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State of Washington

Final Cost-Benefit and Least-Burdensome Alternative Analyses

*Chapter 173-303 WAC
Dangerous Waste Regulations*

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Chapter 173-303 WAC Dangerous Waste Regulations

Updated to Final By

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Executive Summary

This report describes the economic analyses performed by the Washington State Department of Ecology to estimate the costs and benefits of the adopted amendments to the Dangerous Waste Regulations rule (chapter 173-303 WAC). These analyses – the Cost-Benefit Analysis (CBA) and Least-Burdensome Alternative Analysis (LBA) – are based on the best available information at the time of publication. Ecology accepted public comments on these analyses as well as the rule language, and has updated this analysis from the preliminary to reflect changes in the rule language and any changes prompted by relevant public comments.

The adopted rule amendments incorporate:

- Mandatory provisions that Ecology must adopt according to federal statutes.
- Provisions provided by the United States Environmental Protection Agency (EPA) that Ecology chose to adopt.
- Rule amendments initiated by Ecology.

The new federal provisions include alternative processes for managing dangerous waste at academic laboratories, the removal of saccharin from the lists of hazardous constituents and wastes, and alternative treatment standards for carbamate wastes.

Adopted amendments that impact state-only requirements include:

- Establishing a 30-day time limit for special waste accumulated at transfer stations.
- Clarifying appropriate test methods to designate halogenated organic compounds (HOCs).
- Clarifying engineer requirements for independent qualified registered professional engineers (IQRPEs).
- Allowing the use of enforceable documents in lieu of RCRA post-closure permits.
- Provisions of the financial assurance section.
- Removing a section that is in conflict with Public Records Act (PRA).

After evaluating the probable costs and benefits of the adopted rule amendments, Ecology determines that the probable qualitative and quantitative benefits of the adopted rule amendments exceed the probable costs.

COSTS		BENEFITS	
Rule Amendment	PV (1.32%, 20 yrs)	Rule Amendment	PV (1.32%, 20 years)
Transfer Stations	Qualitative. See sec. 3.4	Academic Lab	\$8.8 million
IQRPE	\$245 thousand – \$1.9 million	HOC Testing Method	\$3.4 million
Financial Assurance	\$1.2 million	Enforceable Documents	\$5.8 million
		Efficiency Gains	Qualitative. See sec. 4.5
TOTAL QUANT.	\$1.5 – 3.0 million	TOTAL QUANT.	\$18.0 million

Chapter 1: Background and Introduction

1.1 Introduction

This report contains the economic analyses performed by the Washington State Department of Ecology (“Ecology”) to estimate the costs and benefits of the adopted rule amendments to the Dangerous Waste Regulations (chapter 173-303 WAC). These analyses—the Cost-Benefit Analysis (CBA) and Least-Burdensome Alternative Analysis (LBA) are based on the best available information at the time of publication. Ecology accepted public comments on these analyses as well as the rule language, and has updated this analysis from the preliminary to reflect changes in the rule language and any relevant public comments.

The Washington Administrative Procedure Act (APA), RCW 34.05.328, requires Ecology to evaluate significant legislative rules to “determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the law being implemented.” Chapters 1 through 5 of this document describe our determination in regard to the adopted rule amendments to the Dangerous Waste Regulations rule (chapter 173-303 WAC).

The APA also requires Ecology to “determine, after considering alternative versions of the rule...that the rule being adopted is the least-burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives” of the governing and authorizing statutes. Chapter 6 of this document describes that determination.

1.2 Dangerous waste management in Washington State

The regulations governing dangerous waste in Washington consist of requirements, rules, guidance, and other provisions from both federal and state laws. The Resource Conservation and Recovery Act (RCRA) is the primary federal law dealing with hazardous waste. The United States Environmental Protection Agency (EPA) is the primary federal agency responsible for the various provisions of RCRA. The primary set of rules related to hazardous waste is found in Title 40 (Protection of Environment) of the Code of Federal Regulations (CFR). In particular, 40 CFR Parts 260 through 279 concern hazardous waste. Before turning to the state rules and laws, it is important to note that Ecology uses the term dangerous waste rather than hazardous waste, except when explicitly referring to waste regulated only under the federal program. We follow the same convention throughout this document.

At the state level, the authorizing statute for dangerous waste is chapter 70.105 RCW. The Legislature conferred power to the Department of Ecology to implement the various rules, provide guidance, and enforce the various provisions in Washington. Ecology applied for and received authorization from the EPA to implement RCRA and the related portions of the Federal Code in the state of Washington. As a condition to receive authorization, Ecology must maintain consistency with federal laws and rules. Ecology incorporates the requirements of RCRA into state law chapter 70.105 RCW. In addition, Ecology maintains an additional set of rules that are unique to Washington State. Ecology adopts the federal and state-only requirements into a single

chapter, chapter 173-303 WAC, Dangerous Waste Regulations. Chapter 173-303 WAC provides Ecology with the ability to manage dangerous (hazardous) waste for the protection of the public and the environment.

Ecology operates a “risk-based” regime for dangerous waste management. If the waste poses more of a risk because of the amount or type, facilities face more stringent requirements. Generally speaking, the dangerous waste regulated community consists of four groups:

- Generators (entities that generate dangerous waste)
- Transporters of dangerous waste
- Facilities that treat, store, and dispose (TSDFs) of dangerous waste
- Facilities that recycle dangerous waste

Federal and state rules impact each of these groups to varying degrees. Depending on the waste and process, requirements may overlap for the groups significantly. Generators must follow established procedures to designate waste (determine if the waste is dangerous or not) and follow guidelines specific to each waste and waste stream. The designation of waste helps TSDFs and recyclers to comply with managing and handling requirements based on type of waste managed and handling procedures used. Depending on the type of management/handling procedure used, regulations might consider TSDFs a generator of another type of waste. All generators, TSDFs, and recyclers follow defined procedures when labeling and documenting handling procedures. In addition, each waste travels with a manifest document (or other acceptable documentation) that describes the waste in sufficient detail to allow the recipient to determine the correct procedures used to handle/treat the waste until the waste reaches its final destination.

1.3 Description of the adopted rule amendments

This section describes the adopted rule amendments that require analysis according to the APA. The package of amendments requiring analysis includes rules to adopt federal rules that provide alternative mechanisms for dangerous waste management under RCRA, and amendments initiated by Ecology to amend state-only rules. The new federal provisions include rules related to:

- Academic labs
 - Allowing eligible college and universities with laboratories to choose an alternative process for managing laboratory waste on-site.
- Saccharin
 - Removing saccharin and its salts from list of dangerous constituents, wastes, and substances.
- Carbamate LDR
 - Providing facilities that handle carbamate wastes an alternative standard to use when treating carbamate wastes to meet land disposal restrictions (LDR) treatment standards.

In addition to the federal rules, Ecology is adopting the following amendments that require analysis. Adopted amendments to the state-only requirements include:

- Special waste at transfer stations

- Establish a 30-day time limit for special waste accumulated at solid waste transfer stations.
- Revise Chemical Test Methods (CTM) publication
 - Clarifying appropriate test methods to designate halogenated organic compounds (HOCs).
- Independent qualified registered professional engineer (IQRPE)
 - Clarifying that facilities must use an “independent qualified registered professional engineer” instead of a “qualified professional engineer” (or similar language) for certain dangerous waste regulatory certifications.
- Enforceable documents
 - Adopt federal rules that allow use of enforceable documents in lieu of RCRA post-closure permits.
- Financial assurance
 - 3rd party cost estimates
 - Ensuring that related corporate entities are not considered third parties for cost estimating purposes.
 - Present value
 - Clarifying cost estimates for closure and post-closure financial assurance must be in current dollars, and present value adjustments are not allowed.
 - Financial test
 - Clarifying the financial test and the corporate guarantee are two separate but related options.
 - Tangible net worth
 - Raising the minimum tangible net worth requirement from \$20 million to \$25 million to qualify for use of the financial test or corporate guarantee option.
 - Agreed upon procedures
 - Clarifying financial test and corporate guarantee provisions to allow submission of an “agreed upon procedures” report to fulfill the special report requirement.
 - Increase minimum financial assurance amounts
 - Adjusting the minimum liability coverage amounts.
 - Financial Assurance Corrective Action
 - Adding subsection for corrective action financial assurance.
- Public Disclosure
 - Delete WAC 173-303-905. The section is in conflict with the Public Records Act (PRA).

The adopted rule amendments are described in greater detail in Chapter 2 of this document.

1.4 Reasons for the adopted amendments

The adopted amendments are necessary to maintain consistency with related regulations at the federal level. In addition, Ecology determined the adopted amendments to the state-only requirements increase efficiency at an agency level, which means better protection for people and the environment.

1.5 Document organization

The remainder of this document is organized in the following chapters:

- Chapter 2—Baseline and the adopted amendments: Description and comparison of the baseline (what will occur in the absence of the adopted rule) and the adopted rule requirements.
- Chapter 3—Probable costs of the adopted amendments: Analysis of the types and size of costs we expect impacted entities to incur as a result of the adopted rule.
- Chapter 4—Probable benefits of the adopted amendments: Analysis of the types and size of benefits we expect to result from the adopted rule.
- Chapter 5—Cost-benefit comparison and conclusions: Discussion of the complete implications of the CBA, and comments on the results.
- Chapter 6—Least-burdensome alternative analysis: Analysis of considered alternatives to the contents of the adopted rule.

Chapter 2: Baseline and the Adopted Rule Amendments

2.1 Introduction

In this chapter, we describe the baseline to which the adopted amendments are compared. The baseline is the regulatory context in the absence of the adopted rule.

We also describe the adopted amendments, and identify which requirements will likely result in costs or benefits (or both), and which requirements require analysis under the APA. Here, we address complexities in the scope of analysis, and indicate how costs and benefits are analyzed in chapters 3 and 4 of this document.

2.2 Baseline

The regulatory baseline for this analysis is the existing state rule: Dangerous Waste Regulations chapter 173-303 WAC. This chapter consists of both federal provisions and state-only requirements. Ecology analyzed the elements of the adopted rule amendments that were different than the existing state rule. However, we did not analyze adopted amendments where the adopted rule incorporates the federal laws without change.

2.2.1 Federal laws and rules

The Resource Conservation and Recovery Act (RCRA) is the federal law that regulates hazardous waste at the federal level. RCRA gives EPA the authority to regulate hazardous waste from the "cradle-to-grave," which includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. In 1984, Congress adopted amendments to RCRA that focused on waste minimization, phasing out land disposal of hazardous waste, and corrective action procedures for releases of hazardous waste. The 1986 amendments to RCRA enabled EPA to address environmental problems that will result from underground tanks storing petroleum and other hazardous substances. The primary set of federal rules related to management of hazardous waste is found in Title 40 of the Code of Federal Regulations, Part 260 through Part 279.

EPA delegated enforcement of RCRA to Washington and other states that requested authorization. As a condition of delegated authority, the EPA requires states to incorporate certain provisions of the federal rules and laws in the state rule. In some situations, states must adopt certain of these mandatory provisions of the federal rule by reference with no ability to make amendments. In other cases, the state might incorporate a variation of the federal rule as long as the state rule is as least as stringent as the federal rule.¹ Ecology has incorporated

¹ The Hazardous and Solid Waste Amendments (HSWA) to RCRA are considered "core" regulations to the RCRA program. When EPA promulgates a regulation under HSWA authority that is more stringent than existing federal requirements, that regulation takes effect in all authorized and unauthorized states at the same time. When EPA promulgates a regulation under non-HSWA authority, that regulation takes effect in an authorized state only when that

mandatory provisions of RCRA as articulated in the federal rules found in Title 40 of the Code of Federal Regulations, into chapter 173-303 WAC.

2.2.2 State laws and rules

The authorizing statute for the adopted rule is chapter 70.105 RCW, Dangerous Waste Management. Chapter 70.105 RCW provides a comprehensive framework for the planning, regulation, control, and management of dangerous waste which helps prevent land, air, and water pollution while conserving natural, economic, and energy resources of the state. The statute provides for the prevention of problems related to improper management of hazardous wastes. Another purpose of the statute is to ensure that dangerous waste management facilities are operated safely, and sited to minimize harm to people and the environment. Another major goal of chapter 70.105 RCW is to promote waste reduction and to encourage other improvements by generators in waste management practices. To accomplish these goals, the statute gives the Department of Ecology the authority to enact and enforce regulations relating to management of hazardous wastes and releases of hazardous substances. Ecology implements federal and state laws through chapter 173-303 WAC, Dangerous Waste Regulations, which is the baseline for this analysis.

Chapter 173-303 WAC includes the provisions of the federal rules required by RCRA for authorized states, certain federal provisions adopted by Ecology at its discretion, and provisions initiated by Ecology. Specifically, chapter 173-303 WAC includes provisions related to:

- Designation of dangerous waste
- Reporting of dangerous waste
- Transport of dangerous waste
- Treatment, storage, disposal, and recycling of dangerous waste
- Standards for closure and post-closure of facilities that handle dangerous waste
- Financial assurance requirements

Ecology considers chapter 173-303 WAC the baseline for this analysis.

2.3 Analytic scope

The analysis considers only the probable costs and benefits of adopted rule amendments that differ from the current baseline, and that are made at the discretion of Ecology based on the authorities granted to the agency by the Legislature and the EPA. Required, explicit federal rules are not analyzed.

state adopts it and receives authorization for it. States are not required to adopt less stringent non-HSWA requirements but are expected to adopt those that are more stringent or broader in scope.

2.4 Analyzed requirements

In this analysis, we evaluated the following adopted rule amendments:

2.4.1 *Academic labs*

On December 1, 2008, the EPA finalized an alternative set of generator requirements applicable to laboratories owned by eligible academic entities (Vol. 73 Federal Register 72912). The federal provision addresses hazardous waste generation and accumulation in laboratories at colleges and universities, as well as other eligible academic entities formally affiliated with colleges and universities. Ecology is opting to adopt the provision with the following additional requirements.

First, the adopted rule amendments add an additional labeling requirement for laboratories to include the accumulation start date on the label of the waste accumulation container. The federal rule only requires that the accumulation start date be “associated” with the container (for example, recorded in a computer spreadsheet).

Second, Ecology is adopting state-only unused commercial chemical products as eligible dangerous wastes that can be managed under the laboratory clean-out provisions. EPA’s final rule allows for unused commercial chemical products generated from lab clean-outs not to be counted toward generator status while managed on-site; the state rule extends this allowance to state-only unused commercial chemical products (dangerous waste).

Third, an adaptation requires small quantity generators, who notify Ecology of their participation in the program, to obtain EPA/state identification numbers, if they do not already have one. The federal provision does not have this requirement.

Under the adopted rule, eligible academic entities have the choice of managing their dangerous wastes in accordance with the new alternative regulations or remaining subject to the existing generator regulations.

The adopted amendment will not result in higher compliance costs when compared to the baseline.

The adopted amendment will provide eligible entities the opportunity to adopt alternative methods of managing wastes generated in eligible labs.

This benefit is discussed in Chapter 4.

2.4.2 *Saccharin*

In January 2011, EPA removed U202 (saccharin and its salts) from the RCRA list of hazardous wastes, the RCRA list of hazardous constituents, and also from the list of hazardous substances under CERCLA.² EPA decided to remove Saccharin based on a petition submitted to EPA to

² The adopted federal rule became final on December 17, 2010 (78 Federal Register 78918).

delist saccharin and its salts. In response, EPA evaluated test data from the National Toxicology Program (NTP), from the International Agency for Research on Cancer (IARC), and from its own assessments on saccharin and its salts. Based on the review of this scientific information EPA determined that saccharin and its salts do not pose a present or potential risk of causing toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms.

Ecology is adopting this federal provision by removing Saccharin and its salts from the U-listed dangerous waste (U202) in WAC 173-303-9903 and from the dangerous waste constituents list found in WAC 173-303-9905.

Ecology determined that this adopted rule amendment will reduce compliance costs. However, facilities in Washington do not process or handle considerable amounts of Saccharin and its salts. A review of the amount of saccharin reported to Ecology through the TurboWaste database indicates that saccharin and its wastes are not currently a waste of concern and likely will not emerge as an issue. Assuming this pattern continues, Ecology does not expect the removal of U202 from the aforementioned lists having more than a marginal change in current business practices.

No cost or benefit is included in chapters 3 and 4.

2.4.3 Carbamate LDR

In 1996, the EPA set numerical concentration based land disposal restriction (LDR) treatment limits for carbamate wastes. In addition, EPA added all carbamate waste constituents as Underlying Hazardous Constituents (UHC) in the LDR table of Universal Treatment Standards (UTS). Afterward, EPA confirmed that analytical standards were not readily available for many of the carbamate wastes. Essentially, firms were unable to document compliance with LDR treatment standards. In 2011, EPA provided alternative disposal techniques for carbamate waste and removed carbamate waste constituents as an underlying hazardous constituent in the LDR table of Universal Treatment Standards.³

The adopted rule amendment will allow the use of the best demonstrated available technologies (BDAT) for treating these wastes. Wastewater can be treated using combustion, chemical oxidation, biodegradation, or carbon adsorption. Non-wastewater can be treated by combustion. These will be legally permissible alternatives to the numeric concentration limits for carbamate constituents. In addition, this action will remove carbamate regulated constituents from the table of Universal Treatment Standards, as incorporated by reference in WAC 173-303-140(2)(a).

Ecology determined that this rule will reduce compliance costs by offering generators and TSDF owner/operators flexibility related to the treatment of carbamate waste. However, generators and TSDF facilities do not report high enough amounts of carbamate waste in Washington to experience more than marginal cost-savings. Accordingly, we do not expect generators and

³ On June 13, 2011, the EPA issued a Direct Final Rule (76 Federal Register 34147).

TSDFs to experience an appreciable reduction in compliance costs as a result of this adopted rule amendment.

No cost or benefit is included in chapters 3 and 4.

2.4.4 Special waste at transfer stations

Currently, no time limit exists for storage of special wastes passing through a solid waste transfer station. Special waste means any state-only dangerous waste that is solid only (nonliquid, nonaqueous, nongaseous), that is: corrosive waste, toxic waste, PCB waste, or persistent waste that is not extremely hazardous waste (WAC 173-303-040). Normal procedure is for generators to transfer special waste to a municipal solid waste landfill. However, entities have the option of taking advantage of a rule exemption for special waste and sending it to a transfer station before a solid waste facility. Approximately 147 transfer stations exist in Washington. In 2013, 11 generators sent 16,930,118 pounds of special waste to solid waste facilities. Because of special exemptions in the regulations, Ecology does not track the amount of special waste that passes through transfer stations, and cannot identify the length of time it stays at them.

The adopted rule amendments will establish a 30-day time limit for storage of special waste at transfer stations. A regulatory time limit helps reduce the potential for releases. However, the transfer station operator can apply to the local solid waste permitting agency for a time extension.

The adopted rule amendments will potentially increase costs for transfer stations. Since Ecology does not collect information on the time special waste spends at transfer stations, we do not have the ability to estimate the potential increase in costs to transfer stations. However, the adopted rule amendment might require transfer stations to move special waste to a final destination more frequently than in the past. More frequent trips to the final destination will increase costs and other expenses related to transporting special waste. The size of the transfer station (which determines the capacity to store special waste), distance from a final facility, and price of fuel will influence the increase in costs.

This cost is discussed in Chapter 3.

2.4.5 Update chemical test methods for halogenated organic compounds (HOCs)

The adopted rule amendment clarifies appropriate test methods for designating a waste as persistent for halogenated organic compounds. The regulations require generators to designate a waste as dangerous if it is corrosive, reactive, ignitable, persistent, or toxic. Currently, the regulations allow facilities to use either generator knowledge of the production process or testing to designate waste streams. Because a wide range of HOCs will cause a waste to meet the criteria for persistence, Ecology provides guidance to generators concerning the acceptable testing methods for HOCs. Currently, the guidance provided by Ecology recommends that generators use a general testing method to determine if the waste stream contains HOCs, and then use a variety of different tests to determine the concentration of the different HOCs within the waste.

The EPA maintains a compendium of analytical and sampling methods that have received approval for use in complying with RCRA regulations. The document is titled “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” and is commonly referred by its EPA publication number, SW-846. Ecology maintains a similar document titled “Chemical Testing Methods for Designating Dangerous Waste” (Ecology publication no. 97-407). The Ecology document provides recommendations and guidance for generators to use if the composition of a waste stream is unknown.

Guidance from Ecology currently recommends that generators use either SW-846 Method 9076 or Methods 5050 and 9056 to determine halide concentration for a general evaluation. Currently most generators start with Method 9076. If either Ecology or the generator decides the selected method does not work well, the generator has to use additional tests to determine HOC concentrations.

The adopted rule amendments will simplify testing procedures by reducing the number of tests required to designate halogenated organic compounds (HOCs). Specifically, the adopted rule amendments recommend the use of a testing method (Method 9023) that is capable of determining HOC concentration without additional tests.

We expect the adopted rule amendments will create the opportunity for generators to reduce compliance costs. The adopted rule amendments allow the use of Method 9023, which is better able to determine halide concentration than Method 9076 or Methods 5050 and 9056. Using Method 9023 will reduce the likelihood that generators or Ecology have to use additional test methods, as well.

These benefits are discussed in Chapter 4.

2.4.6 Independent Qualified Registered Professional Engineer (IQRPE)

The adopted rule amendments clarify that treatment, storage, and disposal facilities must use an “independent qualified registered professional engineer (IQRPE),” instead of a “qualified professional engineer” (or similar language) for certifications. Specifically, the adopted rule amendments will require the use of an IQRPE to certify:

- Staging piles
- Surface impoundments (dikes, liner systems, technical data)
- Waste piles (waste pile liners, containment systems)
- Land fill liners

EPA’s 2006 Burden Reduction Initiative Rule modified RCRA to allow use of non-independent or in-house professional engineers (PE) for certification purposes. However, the 2009 amendments to chapter 173-303 WAC retained the requirement that IQRPEs be used. With this adopted rule amendment, Ecology seeks to clarify that facilities use an IQRPE in almost all situations where professional engineer certifications are required. This change maintains consistency with other chapter 173-303 WAC requirements where an IQRPE must be used.

We expect that this will increase costs on a per project basis. The treatment, storage, and disposal facilities in Washington don't operate at a scale that will require frequent construction projects. In addition, the facilities already employ IQRPEs to perform many certification functions. The adopted rule amendments will result in increased costs only to the extent that it might increase additional billable hours for existing IQRPEs.

This cost is discussed in Chapter 3.

2.4.7 Enforceable documents

Currently, state and federal requirements dictate how owners/operators handle dangerous waste facilities during operation and after closure. The adopted rule amendments incorporate federal rules⁴ that allow the use of enforceable documents in lieu of RCRA post-closure permits. The adopted rule will allow interim status facilities to use Model Toxics Control Act (MTCA) enforceable documents, such as agreed orders, in place of a RCRA post-closure permit.

Potentially, the regulatory option of using an enforceable document in place of a RCRA post-closure permit will eliminate the need for many interim-status facilities to apply for a post-closure permit. Accordingly, we expect that this change will likely reduce compliance costs in the future where an entity is able to avoid post-closure permits.

This benefit is discussed in Chapter 4.

2.4.8 Financial assurance

Ecology is adopting rule amendments to the financial assurance section of the dangerous waste regulations, WAC 173-303-620. Generally, the financial assurance regulations apply to facilities that treat, store, dispose of, or recycle dangerous wastes. The financial assurance requirements dictate that facilities establish financial instruments that ensure the facilities have adequate financial resources to clean up and maintain facilities in the case of corrective action, closure, and post-closure. The financial assurance provisions allow facilities to use one of the following mechanisms:

- Trust fund
- Surety bond
- Letter of credit
- Insurance
- Financial test
- Corporate guarantee

The financial assurance regulations dictate how facilities calculate the estimates for closure and post-closure, which is the basis for determining the amount of financial assurance required for each facility.

⁴ (63 Federal Register 204)

In addition, the regulations establish minimum liability coverage amounts for treatment, storage, and disposal facilities and recycling facilities to compensate third parties in case of accidents. The liability coverage regulations dictate that these facilities provide third-party liability coverage covering bodily injury and property damage for “sudden accidental occurrences” such as a fire or explosion. However, only those facilities that include land-based waste management units (i.e., surface impoundments, landfills, land treatment units, some miscellaneous disposal units) are required to maintain equivalent liability coverage for “non-sudden accidental occurrences,” such as a leaking underground tank. Facilities have the option to use any one of the instruments acceptable for financial assurance to demonstrate liability coverage. Facilities also have the option to combine sudden and non-sudden coverage in a single financial instrument if they are required to have both types of coverage.

The adopted rule amendments include the following provisions:

Third party estimates

The intent of the underlying regulation is to ensure that the facility’s cost estimate and the resulting financial assurance amount fully captures all costs that might be incurred for facility’s closure, post-closure, or corrective action activities. The purpose of the adopted rule amendment is to further ensure a true third-party cost by disallowing the use of cost estimates from sibling corporations and unrelated companies that share common owners.

We do not expect that this change will increase costs for facilities. Ecology already incorporates the majority of this adopted rule amendment into Agreed Orders and Consent Decrees for corrective action sites.

No cost or benefit is included in chapters 3 and 4.

Present value

The adopted rule amendment reiterates the requirement that facilities prepare and present cost estimates for closure and post-closure financial assurance based on current dollars, rather than applying present-value calculations to the estimates prior to submittal.

The adopted rule amendment deals with the process used by facilities to estimate costs associated with closure and post-closure financial assurance. The current regulations require that facilities present estimates based on current dollars and without adjustment for inflation or other factors. However, due to perceived ambiguity in the state and federal regulations related to the term current dollars, facilities have submitted estimates after discounting the current dollar value. Ecology does not accept the use of discounting or other techniques that result in present value derivations for financial assurance estimates because the adjustment will result in lower amounts set aside for closure and post-closure situations.

Ecology does not expect that this change will increase compliance costs because the rule already requires the use of current dollars. In other words, Ecology is using its discretion to clarify the underlying federal and state regulations, which will reduce compliance costs by simplifying the closure process for facilities, by reducing calculations and corrections.

This efficiency benefit is discussed in Chapter 4.

Financial test

Currently, the dangerous waste rules provide facilities with the option to use a corporate guarantee or financial test to establish financial assurance for closure and post-closure of facilities. The adopted rule amendment will clarify that the financial test and the corporate guarantee are two separate options. There are currently a number of places in the regulations that refer to the “financial test and corporate guarantee” option for financial assurance. The financial test option and corporate guarantee option are separate but related options. The regulations only require that entities submit documents for one option, not both. The adopted rule amendment seeks to eliminate possible confusion.

We do not expect that this change will result in costs or cost-savings. The adopted rule amendment makes explicit that companies only have to submit documents for one option, not both.

No cost or cost-savings is included in chapters 3 and 4. This amendment contributes to efficiency improvements discussed in Chapter 4.

Tangible net worth

The adopted rule amendments will raise the minimum tangible net worth requirement from \$20 million to \$25 million to qualify for use of the financial test or corporate guarantee options. The adopted rule amendments raise the tangible net worth requirement to keep pace with inflation as defined in the regulations.⁵ The adopted rule amendment only applies to those facilities that choose to use the corporate guarantee or financial test to provide financial assurance.

Ecology does not expect that this change will impact facilities that currently use the financial test or corporate guarantee option to provide financial assurance. Further, since the requirement to provide financial assurance generally only applies to treatment, storage, and disposal facilities or other facilities entering into closure or post-closure, Ecology does not expect entry of a new facility that provides treatment, storage, or disposal given the requirements to site and operate such a facility.

However, in theory, this change has the potential to increase costs. For example, a facility chooses to use the financial test or guarantee option to avoid the cost of obtaining a financial instrument from a third-party, such as a bank. In theory, a firm with a current net worth of between \$20 million and (up to but not including) \$25 million will lose the ability to use a corporate guarantee or financial test. Losing the ability to use the financial test or corporate guarantee will force the firm to incur costs to provide financial assurance. Such a facility is not indicated by existing facilities, and is therefore not likely to come into existence in the state in the next 20 years.

Based on Ecology’s past experience, we don’t expect this adopted rule amendment to impact facilities currently in the financial assurance program or other potential firms because of the high

⁵ WAC 173-303-620 dictates the use of an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product or Gross Domestic Product as published by the United States Department of Commerce. This information is provided by the United States Bureau of Economic Analysis (BEA) in the National Income and Product Accounts Tables.

likelihood that no facilities will enter the universe of treatment, storage, and disposal facilities in Washington.

No cost or benefit is included in chapters 3 and 4.

Agreed upon procedures

Federal rules require a negative assurance financial report from a certified public accountant attesting to the accuracy of the financial documents. Due to Certified Public Accountant (CPA) conduct rules, CPAs are no longer allowed to submit this type of report. The adopted rule amendment will enable facility owners/operators requesting the use of the financial test or corporate guarantee to submit an “Agreed upon Procedures” report in place of a “negative assurance” report as required in federal regulations. The adopted rule amendments allow submittal of a type of financial report that is acceptable to EPA.

We consider this adopted rule amendment a procedural change that, from a practical perspective, reflects changes in financial reporting standards exogenous to the dangerous waste rules. In other words, conduct rules for CPAs do not allow the use of a negative financial assurance report. The adopted rule amendment merely provides facilities with an alternative that will meet the requirements established by the EPA. Accordingly, we do not expect that the adopted rule amendment will result in increased costs or cost-savings.

No cost or benefit is included in chapters 3 and 4.

Minimum liability coverage

The adopted rule amendment increases the amount of minimum liability coverage required for facilities. The adopted rule amendment increases:

- The minimum for “sudden accidental occurrences” from \$1 million to \$2 million per occurrence, with an annual aggregate of at least \$4 million (two accidents per year).
- The minimum for “non-sudden accidental occurrences” from \$3 million to \$5 million per occurrence, with an annual aggregate of at least \$10 million (two accidents per year).

The adopted rule amendments will increase the cost of meeting the minimum liability amount for facilities that use financial instruments such as a letter of credit, surety bond, trust fund, or insurance instead of using a self-insurance option.

This cost is discussed in Chapter 3.

Financial assurance corrective action

The adopted rule amendment establishes requirements for corrective action financial assurance. Currently, federal and state financial assurance rules do not have explicit procedures for corrective action sites.

The adopted rule codifies existing EPA guidance and current Ecology practice as it is used in Agreed Orders and Consent Decrees.

No cost or benefit is included in chapters 3 and 4.

2.4.9 Public disclosure

The adopted amendments delete WAC 173-303-905. This section is in conflict with the Public Records Act (PRA; chapter 42.56 RCW). The PRA says a public disclosure request must be responded to within 5 days, but does not require state agencies to furnish public records within a specified time frame. It is possible to interpret the current regulations to require Ecology to provide requesters with dangerous waste records within 20 working days. Also, Ecology may determine that the records do not have to be provided at all.

The adopted rule amendments will reduce potential legal and administrative costs to Ecology by reducing confusion as to the intent of the PRA. Further, by deleting the conflicting WAC 173-303-905, it eliminates the chance misinterpretation that Ecology must provide documents to the requester within 20 days.

No cost or benefit is included in chapters 3 and 4.

Chapter 3: Probable Costs of the Adopted Rule Amendments

3.1 Introduction

Ecology estimated the expected costs associated with the adopted rule, as compared to the baseline described in section 2.2 of this document, and with impacts discussed in section 2.4 of this document. The baseline is what would happen in the absence of the amended rule being adopted.

The costs analyzed here are associated with specific requirements and impacts falling into the following categories:

- Treatment/Storage/Disposal (Transfer stations)
- Independent Qualified Registered Professional Engineer (IQRPE)
- Financial assurance

3.2 Affected entities

The adopted amendments apply to generators and facilities that treat, store, dispose, and/or recycle dangerous waste in Washington State. Regulations stipulate that facilities report the type and amount of waste generated annually. Generators are classified into one of three groups by Ecology depending on the amount of waste generated each year. The largest monthly amount in a year determines the generator status for that year. The regulations define:

- A large quantity generator (LQG) as a facility that reports more than 2,200 lbs/month or have more than 2.2 lbs of acutely hazardous waste (AHW) or extremely hazardous waste (EHW)⁶;
- A medium quantity generator (MQG) as a facility that reports more than 220 but less than 2,200 pounds/month or have less than 2.2 pounds of AHW/EHW;
- A small quantity generator (SQG) as a facility that reports less than 220 pounds a month and less than 2.2 pounds (AHW/EHW).

The regulations require all LQG and MQG to notify Ecology of their existence and obtain an EPA/State RCRA Site ID number (specific to physical location, not business name). In addition, the MQG/LQG report the amount of waste generated each year, for each site, to Ecology via the TurboWaste reporting system. The regulations do not require SQGs to obtain a RCRA Site ID but waste disposal companies might require a Site ID before accepting waste. In sum, each year LQGs, MQGs, and a portion of the SQGs report the amount of waste generated for each Site ID to Ecology through the TurboWaste system.

The dangerous waste regulations require extensive record keeping, which enables Ecology to identify the entities that report generating or handling specific wastes. We used data from

⁶ Chapter 173-303-040 defines acutely hazardous waste as specific waste sources and discarded chemical products that begin with “P” (chapter 173-303-9903). Chapter 173-303-100 (5)(c) (ii) defines an extremely hazardous waste as a waste that exceeds established bioassay limits.

Ecology’s TurboWaste database to help define the number of entities and amount of waste impacted by the adopted rule amendments. Because the dangerous waste regulations provide exclusions and exemptions for small quantity generators, the information presented here does not represent the entire universe of generators or handlers, only those that report the information to either Ecology or the EPA.

The table details the total number of generators, amount of waste, and number of treatment, storage, and disposal facilities reported to Ecology via TurboWaste to Ecology.

Table 1: Overview of regulated community

Year	Generators	Reported Waste (lbs)	TSDFs
1995	2,393	13,865,558,026	28
1996	1,888	14,729,345,475	25
1997	1,749	16,782,086,974	23
1998	1,606	1,005,103,058	15
1999	1,506	525,118,347	21
2000	1,360	491,287,639	21
2001	1,293	425,219,538	17
2002	1,219	338,677,502	15
2003	1,148	260,376,335	15
2004	1,193	377,945,661	14
2005	1,225	361,477,925	13
2006	1,220	282,465,134	13
2007	1,224	427,270,631	14
2008	1,348	367,221,781	14
2009	1,197	709,207,119	11
2010	1,154	635,286,886	13
2011	1,160	757,806,610	12
2012	1,203	613,829,686	12
2013	1,178	600,019,298	12

Since the dangerous waste regulations create a system covering dangerous wastes from the time they are created through the end of their lifecycles, the impact of the adopted rule amendments falls to the specific entities that generate or handle a particular waste. Accordingly, while Table 1 includes information on the broader universe of generators and treatment, storage, and disposal facilities, we used the TurboWaste database and other sources where appropriate to determine how many of the reported facilities each of the adopted rule amendments will impact. We report those figures in each section.

In Chapter 2, we determined three adopted rule amendments are likely to increase costs. The costs arising from these adopted rule amendments impact different parts of the regulated community:

- The time limit on storing special waste at transfer stations impacts those transfer stations that accept special waste.
- The requirement to use an IQRPE for certification impacts treatment, storage, disposal facilities.
- The adopted rule amendments to increase minimum financial assurance amounts only impacts treatment, storage, disposal and dangerous waste recycling facilities that do not use a financial test or corporate guarantee as financial assurance.

We discuss each of the adopted rule amendments and the probable costs below. We present the most conservatively large estimate of costs in these estimates.

3.3 Discounting and present values

We use a discount rate to convert future costs and benefits to present values, to be able to compare total future value streams.

Typically, we use an average historic discount rate based on the rate of return on US Treasury I-Bonds, as these rates are both risk-free and adjusted for inflation. The current discount rate used for these calculations is 1.32 percent, based on I-Bond rates between September 1998 and June 2014.

3.4 Special wastes at transfer stations

The costs associated with the establishment of a 30-day limit for special wastes at transfer stations will accrue to transfer stations. The adopted rule amendments will increase transportation costs for transfer stations that currently store special waste longer than 30 days. The exact cost will depend on the size of the transfer station, distance from a final destination such as a solid waste facility, and cost of fuel.⁷

At this time, we do not have access to information that will enable us to estimate the potential cost of the 30-day limit on transfer stations. Generators typically send special waste to final disposal facilities such as a municipal solid waste landfill. However, a provision of the dangerous waste regulations allows the generators to send the special waste to a transfer station prior to the final destination.⁸

Approximately 147 transfer stations operate in Washington.⁹ In 2013, 11 generators reported 16,930,118 pounds of special waste to Ecology via the TurboWaste reporting database. Because

⁷ The size of the transfer station will determine the amount of special waste that transfer stations can store for any length of time.

⁸ Chapter 173-303-073 (2) (e) (i-v) WAC list the requirements for transfer stations to accept special waste. The transfer stations must make specific provisions to receive special waste that are reflected in the operating plan for the transfer station. In addition, the transfer stations must receive approval from the local solid waste permitting authority.

⁹ Ecology's Waste 2 Resources program maintains a transfer station database and provided these numbers.

of special exemptions related to transfer stations and special waste, we do not know how much of the 16,930,118 pounds of special waste went through the transfer stations. We also do not have estimates for the average length of time that special waste stays at transfer stations. Due to the specific definition of special waste used by Ecology, we will not find a suitable proxy in the existing literature. Accordingly, it is difficult to determine how many of the transfer stations the adopted rule amendments will impact (how many actually store special waste) or to what extent the change will impact operations (how much the transfer stations store or how long the special waste is kept).

In theory, though, transfer stations that currently accumulate special waste for longer than 30 days before taking it to the solid waste landfill will experience an increase in transportation costs due to the increased frequency of trips to the final destination. The cost increase will arise from the additional number of times the transfer stations must transport the special waste to final facilities.

Despite the lack of information related to this change, we do feel confident that Ecology has incorporated enough flexibility into the adopted rule amendments to help transfer stations adapt to the change. In particular, the adopted amendment enables transfer stations to apply for an exemption to the 30-day limit. Currently, transfer stations must apply for a permit from the local solid waste permitting authority in order to accept special waste. The cost of the permit to accept special waste varies according to the local regulations concerning solid waste. During the application or renewal process for the local permit to accept special wastes, facilities will have the option to request an exemption from the 30-day time limit on special wastes, if necessary. The permitting process for local solid waste facilities is much less cumbersome than other permitting processes found within the dangerous waste regulations. Ecology expects that asking for an exemption, in and of itself, will not increase compliance costs because of the existing permitting processes used by the local authorities.

3.5 Independent Qualified Registered Professional Engineer (IQRPE)

The cost of hiring an IQRPE depends on the scale and frequency of specific construction projects at treatment, storage, and disposal facilities (TSDFs). Currently, Ecology estimates that 13 TSDFs that would likely be required to use an IQRPE operate in Washington (RCRA Info, 2014). Given the existing regulations regarding location of potential facilities, permitting requirements, and other rules, Ecology considers it highly unlikely that any new TSDFs might begin operation in Washington over the next 20 years.¹⁰

As mentioned in section 2.4.6, the dangerous waste regulations in Washington already require facilities to use IQRPEs for numerous certification tasks. Further, the regulations already require

¹⁰ The number of TSDFs that report to TurboWaste (Table 1 above) and the number of TSDFs, as indicated by NAICS code 562211 (hazardous waste treatment and disposal), that report income to the Washington State Department of Revenue, confirm that, if anything, the number of operating TSDFs facilities is declining somewhat, not expanding. Accordingly, we do not forecast that the adopted rule amendments will impact any other facilities than those that already exist in Washington.

a professional engineer to certify the various projects mentioned in the adopted rule amendments. Accordingly, the adopted rule amendment will not necessarily create new work for existing professional engineers.

Ecology expects that because of the existing requirement to use IQRPEs for numerous certification activities, facilities likely already have a contract with an IQRPE. Accordingly, the increase in compliance costs will depend, in part, on the difference between the salary a company pays the professional engineer and the fee the facility will pay an IQRPE. Because the adopted rule amendment does not require additional tasks for the existing professional engineer, we measure the potential increase in compliance costs by focusing on the potential increase in the cost of each billable hour for the IQRPE.

The adopted rule amendments will add to the list of procedures that require certification by an IQRPE. The likely increase in cost will depend on the scope and the frequency of projects that fall under the adopted rule amendments. In other words, the cost of this adopted rule amendment ultimately depends on the investment/maintenance/operation decisions made by the TSDFs.

Ecology estimated a range that describes the number hours that TSDFs might spend on the certification of the various tasks adopted in the rule amendments. The range includes an estimate of 15 hours for more basic projects (staging piles) to 100 hours to certify more complex projects (landfill).¹¹ Again, it is important to note that, as the regulations currently read, the facilities already need a professional engineer (internal or external) to certify the construction projects. We assume that TSDFs pay professional engineers on staff a salary, which includes adjustments for overhead such as benefits. If the professional engineer employed by the facility is able to perform the certification duties, the adopted rule amendments will increase costs only to the extent that an IQRPE costs more than an internal professional engineer.

To determine an estimate of the rate paid to professional engineers, we used the wages of five types of engineer that are likely to perform the certification of projects as listed in the adopted rule amendments. We used wages for chemical, civil, environmental, industrial, and “all other” engineers from the United States Bureau of Labor Statistics (BLS), May 2013 State Occupational Employment and Wage Estimates for Washington (2014). The range of hourly wages was \$40 to \$47 per hour. The BLS (2014c) estimates that benefits account for 30.5 percent of total compensation in the Pacific region. This means the total compensation for an engineer in Washington State is likely to be between \$58 and \$68 per hour, for engineers likely to be used as IQRPEs.

Given Ecology’s experience working with IQRPEs, Ecology estimates that an average rate charged for certification might reach \$140 per hour on average, which includes overhead.¹² The difference between the salary paid professional engineers who are employees and the rate paid IQRPEs is therefore likely to be between \$72 and \$82 per hour. Multiplying by the range of 15 – 100 hours per project, and assuming one project uses a new IQRPE each year, the annual

¹¹ Estimate based on discussions and estimates made in conjunction with professional engineers on staff at the Department of Ecology.

¹² We consider this high end estimate based on the experience of various professional engineers in Ecology working with their counterparts in the industry.

difference between what facilities will pay a professional engineer who is an employee and an IQRPE would be \$1,080 – \$8,200.

The total estimated cost for all thirteen facilities would likely be in the range of approximately \$14 – 107 thousand annually.

In sum, Ecology estimates that this adopted rule amendment will increase costs to the TSDFs operating in Washington by \$14 – 107 thousand annually over the next 20 years. The present value of this cost at a discount rate of 1.32 percent for 20 years is \$245 thousand to \$1.9 million, which represents the total cost for this amendment that will likely accrue to the TSDFs in Washington under the adopted rule.

3.6 Increase minimum liability amounts

The adopted rule amendment to increase minimum liability coverage amounts will increase the cost of compliance for TSDFs and dangerous waste recycling facilities. Generally, financial assurance minimum liability requirements apply to operating treatment, storage, and disposal facilities and dangerous waste recycling facilities. Currently, 22 facilities must demonstrate minimum liability coverage. Of those, four facilities use the financial test or corporate guarantee option and 18 facilities use liability insurance. The adopted rule amendments will not impact facilities that use the financial test or corporate guarantee option. Ecology expects that those facilities that use an insurance policy to demonstrate liability coverage will experience an increase in compliance costs due to the increase in minimum liability amounts.

Because the financial assurance requirements only apply to active treatment, storage, and disposal facilities and dangerous waste recycling facilities, Ecology does not expect that any new facilities will require financial assurance. That is, given the current regulatory context, it is unlikely that any new TSDFs will locate in Washington. Additionally, the current recycling market appears to be stable and Ecology does not currently expect any new dangerous waste recyclers will enter the market. Ecology is also confident that the firms that use a financial test or corporate guarantee will continue to do so over the time horizon in this analysis. It is possible that a currently active TSDF site or recycler will transition to closure or post-closure status in the next 20 years, which will reduce compliance costs. Since the transition to closure and post-closure program is generally a negotiated process, we do not feel confident forecasting when, if at all, a facility might transition to closure/post-closure status.

Increasing the face value of an insurance policy used to provide minimum liability coverage will increase the cost of using insurance. The cost of insurance depends on the specific wastes handled at a location, location of the facility, the proximity and condition of the surrounding buildings, the financial standing of the insured, and the insurance company.

Ecology does not have access to all of the policy documents needed to determine the term, details, and premiums that the facilities pay for insurance to meet financial assurance.

Accordingly, we contacted several local brokers and financial assurance officers in other states, consulted marketing information from leading providers of environmental insurance, and consulted three studies concerning environmental insurance (Yount and Meyer, 2005a, 2005b, 2006).

Based on the above research, Ecology assumed that increasing the minimum financial assurance amounts for sudden accidental occurrences will increase premiums by \$5 thousand annually and increasing the amount of financial assurance for combined sudden occurrence and non-sudden accidental occurrences accidents will cost \$10 thousand annually.

Of the 18 facilities that use insurance to meet their obligation, four provide policies in excess of the current minimums. The remaining 14 facilities may need to purchase additional coverage for sudden accidents at an estimated cost of \$5 thousand each year. This cost would therefore be up to \$70 thousand annually.

Ecology estimates that seven facilities that require non-sudden coverage will choose to self insure, and thus incur a zero incremental cost due to the rule amendments (instead of \$10 thousand by insuring through a third party).

In addition to information about insurance premiums, we also considered the price of alternative mechanisms that a facility in need of financial assurance might consider instead of insurance. From discussions with past and present facilities in the financial assurance program and regulators at EPA and in other states, Ecology also understands that the cost of surety bonds is frequently similar to those for insurance. The remaining options available under the regulations are obtaining a letter of credit from a bank or creating a trust fund with a bank or other acceptable trustee. Both of these options will likely be far more expensive than either an insurance policy or a surety bond. Therefore, we do not expect any business will elect to use either of these options as a result of the adopted rule.

In sum, Ecology estimates that the adopted rule amendment will increase costs to facilities using liability insurance to provide sudden accidental occurrence financial assurance by \$70 thousand annually over the next 20 years. The present value of \$70 thousand annually at a discount rate of 1.32 percent for 20 years is \$1.2 million.

3.7 Combined costs

Table 2 below provides a review of the costs we expect will occur. Again, we opted for caution and used the higher end estimates for costs. We also assume that facilities proceed with some type of activity that requires certification from an IQRPE each year. We don't think it is probable that all fourteen entities engage in activities that require an IQRPE.

Table 2: Probable costs

Adopted Rule Amendment	PV (1.32%; 20 yrs)
Transfer Stations	See section 3.4 for qualitative discussion
IQRPE	\$245 thousand – \$1.9 million
Financial Assurance	\$1.2 million
TOTAL QUANTIFIED	\$1.5 – 3 million

Again, though, we emphasize that these costs do not apply to the same sectors of the regulated community. The probable costs from the adopted rule amendment regarding special waste will accrue to transfer stations. We reiterate that we do not have a suitable estimate or proxy to gauge the potential increase in transportation costs for transfer stations. However, the adopted rule amendments provide flexibility for transfer stations that would be likely to store special waste for more than 30 days. In addition, the regulations do not require generators to use transfer stations to store special waste. Accordingly, the increased costs associated with this adopted rule amendment will accrue on a situational basis.

The probable costs of the adopted amendment to use IQRPEs will accrue to treatment, storage, and treatment facilities, as will the probable costs of increased liability requirements. However, it is not obvious that the TSDFs that decide to engage in a project that requires an IQRPE also use insurance to provide minimum liability coverage.

Chapter 4: Probable Benefits of the Adopted Rule Amendments

4.1 Introduction

Ecology estimated the probable benefits associated with the adopted amendments discussed in section 2.4, as compared to the baseline described in section 2.2 of this document. The baseline is what would happen in the absence of the adopted rule. The benefits analyzed here are associated with:

- Reduced compliance costs
- Efficiency gains

4.2 Academic labs

The adopted rule gives eligible entities the opportunity to reduce compliance costs by opting to abide by the alternative set of generator guidelines. The adopted rule amendment will enable eligible entities to:

- Reduce transportation costs to disposal facilities
- Reduce transportation on campus
- Protect students and staff from unnecessary risks due to accumulated waste

The amount of savings depends on the amount and type of wastes generated at the eligible entity, the mode of transportation, and fuel costs.

In 2008, the EPA published a cost benefit analysis of the potential cost-savings that eligible units might accrue. The EPA (2008) estimated an average annual cost-savings of \$3,540, which translates into approximately \$4 thousand in 2014-dollars.¹³

Of the 129 academic institutions in the state, all 129 could have eligible labs.¹⁴ Assuming that all 129 academic institutions will have an eligible lab is the upper bound of the regulated community impacted by this adopted rule amendment.

¹³ United States Bureau of Labor Statistics. 2014. Consumer Price Index Calculator.

¹⁴ <http://www.wsac.wa.gov/colleges-and-institutions-washington>

Table 3: Potentially eligible academic entities

Type of Institution	Number in Washington
Community and technical colleges	34
Public baccalaureate granting colleges and universities	6
Exempt and independent colleges	33
Authorized Institutions	56
TOTAL	129

If all 129 potentially eligible entities realize the average annual cost-savings of \$3,911, the 129 units will save up to \$505 thousand annually. The present value of \$505 thousand annually at a discount rate of 1.32 percent for 20 years is \$8.8 million. The benefits that could accrue depend on participating eligible labs, so the benefit could be any value up to \$8.8 million.

4.3 Halogenated organic compound (HOC) test methods

The adopted rule amendment to simplify testing methods for HOCs has the potential to reduce compliance costs for those generators that do not know the HOC content of a waste stream.

When a waste stream contains one or more HOCs, generators must determine the total HOC concentration based on known concentrations of each HOC. Ecology acknowledges that no single analytical method clearly defines all potential HOCs regulated in Washington State. Accordingly, the adopted rule amendment is an attempt to simplify the process of designating HOCs by offering new methods of testing.

Currently, generators either use accumulated knowledge (previous test results for waste streams) or approved test methods as listed in “Chemical Test Methods for Designating Dangerous Waste” (Ecology, 2009) to designate waste streams. Currently, the regulations suggest that generators use Method 9076, and a combination of other tests such as Method 8260 and 8270. Estimates suggest that a generator using Methods 9076, 8260, and 8270 will experience lab costs of \$595.¹⁵ See Table 4, below, for a break-down of this cost.

Table 4: Examples of testing costs

Method	Estimated Cost
9076	\$45
8260	\$200
8270	\$350

The adopted rule amendments simplify testing and reduce compliance costs by allowing use of one test, Method 9023, as opposed to a combination of tests. The estimated cost of Method 9023 is \$45. Allowing the use of Method 9023 will result in a cost-savings of \$550 per testing event.

¹⁵ Spectra Laboratories (Tacoma, Washington) price list.

The regulations do not require testing every time a waste is produced if the generator knows what the waste contains. Further, the regulations do not require the generators to report which method was used to determine HOC concentrations. Accordingly, we do not have access to data that will allow Ecology to determine the number of testing events each year that will enable generators to experience a cost-savings.

We looked at the number of waste streams that contain HOCs reported to Ecology. In 2013, 753 generators reported HOC waste streams to Ecology via TurboWaste. Since 1995, on average, 702 generators reported HOC waste streams each year. Ecology does not consider it likely that all of the generators that report waste streams actually test for HOC concentrations. Some generators use product knowledge, previous test results, material data sheets, and other information to designate HOCs. We assumed that as many as 50% of the generators actually test the waste streams for HOC concentrations. Accordingly, as a conservative estimate, we use 50% of the average number of HOC waste streams reported to Ecology, and assume all 351 generators tested for the HOCs prior to reporting to TurboWaste.

To calculate the total cost-savings from this adopted rule amendment, we multiply the amount saved by using Method 9023 by 351, which results in potential cost-savings of \$193 thousand annually. Since we do not know which generators actually test for HOCs, we attribute this annual savings to all generators. The present value at a discount rate of 1.32 percent for 20 years is \$3.4 million.

4.4 Enforceable documents

The adopted rule amendment allowing the use of enforceable documents rather than a post-closure permit will likely result in cost-savings arising from the reduction of time required to submit necessary documents. The cost-savings will accrue to interim-status TSDFs that plan to close and must establish plans for post-closure. Currently, this is a negotiated process between facilities, Ecology, and the EPA.

Under the adopted rule, Ecology will choose whether to use a post-closure permit process or an enforceable document, when determining post-closure plans for an interim-status facility. Both choices require extensive initial time and resources to complete on the part of Ecology and the facility. However, Ecology expects the use of enforceable documents initially will require fewer hours for facilities and the agency. Because few facilities have needed to obtain post-closure permits in the past, and the enforceable documents option was not available, we do not have data to base estimates on prior experience.

We assume that the use of enforceable documents means that facilities will not have to reapply for a post-closure permit. The post-closure permit lasts for 10 years. Accordingly, we estimate potential cost-savings based on projected savings from not having to reapply for a post-closure permit in years 10 and 20 after the decision to use enforceable documents.

Ecology considers the post-closure permitting process a subset of the final permitting process. Discussions with permitting staff in Ecology and informal discussions with consultants in Washington that perform permitting work for dangerous waste facilities suggest that the

permitting process will take as many as 640 hours and involve numerous staff from the entity applying for the permit. Accordingly, using the enforceable documents might save each facility 640 hours in years 10 and 20. The 640 hours represents the combined efforts of managerial, technical, and administrative personnel. We consider an average hourly wage of \$100, including overhead, as a reasonable estimate. Using these assumptions, we arrive at a cost of \$64 thousand for each facility to reapply for a permit in year 10 and 20.

Assuming that all ten facilities will accrue these cost-savings, the total cost-savings for the regulated community would reach \$640 thousand annually beginning in year 10.

Washington has as many as ten interim-status facilities that may use the enforceable documents option rather than applying for a post-closure permit. Using the high end of this range, over the next ten years, we expect that, on average, at least one site will need to decide whether to use enforceable documents or the post-closure permitting process per year. If this assumption holds, each entity that uses the enforceable document will experience an initial savings from the reduced work load associated with the enforceable documents. While we do not have data or a similar process to use a proxy to determine the initial cost-savings from using an enforceable document, we assume the cost-savings is positive and more than a minor cost-savings. In addition to the initial savings, facilities will accrue savings of \$640 thousand in year 10 and year 20 after using the enforceable document.

Since we do not have a reasonable basis to gauge the initial cost-savings of using enforceable documents and the time horizon for this analysis is 20 years, we calculated the present value of the potential cost-savings from this adopted rule amendment assuming that facilities do not realize cost-savings until 10 years after the use of the enforceable document. We used cost-savings in year 10-20 of the analysis to determine the present value of the cost-savings if this adopted rule amendment is adopted, which is \$5.8 million. The present value (PV) calculation does not include the expected initial savings from using the enforceable document. In addition, the PV calculation does not account for the savings from avoiding the renewal of the post-closure permit in year 20 for each firm. Accordingly, we consider the PV calculation as understating the potential costs savings of the adopted rule.

4.5 Efficiency gains

The adopted rule amendments help ensure that the cradle-to-grave system of regulations for dangerous wastes remains vibrant in Washington. The adopted rule amendments help ensure the baseline regulatory levels remain as stringent as under the baseline but in a manner that reduces compliance costs.

In particular, the adopted amendments to the financial assurance program, as a whole, will likely result in a more efficient and effective regulatory regime. The adopted amendments will save staff and those entities involved with financial assurance time and resources. For example, prohibiting the use of present value for financial assurance estimates reduces the likelihood that staff or applicants will spend time preparing or processing documents with ineligible calculations. Clarifying that companies must only submit a financial test or a corporate guarantee reduces the likelihood that companies will duplicate effort. While we do not have specific data

related to the amount of time and resources saved by the adopted rule amendments to the financial assurance program, we feel confident that the adopted rule amendments will improve efficiency of program delivery on the part of Ecology and reduce the amount of work necessary to comply with financial assurance requirements.

4.6 Combined benefits

While we feel that the estimated costs presented in the analysis likely overstate the costs, we feel that the estimates of the cost-savings likely understate potential savings.

Table 5: Probable benefits

Adopted Rule Amendment	PV (1.32%, 20 years)
Academic Lab	\$8.8 million
HOC Testing Method	\$3.4 million
Enforceable Documents	\$5.8 million
Efficiency gains	Qualitative. See section 4.5
TOTAL QUANTIFIED	\$18.0 million

Chapter 5: Cost-Benefit Comparison and Conclusions

5.1 Probable costs and benefits of the adopted rule

Ecology estimated the following ranges of costs and benefits of the adopted amendments.

5.2 Estimated costs

As described in Chapter 3, Ecology estimated the following costs associated with the adopted rule amendments.

Table 6: Probable costs

Adopted Rule Amendment	PV (1.32%, 20 yrs)
Transfer Stations	Qualitative. See section 3.4
IQRPE	\$245 thousand – \$1.9 million
Financial Assurance	\$1.2 million
TOTAL QUANTIFIED	\$1.5 – 3.0 million

5.3 Estimated benefits

As described in Chapter 4, Ecology estimated the following cost-savings associated with the adopted rule amendments.

Table 7: Probable benefits

Adopted Rule Amendment	PV (1.32%, 20 years)
Academic Lab	\$8.8 million
HOC Testing Method	\$3.4 million
Enforceable Documents	\$5.8 million
Efficiency gains	Qualitative. See section 4.5
TOTAL QUANTIFIED	\$18.0 million

5.4 Conclusion

After evaluating the probable costs and benefits of the adopted rule, Ecology determines that the probable qualitative and quantitative benefits of the rule exceed the probable costs.

Chapter 6: Least-Burdensome Alternative Analysis

6.1 Introduction

RCW 34.05.328(1)(e) requires Ecology to "...[d]etermine, after considering alternative versions of the rule and the analysis required under (b), (c), and (d) of this subsection, that the rule being adopted is the least-burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated under (a) of this subsection." Where the referenced subsections are:

- (a) Clearly state in detail the general goals and specific objectives of the statute that the rule implements;
- (b) Determine that the rule is needed to achieve the general goals and specific objectives stated under (a) of this subsection, and analyze alternatives to rule making and the consequences of not adopting the rule;
- (c) Provide notification in the notice of adopted rulemaking under RCW [34.05.320](#) that a preliminary cost-benefit analysis is available. The preliminary cost-benefit analysis must fulfill the requirements of the cost-benefit analysis under (d) of this subsection. If the agency files a supplemental notice under RCW [34.05.340](#), the supplemental notice must include notification that a revised preliminary cost-benefit analysis is available. A final cost-benefit analysis must be available when the rule is adopted under RCW [34.05.360](#);
- (d) Determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and the specific objectives stated under (a) of this subsection.

Ecology is required to determine that the contents of the adopted rule amendment are the least burdensome set of requirements that still achieve the goals and objectives of the authorizing statute.

Ecology assessed alternatives to elements of the adopted rule amendments, and determined whether they met the goals and objectives of the authorizing statute. Of those that will meet these objectives, Ecology determined whether those chosen for the adopted rule were the least burdensome.

6.2 Goals and objectives

The authorizing statute for the adopted rule is chapter 70.105 RCW, Hazardous Waste Management Act. The purpose of this statute is to establish a comprehensive statewide framework for the planning, regulation, control, and management of hazardous waste which prevent land, air, and water pollution and conserve the natural, economic, and energy resources of the state. To accomplish this, the Legislature gave Ecology's Hazardous Waste and Toxics Reduction Program the authority to enact and enforce regulations relating to the management of

dangerous wastes and releases of dangerous substances.

The statute is intended to provide for prevention of problems related to improper management of hazardous substances. Another purpose of the statute is to ensure that hazardous waste management facilities are operated safely, and sited to minimize harm to people and the environment. A major goal of the Act is to promote waste reduction and to encourage other improvements by generators in waste management practices.

6.3 Alternatives considered

This section details Ecology's analysis of the various alternatives considered when developing the adopted amendments.

6.3.1 Academic labs

The adopted rule amendments regarding academic laboratories are less burdensome than the baseline dangerous waste regulations. It allows generators optional, easier methods to manage waste within the academic laboratory setting, while maintaining a similar level of protection to current regulations. The adopted rule amendment provides a yearly clean out of lab chemicals without the generator having to count the waste towards their generator status.

The adopted rule amendment varies slightly from the federal rule. Ecology added a requirement to physically attach the accumulation start date onto dangerous waste containers. Directly placing a start date on each container is a visual cue to help ensure that the generator is removing the container from the laboratory within regulatory time limits.

There are also a few other additional state-only paper work requirements for the academic setting. These requirements pertain to academic institutions notifying Ecology of their participation in the academic laboratory regulatory program (known as Subpart K Rules in RCRA). In Washington State, this notification includes obtaining an EPA/State Identification number. The EPA does not require conditionally exempt small quantity generator, Subpart K, notifiers to have an identification number. These paperwork requirements are necessary because of how Ecology's/EPA generator identification system operates. Every generator who uses the system must follow the same requirements.

These adopted rule amendments are the least burdensome because the amendments provide eligible academic entities the opportunity to reduce compliance costs by opting for alternative management practices, while still meeting the goals and objectives.

6.3.2 Saccharin

EPA removed saccharin (waste code U202) from listing as a commercial chemical product. EPA determined that saccharin and its salts do not meet federal hazardous waste criteria. Although states are not required to remove saccharin from their hazardous waste regulations, there is not a reason to keep it in state regulations if it is not regulated at the federal level.

Ecology considered not adopting this federal rule and keeping saccharin as a state-only waste. However, the alternative of keeping saccharin as a state only waste will have required evaluation by generators to determine toxicity, which would have increased compliance costs.

Choosing to adopt the federal rule is the least-burdensome alternative because it reduces compliance costs and meets the goals and objectives of the rule.

6.3.3 Carbamate LDR

Ecology is adopting an optional Land Disposal Restriction (LDR) rule modifying the Universal Treatment Standards for carbamate chemical wastes. This adopted rule amendment allows use of technology based treatment methods instead of numerical testing methods.

Ecology considered not allowing the use of technology based treatment methods. However, EPA found that currently available testing methods were not adequate for determining if LDR concentration limits were met. If this rule is not adopted, it will be difficult to determine if carbamate LDR standards are met, and if the carbamate will be acceptable for landfilling. Accordingly, not adopting the rule will contradict the goals and objectives of the statute.

6.3.4 Special waste at transfer stations

Ecology considered longer storage times for special waste at transfer stations. However, longer storage times increase the likelihood of exposure to potentially harmful waste streams. Accordingly, the status quo will not meet the goals and objectives of the underlying regulations. Accordingly, the adopted rule amendment is the least-burdensome alternative.

6.3.5 Update chemical test methods (CTM)

The Chemical Test Methods guidance was revised in response to confusion over appropriate halogenated organic compound (HOC) test methods. The adopted rule amendments were based on scientifically determining the most appropriate methods for carrying out required HOC testing.

Ecology considered not updating the guidance for allowable test methods. However, the adopted updates provide a more streamlined approach to choosing test methods for HOCs, and provide testing alternatives that will reduce testing costs for generators. Accordingly, updating the test methods is the least-burdensome alternative.

6.3.6 Independent Qualified Registered Professional Engineer (IQRPE)

Ecology is adopting rule amendments pertaining to regulatory requirements for professional engineer certifications at treatment, storage, and disposal facilities (TSDFs). The adopted rule amendments require the use of an IQRPE to certify TSDF construction projects.

These adopted rule amendments are in line with previous rule amendments maintaining the IQRPE requirement, and provide internal consistency in the rules.

As alternatives, Ecology considered further expanding the IQRPE requirement to include:

- Development and implementation of construction quality assurance program (WAC173-303-335 (1) (a));
- Certification of technical data, such as design drawings, specifications, and engineering studies for final facility permits (WAC173-303-806 (4) (a));
- Certification of construction and modification to facilities applying for general permits (WAC 173-303-810 (14) (a) (i)).

However, Ecology determined that the additional bulleted provisions will prove more burdensome as the additional provisions will likely increase compliance costs without providing additional protection. For the other IQRPE rules being adopted, Ecology determined that maintaining the status quo will not meet the goals and objectives of the underlying statutes and rules. Accordingly, the adopted rule amendments are the least-burdensome alternatives.

6.3.7 Enforceable documents

This adopted rule amendment allows facilities to use alternative Model Toxics Control Act (MTCA) documents, such as enforceable documents, in place of a RCRA post-closure permit. Ecology considered maintaining the status quo and not adopting the optional federal rule. However, such an alternative will prove more burdensome. Offering the option to use enforceable documents will likely result in reduced compliance costs for affected entities.

Ecology determined these adopted rule amendments will give more flexibility to both the facilities and Ecology staff in implementing post-closure regulations. Further, Ecology will be able to cost recover staff time spent on a post-closure project. Also, MTCA allows Ecology to do periodic reviews of a post-closure site, whereas the RCRA post-closure permit is only renewed every 10 years. This will help ensure better environmental oversight.

6.3.8 Financial assurance

Adopted rule amendments to the financial assurance rules are mainly to clarify the intent of the regulations or to codify existing practices and guidance (both from Ecology and EPA). For facilities that use the financial test or corporate guarantee option, Ecology is raising the tangible net worth requirement from \$20 million to \$25 million. This change was adopted to keep pace with inflation.¹⁶ Maintaining the status quo will fail to meet the goals and objectives of the underlying rules regarding management of dangerous waste in general, and financial assurance, in particular.

The adopted rule also increases the minimum financial assurance amounts for liability coverage. This change was also made to keep pace with inflation. Ecology considered how other states have dealt with liability coverage, particularly since the minimum liability insurance amounts have not been updated since 1982. Some states have adopted provisions that make it more difficult for TSDFs to be in compliance with financial assurance regulations by disallowing the

¹⁶ Ecology uses the National Income and Product Account tables provided by the BEA to determine appropriate inflation levels for financial assurance requirements.

use of a financial test or corporate guarantee for financial assurance, or requiring facilities to meet minimum financial strength requirements. Other states expanded the financial assurance criteria to include recycling facilities and transfer stations. Ecology considers these alternatives as more burdensome than raising the minimum amount for liability coverage.

Ecology is also adopting rule amendments governing financial assurance at corrective action sites. Currently there are no explicit federal or state financial assurance procedures for corrective action sites. EPA guidance is used instead. The amendments are similar to existing regulations for closure/post-closure financial assurance, and mirror current practices for implementing corrective action financial assurance.

Because the regulations currently do not have explicit corrective action financial assurance procedures, considerable time is spent by Ecology and facility staff in negotiating terms. Having these procedures in rule will greatly reduce time spent on these negotiations. Without these adopted rule amendments, there will be continued confusion and time spent negotiating terms for financial assurance at corrective action sites. Accordingly, adopting new provisions for financial assurance at corrective action sites is the least-burdensome alternative.

In sum, Ecology determined that the adopted rule amendments concerning financial assurance are the least-burdensome alternatives that also meet the goals and objectives of the statute.

6.4 Conclusions

After considering alternatives to the adopted rule, as well as the goals and objectives of the authorizing statute, Ecology determined that the adopted rule represents the least-burdensome alternative of possible rule contents meeting these goals.

References

- American International Group (AIG), Inc. 2014. "Environmental Products Guide." AIG Property Casualty. Accessed August 8, 2014. http://www.aig.com/Industry-Specialization_3171_442588.html.
- Bureau of Economic Analysis, US. 2014. Implicit Price Deflator for Gross National Product or Gross Domestic Product. National Income and Product Accounts Tables. <http://www.bea.gov/iTable/iTable.cfm?reqid=9&step=3&isuri=1&904=2012&903=13&906=a&905=1980&910=x&911=0#reqid=9&step=3&isuri=1&904=2012&903=13&906=a&905=1980&910=x&911=0>.
- Bureau of Labor Statistics, US. 2014a. "2013 State Occupational Employment and Wage Estimates for Washington State." http://www.bls.gov/oes/current/oes_wa.htm.
- Bureau of Labor Statistics, US. 2014b. "Consumer Price Index". http://www.bls.gov/data/inflation_calculator.htm.
- Bureau of Labor Statistics, US. 2014c. Employer Costs for Employee Compensation. Table Seven, "Private Industry, by census region and division, and area." Last modified June 11, 2014. <http://www.bls.gov/news.release/ecec.t07.htm>.
- Department of Ecology, Washington State. 2009. Chemical Test Methods for Designating Dangerous Waste, (Publication #97-407).
- Department of Ecology, Washington State. 2014. TurboWaste.Net. <https://fortress.wa.gov/ecy/turbowaste/Login/Splash.aspx#>.
- Department of Revenue, Washington State. 2014. Detailed Tax Data by Industry and Tax Classification. Accessed July 2014. http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/line_code_detail/default.aspx.
- Environmental Protection Agency, US. 2007. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (Third Edition), Publication # SW-846.
- Environmental Protection Agency, US. 2008. "Assessment of Potential Costs, Benefits and Other Impacts for the Revised Standards Applicable to Generators of Hazardous Waste; Subpart K-Laboratories Owned by Eligible Academic Entities." Economics, Methods, and Risk Analysis Division, Office of Solid Waste. June 30.
- Environmental Protection Agency, US. 2014. RCRA Info. <http://www.epa.gov/enviro/facts/rcrainfo/search.html>.

Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Removal of Saccharin and Its Salts from the Lists of Hazardous Constituents, Hazardous Wastes, and Hazardous Substances, 78 Fed. Reg. 78918 (December 17, 2010) (Amending 40 CFR Parts 261, 268, and 302).

Land Disposal Restrictions: Revision of the Treatment Standards for Carbamate Wastes, 76 Fed. Reg. 34147 (June 13, 2011) (Amending 40 CFR Parts 268 and 271).

Marsh & McLennan Companies. 2013. "Benchmarking Trends: US Environmental Insurance Rates Remain Competitive." Accessed August 8, 2014.
<http://usa.marsh.com/NewsInsights/MarshRiskManagementResearch/ID/32690/Benchmarking-Trends-US-Environmental-Insurance-Rates-Remain-Competitive.aspx>.

Standards Applicable to Generators of Hazardous Waste; Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material at Laboratories Owned by Colleges and Universities and Other Eligible Academic Entities Formally Affiliated With Colleges and Universities, 73 Fed. Reg. 72912 (December 1, 2008) (Amending 40 CFR Parts 261 and 262).

Standards Applicable to Owners and Operators of Closed and Closing Hazardous Waste Management Facilities; Post-Closure Permit Requirement and Closure Process; Final Rule. 63 Fed. Reg. 204 (October 22, 1998) (Amending 40 Code of Federal Regulations (CFR) Parts 264, 265, 270, and 271).

Washington Student Achievement Council. 2014. "Colleges and Institutions in Washington." Accessed June 24, 2014. <http://www.wsac.wa.gov/colleges-and-institutions-washington>.

Yount, Kristen and Peter Meyer. 2005a. "Environmental Insurance Products Available for Brownfields Redevelopment." Report for US EPA. Accessed August 8, 2014.
http://www.epa.gov/brownfields/insurance/enviro_insurance_2006.pdf.

_____ 2005b. Update: State Brownfield Insurance Programs, 2005. Report for the US EPA. Accessed August 8, 2014. <http://www.epa.gov/brownfields/insurance/>.

_____ 2006. State Brownfield Insurance Programs. Report for the US EPA. Accessed August 8, 2014. <http://www.epa.gov/brownfields/insurance/>.

Zurich Insurance Company. 2014. "Z Choice Pollution Liability." Accessed August 8, 2014.
www.zurichna.com/environmental.