16	0.2	6.7E-06		5.9E-02		5.9E-02
tert-Butyl alcohol	75-65-0	B	1000	5	2.4E-04	1.1E-04	3.1E+00	4.0E-02	3.1E+00
Trichlorofluoromethane	75-69-4	B	19000	5	3.1E-02	6.8E-03	3.3E+02	2.3E+00	3.3E+02
Dichlorodifluoromethane	75-71-8	B	16000	5	1.4E-04	7.3E-04	7.6E+00	2.5E-01	7.9E+00
1,1,2-Trichloro-1,2,2-trifluorethane	76-13-1	B	27000	5	3.3E-04	7.4E-04	9.4E+00	2.6E-01	9.7E+00
Dichlorotetrafluoroethane	76-14-2	B	23000	5	5.3E-05	2.7E-05	7.0E-01	9.0E-04	7.1E-01
Ammonia	7664-41-7	B	100	2	1.5E+00	1.1E+00	2.3E+04	4.0E+02	2.4E+04
Isobutyl alcohol	78-83-1	B	510	5	1.2E-05		1.1E-01		1.1E-01
sec-Butyl alcohol	78-92-2	B	1000	5	1.5E-04	4.5E-04	5.2E+00	1.5E-01	5.4E+00
Methyl ethyl ketone (MEK)	78-93-3	B	1000	5	7.4E-03	6.6E-02	6.4E+02	2.3E+01	6.7E+02
1,1,2-Trichloroethane	79-00-5	B	180	2.6	8.4E-05	2.7E-04	3.1E+00	9.9E-02	3.2E+00
Propionic acid	79-09-4	B	100	2	3.8E-06	8.6E-06	1.1E-01	3.0E-03	1.1E-01
Acrylic acid	79-10-7	B	0.3	0.02	4.7E-04	2.2E-03	2.3E+01	7.7E-01	2.4E+01
Methyl acetate	79-20-9	B	2000	5	1.8E-05		1.6E-01		1.6E-01
1,1,2,2-Tetrachloroethane	79-34-5	B	23	0.2	5.4E-05	4.9E-04	4.8E+00	1.7E-01	4.9E+00

Table 2: Hanford Single Shell Tank Categorical Retrieval Toxic Air Pollutant Emissions Estimate

NOC DE05NWP-002 Rev 2.					Retrieval Emissions			Non-Retrieval Emissions	Total Emissions
Material Data			ASIL/ Screening Level [1]	SQER [2]	SST Base [3]	C-Farm with Stack Relocation [4]	Total	C-Farm with Stack Relocation [4]	DE05NWP-002, Rev. 1
Chemical Name	CAS [5]	Class	µg/m^3	lb/period	lb/hr	lb/hr	lb/yr	lb/yr	lb/yr
Diethyl phthalate	84-66-2	B	17	0.2	1.6E-04	4.7E-06	1.4E+00	1.6E-03	1.4E+00
Dibutyl phthalate	84-74-2	B	17	0.2	1.3E-06	3.1E-06	3.8E-02	1.1E-03	3.9E-02
Hexachlorobutadiene	87-68-3	B	0.7	0.02	4.1E-05	5.3E-04	5.0E+00	1.9E-01	5.1E+00
Naphthalene	91-20-3	B	170	2.6	9.1E-06	1.5E-06	9.3E-02	5.3E-04	9.3E-02
Biphenyl	92-52-4	B	4.3	0.02	2.0E-03	9.5E-03	1.0E+02	3.3E+00	1.0E+02
o-Dichlorobenzene (1,2-Dichlorobenzene)	95-50-1	B	1000	5	2.3E-05	1.1E-06	2.1E-01	4.1E-04	2.1E-01
Diethyl ketone	96-22-0	B	2300	5	8.1E-06	2.3E-04	2.1E+00	8.2E-02	2.2E+00
Cumene	98-82-8	B	820	5	5.4E-05	2.5E-04	2.7E+00	8.9E-02	2.8E+00
a-Methyl styrene	98-83-9	B	810	5	2.1E-06	2.5E-06	4.0E-02	8.8E-04	4.1E-02
Acetophenone	98-86-2	B	350		2.8E-04	1.9E-03	1.9E+01	6.7E-01	2.0E+01
Nitrobenzene	98-95-3	B	1.7	0.02	2.0E-06		1.8E-02		1.8E-02
Mercury, Aryl & inorganic cmpd	C7439-97-6	B	0.33	0.02		1.3E-04	1.1E+00	4.6E-02	1.1E+00
Antimony & compounds as Sb	C7440-36-0	B	1.7	0.02		4.3E-06	3.8E-02	1.5E-03	4.0E-02
Barium, soluble compounds Ba	C7440-39-3	B	1.7	0.02		1.4E-04	1.2E+00	5.0E-02	1.2E+00
Selenium compounds, as Se	C7782-49-2	B	0.67	0.02		5.7E-05	5.0E-01	2.0E-02	5.2E-01
Total					1.7	2.1	33,010	731	33,741

Notes:
1: ASILS for materials identified in Table 1 do not exist within WAC 173-460-150 or WAC 173-460-160. Table 1 establishes Screening Levels to be applied. Periods of exposure assessment are Annual for "A" TAPs and 24 hours for "B" TAPs.
2: Small quantity emission rate (SQER) periods are Annual for "A" TAPs and per hour for "B" TAPS. "A" TAP 1,2-Dichloropropane is treated with "B" class periods. SQER values for Table 1 materials do not exist within WAC 173-460-080.
3: Single-Shell Tank Retrieval NOC Application of July 22, 2004.
4: C-Farm Stack Relocation NOV Modification Application of September 1, 2005, and as modified May 15, 2007
5: CAS = Chemical Abstracts Service registry number.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950

July 31, 2007

Ms. Shirley Olinger, Acting Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Approval of Criteria and Toxic Air Emissions Notice of Construction (NOC) Application, Hanford Single-Shell Tank Waste Retrieval

References:
1. USDOE-RL Letter 07-ESQ-091, *Request for Modification to Non-Radiological Air Emissions Notice of Construction (NOC) Application for Operation of New Ventilation Systems in AN and AW Tank Farms*, dated May 16, 2007.
2. Ecology Letter, *Determination of Complete Application, Double-Shell Tank Farms*, dated June 7, 2007.

Dear Ms. Olinger:

The United States Department of Energy - Office of River Protection petitioned for approval of a Notice of Construction modification for the ventilation of Hanford Double-Shell Tank Waste operations for the 241-AN and 241-AW Tank Farms (Reference 1). Ecology determined that your application was complete and provided you a proposed ORDER revision (Reference 2). This letter issues approval for ORDER revision and the petitioned operations.

Enclosed is ORDER No. **DE05NWP-001, Rev. 1**, authorizing the proposed operations. The enclosed ORDER may be appealed. Appeal procedures are described in the ORDER. Administrative revision of the Hanford Air Operating Permit, to incorporate provisions of this ORDER as requested in Reference 1, will follow this issuance.

This authorization can be modified, suspended, or revoked, in whole or in part, if Ecology finds that, due to inaccuracies in the petition request, compliance with ambient air quality standards is not ensured.

The proposed ORDER revision was subject to public review and comment from June 25, 2007, through July 25, 2007. No applicable comments were received adverse to the proposed ORDER; however, comment received did alter the numerical concentration standard of carbonyl sulfide from that as proposed. The Responsiveness Summary prepared to address comments will soon be available upon the Ecology website at http://www.ecy.wa.gov/programs/nwp/currentnews.htm.

If you have any questions, contact Doug Hendrickson at 509-372-7983.

Sincerely,

Jane A. Hedges
Program Manager
Nuclear Waste Program

dh/pll
Enclosure

cc: Dennis Bowser, USDOE
Mary Jarvis, USDOE
Nancy Homan, FH
Lucinda Penn, CH2M
Chris Kemp, CH2M
Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN
Susan Leckband, HAB
Ken Niles, ODOE
John Martell, WDOH
Administrative Record: AIR Permits
Environmental Portal

NON-RADIOACTIVE AIR EMISSIONS
NOTICE OF CONSTRUCTION APPROVAL ORDER
CONDITIONS AND RESTRICTIONS

REGULATORY AUTHORITY:

Pursuant to the Washington State Department of Ecology General Regulations for Air Pollution Sources, Chapter 173-400 Washington Administrative Code (WAC), and Controls for New Sources of Toxic Air Pollutants, Chapter 173-460 WAC, Ecology now finds the following:

FINDINGS:

1. The United States Department of Energy proposes to modify their existing facility (Hanford) located in Richland, Washington.

2. A Notice of Construction (NOC) application was submitted on December 16, 2003. The application was found to be complete on August 11, 2004.

3. Hanford is an existing major stationary source that emits more than 250 tons of a regulated pollutant per year.

4. The proposed project consists of installing a replacement primary tank ventilation exhaust system for each of the 241-AN and 241-AW tank farms.

5. An NOC application for modification was submitted on May 16, 2007. The application was found to be complete on June 4, 2007.

6. The proposed modification consists of including thirty-seven toxic air pollutants (TAPs) newly identified or anticipated in primary tank ventilation exhaust systems for each of the 241-AN and 241-AW tank farms.

7. Emissions of criteria pollutants from the proposed project are below the Prevention of Significant Deterioration Significant Emission Rates.

8. Hanford is located in a Class II Area designated as “attainment” for the purpose of NOC permitting for all pollutants.

9. Criteria air pollutant emissions from the proposed project are below the *de minimus* levels in WAC 173-400-110(5)(d).

10. Acceptable Source Impact Levels (ASILs) do not exist for the TAPs propionaldehyde, acetophenone, 4-nitrophenol, carbonyl sulfide, n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine which the proposed project may emit; therefore Ecology has developed Screening Levels for these pollutants as detailed in Table 1**.**

Table 1: Development of Screening Levels			
Toxic Air Pollutant	Chemical Abstracts Service #	Screening Level [μg/m^3]	Basis for Screening Level (S.L.)
Propionaldehyde	123-38-6	160 (24-hr average)	The current ACGIH Threshold Limit Value (TLV) for this material is 20 ppm (TWA). At 25˚C and one atmosphere this TLV is 47,477.6 μg/m^3. Application of WAC 173-460-110(2)(b) divides the TLV by 300 resulting in a value of 158.26 μg/m^3 (24 hr average). Assessment rounded to two significant digits.
Acetophenone	98-86-2	350 (24-hr average)	Applying, under WAC 173-460-110(3)(a), IRIS general toxicity data of this material with RfD of 100 μg/Kg-day, for average adult of 70 Kg weight and inhaled air of 20 m^3, results in a value of: $S.L. = \frac{100\mu g}{Kg \cdot day} \bullet \frac{day}{20m^3 air} \bullet 70Kg = \frac{350\mu g}{m^3} \ (24hr\ average)$
4-Nitrophenol	100-02-7	6.3 (24-hr average)	Applying, under WAC 173-460-110(3)(a), Toxics release toxicity data of this material with RfD of 1.8 μg/Kg-day, for average adult of 70 Kg weight and inhaled air of 20 m^3, results in a value of: $S.L. = \frac{1.8\mu g}{Kg \cdot day} \bullet \frac{day}{20m^3 air} \bullet 70Kg = \frac{6.3\mu g}{m^3} \ (24hr\ average)$
Carbonyl Sulfide	463-58-1	10 (24-hr average)	Based upon carbonyl sulfide metabolysis to hydrogen sulfide and carbon dioxide, the chronic reference exposure level (REL) of hydrogen sulfide is established as the basis for exposure to carbonyl sulfide: $S.L. = REL_{H_2S} = \frac{10\mu g}{m^3} \ (24hr\ average)$
n-Nitrosomethylethylamine	10595-95-6	1.6E-04 (Annual average)	Unit cancer unit risk factor of 6.3E-03/μg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1E+06} \Big/ \frac{6.3E-03\ m^3}{\mu g} = \frac{1.587E-04\mu g}{m^3} \ (Annual\ average)$ Assessment rounded to two significant digits.
n-Nitrosodi-n-propylamine	621-64-7	5 E-04 (Annual average)	Unit cancer unit risk factor of 2E-03/μg/m^3 with estimated continuous inhalation exposure resulting in excess lifetime cancer risk by 1/1,000,000 results in a value of: $S.L. = \frac{1}{1E+06} \Big/ \frac{2E-03\ m^3}{\mu g} = \frac{5.0E-04\mu g}{m^3} \ (Annual\ average)$ Assessment limited to one significant digit.

References:

Propionaldehyde: ACGIH 2004, American Conference of Government Industrial Hygienists, *2004 TLVs® and BEIs®*, Cincinnati, Ohio.

Acetophenone: IRIS, Integrated Risk Information System, http://www.epa.gov/iris/subst/0321.htm

4-Nitrophenol: Bouwes, N. and Hassur, S., *Toxics Release Inventory Relative Risk-Based Environmental Indicators: Interim Toxicity Weighting Summary Document.* Economics, Exposure and Technology Division Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency. 401 M St., SW Washington, D.C. 20460. June 1997. (http://www.epa.gov/oppt/rsei/docs/toxwght97.pdf).

Carbonyl Sulfide: California Office of Environmental Health Hazard Assessment (OEHHA), Chronic Reference Exposure Levels (http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html).

n-Nitrosomethylethylamine, and n-Nitrosodi-n-propylamine: California Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database (TCDB). (http://www.oehha.ca.gov/risk/ChemicalDB/index.asp)

11. TAPs from the proposed project are below the ASILs of WAC 173-460-150 and WAC 173-460-160 or Screening Levels of Table 1.

12. Toxics Best Available Control Technology (T-BACT) for this project has been determined to be operation of the primary tank ventilation exhauster systems not exceeding 4,000 cubic feet per minute (ft^3/min) with moisture de-entrainment, pre-heater, and High Efficiency Particulate Air (HEPA) filtration in service in the treatment train.

13. The proposed project, if constructed and operated as herein required, will provide T-BACT.

14. The proposed project, if operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and Chapter 173-460 WAC, and the operation thereof will not result in ambient air quality standards being exceeded.

15. The project will have no significant impact on air quality.

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction application, and as detailed in emissions estimates and impact and control technology assessments submitted to the Washington State Department of Ecology in reference thereto, is approved for construction, installation, and operation, provided compliance with the conditions and restrictions described below. This ORDER shall be identified as NOC ORDER **DE05NWP-001, Revision 1**.

1.0 GENERAL APPROVAL CONDITIONS

1.1 Effective Date

The effective date of this authorization shall be that as signed in Section 4.0. All references to procedures or test methods shall be to those in effect as of the effective date of this ORDER.

1.2 Emission Limits

1.2.1 Visible emissions from each stack shall not exceed five percent.

1.2.2 Primary tank ventilation exhauster systems for the 241-AN and for the 241-AW double-shell tank (DST) farms shall not exceed 4,000 ft^3/min (standard temperature and pressure).

1.2.3 All TAPs, as submitted in the Permittee's NOC Applications (Table 2), shall be below their respective ASIL or Screening Level of Table 1.

1.2.4 Emissions of ammonia shall not exceed 0.22 pounds per hour (2.77E-02 gram/second) from either primary tank ventilation exhauster system.

1.3 Compliance Demonstration

1.3.1 Compliance with Approval Condition 1.2.1 shall be met by Tier 3 Visible Emissions Survey requirements of the Hanford Air Operating Permit.

1.3.2 Should visible emissions be observed which are not solely attributable to water condensation, compliance with Approval Condition 1.2.1 shall be met by performing an opacity determination utilizing 40 Code of Federal Regulations (CFR) Part 60, Appendix A, Method 9, providing that such determination shall not place the visible emission observer in hazard greater than that identified for the general worker.

1.3.3 Compliance with Approval Condition 1.2.2 shall be demonstrated by stack gas flow and temperature measurement.

1.3.4 Compliance with Approval Condition 1.2.3 shall be met by operating the exhauster systems only when in accord with T-BACT emission controls found for this project.

1.3.5 Compliance with Approval Condition 1.2.4 shall be demonstrated by the conduct of ammonia concentration readings as described in Sections 3.1 and 3.2, and applying these concentration readings with contemporaneous stack flow rate and temperatures to determine instantaneous mass release rate of ammonia.

1.4 Manuals

Existing Operations and Maintenance (O&M) manuals for all equipment, procedures, and controls associated with the proposed activities that have the potential to affect emissions to the atmosphere shall be followed. Manufacturer's instructions may be referenced. The O&M manuals shall be updated to reflect any modifications of the process or operating procedures. Copies of the O&M manuals shall be available to Ecology upon request.

2.0 Notifications and Submittals

2.1 Addressing

Any required notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354

2.2 Schedule

A schedule of installation and operation activities for these exhauster systems shall be submitted within 30 days of issuance of this ORDER.

2.3 Operational Notice

Notification will be made at least ten days prior to initial operation of each of the exhauster systems covered by this ORDER.

2.4 Recordkeeping

Specific records shall be kept on the Hanford Site by the Permittee and made available for inspection by Ecology upon request. The records shall be organized in a readily accessible manner and cover a minimum of the most recent 60-month period. The records to be kept shall include the following:

1. Records of calibration of stack gas flow rate and temperature measurement devices.
2. Exhauster system stack flow rates and temperatures records.
3. Baseline and biannual emission monitoring results required in Section 3.0.
4. Supporting data and calculations to demonstrate compliance as detailed in Section 1.3.5.
5. All monitoring and operations records required to operate and maintain the emission control equipment which implements T-BACT as described in Section 1.0.
6. Laboratory analysis result summaries of any samples undertaken after the effective date of this ORDER from 241-AN or 241-AW tank farm tank headspaces or primary tank ventilation system exhaust which are examined for organic species or other TAPS.

2.5 Reporting

Results of emission assessments conducted pursuant to Section 3.1 shall be submitted to Ecology within 90 days of completion of such assessment.

Identification of any TAP not previously identified within the NOC Application emissions estimate shall be submitted to Ecology within 90 days of completion of laboratory analyses, which verify emissions of that toxic air pollutant from the project.

Visible emission surveys, conducted pursuant to Compliance Demonstration requirement 1.3.2, shall be submitted to Ecology within 30 days of completion of the survey. An assessment of the cause of visible emissions and a report of the maintenance conducted to maintain the subject exhaust system's T-BACT operations shall also be submitted.

3.0 EMISSION MONITORING

Although all toxic air pollutants from this project are estimated below their ASILs or Screening Levels, the following sampling and monitoring are required in order to verify emissions estimates and compliance with Section 1.3, above. The term "each exhauster system," herein, shall mean each individual primary tank ventilation exhauster system within the 241-AN Tank Farm and 241-AW Tank Farm, where an exhauster system may be operated in single-train or dual-train modes.

3.1 Baseline Assessment

In order to assess baseline emission concentrations from each exhauster system, emission levels of ammonia will be assessed:

1. During single train exhauster operation: Between 12 and 24 hours after initiation of single train exhauster operation, ammonia stack concentrations shall be sampled a minimum of three times.
2. During dual train exhauster operation: Between 12 and 24 hours after initiation of dual train exhauster operation, ammonia stack concentrations shall be sampled a minimum of three times.

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

Baseline assessments shall be conducted within 90 days of commencement of operations. Should dual exhauster train operation not be required by the Permittee during this 90-day period, assessment of dual train operation emissions shall be conducted on the first occasion of dual train operation which is anticipated to exceed 24 hours duration.

3.2 Bi-Annual Emission Assessment

In order to maintain reasonable assurance of continued compliance with emission limitations from these exhauster systems, bi-annual assessment of ammonia stack emissions will be conducted beginning the second calendar year following completion of single train exhauster operation assessment under Section 3.1. A minimum of three samples shall be used to assess these emissions.

Ammonia sampling and analysis will be in accord with approved alternative sampling procedures including the use of Draeger tubes to measure stack gas concentration of ammonia providing such devices are spanned to appropriately measure the stack gas ammonia concentration. Stack flow rate and temperature will be applied with the ammonia stack gas concentration to report ammonia emission in terms of grams per second.

4.0 APPROVAL ORDER AND RESTRICTIONS

Operation of the subject primary tank ventilation systems is intended for the storage, treatment, retrieval, and disposal of waste contained in the tanks as described in the NOC application. "Retrieval" for the purposes of this Authorization includes routine mixing and pumping, and lancing as necessary and sufficient for instrument, airlift circulator, saltwell, pump, or mixer placement and for such mixing and pumping, but shall not include aggressive waste movement actions, such as sluicing, undertaken for the objective of Tank or Tank System Closure.

This Authorization may be modified, suspended, or revoked in whole, or in part, for cause including, but not limited to, the following:

1. Violating any terms or conditions of this authorization.
2. Obtaining this authorization by misrepresentation, or failure to fully disclose all relevant facts.

The provisions of this authorization are severable. If any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.

Any person aggrieved by this ORDER may obtain review thereof by application, within 30 days of receipt of this order, to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted thereunder.

DATED at Richland, Washington, this 31st day of July 2007.

DOUGLAS W. HENDRICKSON
STATE OF WASHINGTON
33907
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 4/10/2009

REVIEWED AND PREPARED BY:

Doug Hendrickson, P.E.

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Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1

Material Data			ASIL/ Screening Level [1]	SQER [2]	Emissions Estimate		Emissions Consequence
Chemical Name	CAS [3]	Class	µg/m^3	lb/period	lb/hr	lb/yr	µg/m^3
N-Nitrosomethylethylamine	10595-95-6	A	0.0002	None	7.60E-07	6.66E-03	5.7E-09
1,4-Dichlorobenzene	106-46-7	A	1.5	500	5.30E-06	4.65E-02	4.0E-08
Ethylene dibromide (dibromethane)	106-93-4	A	0.0045	0.5	1.30E-04	1.14E+00	9.8E-07
1,3-Butadiene	106-99-0	A	0.0036	0.5	3.90E-03	3.42E+01	2.9E-05
1,2-Dichloroethane (ethylene chloride)	107-06-2	A	0.038	10	1.10E-08	9.64E-05	8.3E-11
Acrylonitrile	107-13-1	A	0.015	10	5.00E-06	4.38E-02	3.8E-08
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	A	2.5	500	5.80E-05	5.08E-01	4.4E-07
1,4-Dioxane	123-91-1	A	0.032	10	1.70E-02	1.49E+02	1.3E-04
Perchloroethylene (tetrachloroethylene)	127-18-4	A	1.1	500	1.00E-04	8.77E-01	7.5E-07
Polychlorinated biphenyls (PCBs)	1336-36-3	A	0.0045	0.5	2.50E-05	2.19E-01	1.9E-07
Formaldehyde	50-00-0	A	0.077	20	2.50E-05	2.19E-01	1.9E-07
Benzo(a)pyrene	50-32-8	A	0.00048	None	3.00E-05	2.63E-01	2.3E-07
Carbon tetrachloride	56-23-5	A	0.067	20	9.60E-06	8.42E-02	7.2E-08
N-Nitrosodi-n-propylamine	621-64-7	A	0.0005	None	1.91E-08	1.67E-04	1.4E-10
N-Nitrosodimethylamine	62-75-9	A	0.000071	None	2.80E-03	2.45E+01	2.1E-05
Chloroform	67-66-3	A	0.043	10	2.50E-04	2.19E+00	1.9E-06
Benzene	71-43-2	A	0.12	20	1.30E-03	1.14E+01	9.8E-06
Vinyl chloride	75-01-4	A	0.012	10	3.70E-06	3.24E-02	2.8E-08
Acetaldehyde	75-07-0	A	0.45	50	2.60E-02	2.28E+02	2.0E-04
Dichloromethane (methylene chloride)	75-09-2	A	0.56	50	2.50E-02	2.19E+02	1.9E-04
Ethylene oxide	75-21-8	A	0.01	10	3.40E-05	2.98E-01	2.6E-07
Bromoform	75-25-2	A	0.91	50	1.50E-08	1.31E-04	1.1E-10
Heptachlor	76-44-8	A	0.00077	None	7.60E-07	6.66E-03	5.7E-09
1,2-Dichloropropane	78-87-5	A	4	0.02	2.60E-08	2.28E-04	2.0E-10
Trichloroethylene	79-01-6	A	0.59	50	7.80E-04	6.84E+00	5.9E-06
N-Nitrosodi-n-butylamine	924-16-3	A	0.00063	None	2.20E-06	1.93E-02	1.7E-08
p-Nitrochlorobenzene	100-00-5	B	2	0.02	1.50E-03	1.31E+01	3.4E-04
4-Nitrophenol	100-02-7	B	6.3	0.02	2.80E-02	2.45E+02	6.4E-03
Ethyl benzene	100-41-4	B	1000	5	2.90E-03	2.54E+01	6.6E-04
Styrene	100-42-5	B	1000	5	3.60E-03	3.16E+01	8.2E-04
Nitric oxide	10102-43-9	B	100	2	1.60E-03	1.40E+01	3.7E-04
Phenyl ether	101-84-8	B	23	0.2	1.20E-04	1.05E+00	2.7E-05
Ethyl butyl ketone	106-35-4	B	780	5	5.10E-02	4.47E+02	1.2E-02
1,2-Epoxybutane	106-88-7	B	20	0.2	1.80E-04	1.58E+00	4.1E-05
Butane	106-97-8	B	6300	5	7.10E-02	6.22E+02	1.6E-02
Acrolein	107-02-8	B	0.02	0.02	1.00E-05	8.77E-02	2.3E-06
Allyl alcohol	107-18-6	B	17	0.2	6.20E-06	5.43E-02	1.4E-06
Methyl formate	107-31-3	B	820	5	1.30E-06	1.14E-02	3.0E-07
Methyl propyl ketone	107-87-9	B	2300	5	2.60E-02	2.28E+02	5.9E-03

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1

Material Data			ASIL/ Screening Level [1]	SQER [2]	Emissions Estimate		Emissions Consequence
Chemical Name	CAS [3]	Class	µg/m^3	lb/period	lb/hr	lb/yr	µg/m^3
1-Nitropropane	108-03-2	B	20	0.2	9.30E-05	8.15E-01	2.1E-05
Vinyl acetate	108-05-4	B	200	2.6	2.80E-06	2.45E-02	6.4E-07
Methyl isobutyl ketone (MIBK)	108-10-1	B	680	5	1.20E-02	1.05E+02	2.7E-03
Isopropyl ether	108-20-3	B	3500	5	2.90E-04	2.54E+00	6.6E-05
Isopropyl acetate	108-21-4	B	3500	5	2.10E-03	1.84E+01	4.8E-04
Methylcyclohexane	108-87-2	B	5400	5	1.80E-02	1.58E+02	4.1E-03
Toluene	108-88-3	B	400	5	2.50E-02	2.19E+02	5.7E-03
Chlorobenzene	108-90-7	B	150	2.6	1.10E-04	9.64E-01	2.5E-05
Cyclohexanol	108-93-0	B	690	5	1.40E-06	1.23E-02	3.2E-07
Cyclohexanone	108-94-1	B	330	5	4.40E-05	3.86E-01	1.0E-05
Phenol	108-95-2	B	63	1.2	2.60E-02	2.28E+02	5.9E-03
Pentane	109-66-0	B	6000	5	4.00E-02	3.51E+02	9.1E-03
Tetrahydrofuran	109-99-9	B	2000	5	6.50E-02	5.70E+02	1.5E-02
Methyl isoamyl ketone	110-12-3	B	780	5	1.30E-04	1.14E+00	3.0E-05
Methyl n-amyl ketone	110-43-0	B	780	5	1.00E-02	8.77E+01	2.3E-03
Hexane (n-Hexane)	110-54-3	B	200	2.6	5.90E-02	5.17E+02	1.3E-02
n-Valeraldehyde	110-62-3	B	590	5	3.20E-03	2.81E+01	7.3E-04
Cyclohexane	110-82-7	B	3400	5	2.40E-02	2.10E+02	5.5E-03
Cyclohexene	110-83-8	B	3400	5	1.40E+00	1.23E+04	3.2E-01
Pyridine	110-86-1	B	53	0.6	4.30E-01	3.77E+03	9.8E-02
Octane	111-65-9	B	4700	5	2.30E-02	2.02E+02	5.3E-03
2-Butoxyethanol	111-76-2	B	400	5	5.50E-01	4.82E+03	1.3E-01
Nonane	111-84-2	B	3500	5	7.40E-03	6.49E+01	1.7E-03
1,2,4-Trichlorobenzene	120-82-1	B	120	2	7.80E-05	6.84E-01	1.8E-05
Diphenylamine	122-39-4	B	33	0.6	1.50E-04	1.31E+00	3.4E-05
Dipropyl ketone	123-19-3	B	780	5	2.40E-02	2.10E+02	5.5E-03
Propionaldehyde	123-38-6	B	160	2.6	6.10E-07	5.35E-03	1.4E-07
Isoamyl alcohol	123-51-3	B	1200	5	7.00E-05	6.14E-01	1.6E-05
n-Butyl acetate	123-86-4	B	2400	5	8.90E-02	7.80E+02	2.0E-02
Tributyl phosphate	126-73-8	B	7.3	0.02	4.90E-02	4.30E+02	1.1E-02
Methylacrylonitrile	126-98-7	B	9	0.02	7.20E-05	6.31E-01	1.6E-05
Dimethyl acetamide	127-19-5	B	120	2	3.30E-05	2.89E-01	7.5E-06
2,6-Ditert. butyl-p-cresol	128-37-0	B	33	0.6	2.10E-02	1.84E+02	4.8E-03
Cresol, all isomers	1319-77-3	B	73	1.2	7.80E-01	6.84E+03	1.8E-01
Xylenes (m-,o-,p-isomers)	1330-20-7	B	1500	5	1.00E-03	8.77E+00	2.3E-04
Ethyl acetate	141-78-6	B	4800	5	2.70E-01	2.37E+03	6.2E-02
Mesityl oxide	141-79-7	B	200	2.6	5.70E-05	5.00E-01	1.3E-05
Heptane (n-Heptane)	142-82-5	B	5500	5	1.60E-02	1.40E+02	3.7E-03
Cyclopentane	287-92-3	B	5700	5	4.30E-04	3.77E+00	9.8E-05
Crotonaldehyde	4170-30-3	B	20	0.2	4.70E-05	4.12E-01	1.1E-05
Carbonyl sulfide	463-58-1	B	10	0.2	4.60E-05	4.03E-01	1.1E-05
Dinitro-o-cresol	534-52-1	B	0.67	0.02	7.90E-06	6.92E-02	1.8E-06

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1

Material Data			ASIL/ Screening Level [1]	SQER [2]	Emissions Estimate		Emissions Consequence
Chemical Name	CAS [3]	Class	µg/m^3	lb/period	lb/hr	lb/yr	µg/m^3
Dichloropropene	542-75-6	B	20	0.2	2.20E-08	1.93E-04	5.0E-09
Methyl isopropyl ketone	563-80-4	B	2300	5	3.60E-02	3.16E+02	8.2E-03
1,1-Dimethylhydrazine	57-14-7	B	4	0.02	5.40E-06	4.73E-02	1.2E-06
2-Hexanone (MBK)	591-78-6	B	67	1.2	7.60E-03	6.66E+01	1.7E-03
Methyl hydrazine	60-34-4	B	1.2	0.02	1.80E-06	1.58E-02	4.1E-07
Methyl isocyanate	624-83-9	B	0.16	0.02	3.00E-05	2.63E-01	6.9E-06
n-Propyl nitrate	627-13-4	B	360	5	2.30E-05	2.02E-01	5.3E-06
Ethyl alcohol	64-17-5	B	6300	5	4.40E-02	3.86E+02	1.0E-02
Acetic acid	64-19-7	B	83	1.2	2.20E-02	1.93E+02	5.0E-03
Methyl alcohol	67-56-1	B	870	5	1.20E-01	1.05E+03	2.7E-02
Isopropyl alcohol	67-63-0	B	3300	5	2.00E-02	1.75E+02	4.6E-03
Acetone	67-64-1	B	5900	5	1.70E-01	1.49E+03	3.9E-02
n-Propyl alcohol	71-23-8	B	1600	5	8.60E-03	7.54E+01	2.0E-03
n-Butyl alcohol	71-36-3	B	500	5	2.60E-01	2.28E+03	5.9E-02
Methyl chloroform (1,1,1-Trichloroethane)	71-55-6	B	6400	5	1.00E-04	8.77E-01	2.3E-05
Methyl bromide	74-83-9	B	5	0.02	5.70E-04	5.00E+00	1.3E-04
Methyl chloride	74-87-3	B	340	5	2.30E-04	2.02E+00	5.3E-05
Methylamine	74-89-5	B	43	0.6	2.80E-08	2.45E-04	6.4E-09
Methyl acetylene	74-99-7	B	5500	5	4.00E-04	3.51E+00	9.1E-05
Ethyl chloride	75-00-3	B	10000	5	1.80E-03	1.58E+01	4.1E-04
Ethylamine	75-04-7	B	60	1.2	1.90E-09	1.67E-05	4.3E-10
Acetonitrile	75-05-8	B	220	2.6	6.40E-02	5.61E+02	1.5E-02
Formamide	75-12-7	B	60	1.2	5.50E-06	4.82E-02	1.3E-06
Carbon disulfide	75-15-0	B	100	2	7.50E-03	6.57E+01	1.7E-03
1,1-Dichloroethane	75-34-3	B	2700	5	9.30E-09	8.15E-05	2.1E-09
Vinylidene chloride	75-35-4	B	67	1.2	5.60E-02	4.91E+02	1.3E-02
Dichlorofluoromethane	75-43-4	B	130	2.6	1.60E-04	1.40E+00	3.7E-05
Chlorodifluoromethane	75-45-6	B	12000	5	4.20E-03	3.68E+01	9.6E-04
Trimethylamine	75-50-3	B	80	1.2	4.60E-03	4.03E+01	1.1E-03
Nitromethane	75-52-5	B	830	5	2.60E-08	2.28E-04	5.9E-09
Propylene imine	75-55-8	B	16	0.2	9.70E-05	8.50E-01	2.2E-05
tert-Butyl alcohol	75-65-0	B	1000	5	5.20E-03	4.56E+01	1.2E-03
Trichlorofluoromethane	75-69-4	B	19000	5	5.20E-03	4.56E+01	1.2E-03
Dichlorodifluoromethane	75-71-8	B	16000	5	5.40E-04	4.73E+00	1.2E-04
1,1,2-Trichloro-1,2,2-trifluorethane	76-13-1	B	27000	5	8.30E-04	7.28E+00	1.9E-04
Dichlorotetrafluoroethane	76-14-2	B	23000	5	1.40E-05	1.23E-01	3.2E-06
Ammonia	7664-41-7	B	100	2	2.20E-01	1.93E+03	5.0E-02
Isobutyl alcohol	78-83-1	B	510	5	3.90E-05	3.42E-01	8.9E-06
sec-Butyl alcohol	78-92-2	B	1000	5	1.20E-04	1.05E+00	2.7E-05
Methyl ethyl ketone (MEK)	78-93-3	B	1000	5	1.50E-01	1.31E+03	3.4E-02
1,1,2-Trichloroethane	79-00-5	B	180	2.6	3.40E-04	2.98E+00	7.8E-05

Table 2: Toxic Air Pollutants for DE05NWP-001, Revision 1

Material Data			ASIL/ Screening Level [1]	SQER [2]	Emissions Estimate		Emissions Consequence
Chemical Name	CAS [3]	Class	µg/m^3	lb/period	lb/hr	lb/yr	µg/m^3
Propionic acid	79-09-4	B	100	2	1.10E-05	9.64E-02	2.5E-06
Acrylic acid	79-10-7	B	0.3	0.02	1.20E-02	1.05E+02	2.7E-03
Methyl acetate	79-20-9	B	2000	5	9.30E-05	8.15E-01	2.1E-05
1,1,2,2-Tetrachloroethane	79-34-5	B	23	0.2	2.50E-05	2.19E-01	5.7E-06
Diethyl phthalate	84-66-2	B	17	0.2	4.80E-05	4.21E-01	1.1E-05
Dibutyl phthalate	84-74-2	B	17	0.2	1.30E-04	1.14E+00	3.0E-05
Hexachlorobutadiene	87-68-3	B	0.7	0.02	4.50E-03	3.94E+01	1.0E-03
Naphthalene	91-20-3	B	170	2.6	7.00E-06	6.14E-02	1.6E-06
Biphenyl	92-52-4	B	4.3	0.02	4.30E-02	3.77E+02	9.8E-03
o-Dichlorobenzene (1,2-Dichlorobenzene)	95-50-1	B	1000	5	6.10E-06	5.35E-02	1.4E-06
Diethyl ketone	96-22-0	B	2300	5	2.80E-05	2.45E-01	6.4E-06
Cumene	98-82-8	B	820	5	3.10E-04	2.72E+00	7.1E-05
a-Methyl styrene	98-83-9	B	810	5	5.20E-03	4.56E+01	1.2E-03
Acetophenone	98-86-2	B	350	5	1.10E-02	9.64E+01	2.5E-03
Nitrobenzene	98-95-3	B	1.7	0.02	1.40E-02	1.23E+02	3.2E-03
Total					5.51E+00	4.83E+04	

Notes:

1: ASILS for materials identified in Table 1 do not exist within WAC 173-460-150 or WAC 173-460-160. Table 1 establishes Screening Levels to be applied (shaded herein). Periods of exposure assessment are Annual for "A" TAPs and 24 hours for "B" TAPs.

2: Small Quantity Emission Rate (SQER) periods are Annual for "A" TAPs and 24-hours for "B" TAPS. "A" TAP 1,2-Dichloropropane is treated with "B" class periods. SQER values do not exist within WAC 173-460-080 for ASILs or Screening Levels below 0.001 µg/m^3.

3: CAS = Chemical Abstracts Service registry number.