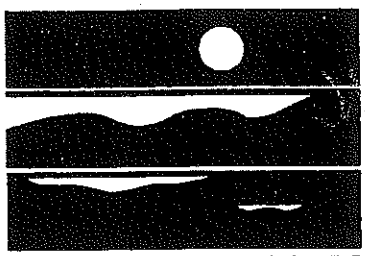

Final
Economic Impact Statement for the Washington State Sediment Management Standards

Chapter 173-204 WAC

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ECONOMIC IMPACT STATEMENT FOR PROPOSED SEDIMENT MANAGEMENT STANDARDS WAC 173-204

Prepared for:

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December 1990

PREFACE

The Washington Department of Ecology (Ecology) is proposing a management process for implementing sediment quality standards pursuant to requirements of the Model Toxics Control Act (Chapter 70.105D RCW), the Water Pollution Control Act (Chapter 90.48 RCW) and the Puget Sound Water Quality Authority Act (Chapter 90.70 RCW). The management standards will establish surface sediment quality standards (Chapters 173-204-300 through 350 WAC) and define procedures for use in source control and cleanup of contaminated sediment sites.

This document provides an analysis of the economic impacts of certain sections of the proposed rule on small businesses. The sections of the rule that are analyzed in this document provide management standards for areas with sediment contamination exceeding the sediment quality standards provided in Sections 173-204-320 through 340 of the new rule. A separate economic impact analysis addresses the preferred approach to developing standards for media other than sediments (ICF 1990).

Two laws require Ecology to perform economic analyses of the proposed rule. First, the Regulatory Fairness Act (Chapter 19.85 RCW) requires that rules that have an economic impact on more than 20 percent of all industrial categories or 10 percent of the businesses in any one industrial category be reviewed and altered to minimize their impact on small business. Under those circumstances, the rule-making agency must 1) reduce, if possible, the economic impact of the rule on small business through one of a number of specified measures, and 2) prepare a small business economic impact statement and file the statement with the Office of the Code Revisor. The Regulatory Fairness Act specifies the measures with which to assess the degree of burden placed on small business by a regulation.

Second, the Economic Policy Act (Chapter 43.21h RCW) requires that the rule-making agency adopt methods and procedures to ensure that economic values are given appropriate consideration in the rule-making process along with environmental, social, health, and safety considerations. The Economic Policy Act does not specify methods for assessing economic impacts and is not limited to small business.

This document is intended to meet the requirements of the Regulatory Fairness Act and the Economic Policy Act as they apply to the proposed rule for managing contaminated sediments. The economic analysis is presented in the following two parts:

Part I. A small business economic impact statement addressing the requirements of the Regulatory Fairness Act

Part II. An analysis of the overall economic impacts of the proposed rule addressing the requirements of the Economic Policy Act.

Both the draft environmental impact statement and the draft economic impact statement were provided to the public for review. Comments received were addressed and responses were summarized in the *Final Environmental Impact Statement Responsiveness Summary Appendix*, issued in conjunction with this document.

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Part II

LIST OF ACRONYMS

AKART	all known available and reasonable methods of prevention, control, and treatment
ARAR	applicable or relevant and appropriate requirement
BAT	best available technology
BCT	best conventional pollutant control technology
BMP	best management practice
BPJ	best professional judgment
BPT	best practicable control technology
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (Superfund)
CFR	Code of Federal Regulations
Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Act
PSDDA	Puget Sound Dredged Disposal Analysis
QA/QC	quality assurance and quality control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SARA	Superfund Amendments and Reauthorization Act
SIC	standard industrial classification
U.S.C.	United States Code
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act

ECONOMIC COMPLIANCE DOCUMENT

for

PROPOSED SEDIMENT MANAGEMENT STANDARDS
CHAPTER 173-204 WAC

ECONOMIC COMPLIANCE DOCUMENT

Small Business Economic Impact Statement
Sediment Management Standards (Chapter 173-204 WAC)

The Washington Department of Ecology (Ecology) is proposing a management process for implementing sediment quality standards pursuant to requirements of the Model Toxics Control Act (Chapter 70.105D RCW), the Water Pollution Control Act (Chapter 90.48 RCW), and the Puget Sound Water Quality Authority Act (Chapter 90.70 RCW). The management standards will establish surface sediment quality standards (Chapters 173-204-300 through 350 WAC) and define procedures for use in source control and cleanup of contaminated sediment sites. Source control includes provisions for sediment impact zones (Chapters 173-204-410 through 420 WAC). Sediment cleanup includes provisions for cleanup standards and a decision process (Chapters 173-204-500 through 580 WAC) and sediment recovery zones (Chapter 173-204-590 WAC). Under certain circumstances, the provisions for sediment impact and recovery zones allow contamination of marine, low-salinity, or freshwater surface sediments to exceed sediment quality standards within a defined range of contamination levels.

This document summarizes the economic impacts of the proposed rule on small businesses in Washington in accordance with the Regulatory Fairness Act (Chapter 19.85 RCW). Under this act, regulations that have an economic impact on greater than 20 percent of all businesses or greater than 10 percent of businesses in any one industrial category must be reviewed and amended to the extent possible to minimize impacts on small businesses. Certain provisions of the rule may place disproportionate economic impacts on small businesses according to the criteria of the Regulatory Fairness Act. Therefore, mitigating factors that would reduce impacts were examined.

Businesses in 34 industrial categories currently hold National Pollutant Discharge Elimination System (NPDES) permits for direct discharge to Puget Sound and may be affected by the proposed management rule. These businesses comprise less than 20 percent of all businesses in Washington. However, the proposed rule may affect greater than 10 percent of all businesses in at least 10 of these industrial categories. These industrial categories include pulp mills, paper mills, paperboard mills, industrial inorganic chemicals, plastics materials and synthetics, industrial organic chemicals, petroleum refining, paving and roofing materials, blast furnaces and basic steel products, and primary nonferrous metals. The proposed rule affects a sufficient percentage of businesses in individual industrial categories to warrant a small business economic impact analysis. Impacts on public entities are considered separately in a broader economic analysis conducted under the Economic Policy Act (Chapter 43.21h RCW).

The small business impact analysis compares the estimated costs of complying with the proposed rule with the number of employees and sales revenue of selected businesses that may be subject to additional discharge requirements or liable for cleanup actions. Total costs for establishing and monitoring sediment impact zones range from approximately $27,100 to $232,100 for a 5-year permit. The major factor influencing compliance costs for the proposed rule is monitoring costs, many of which may be attributable to evolving NPDES requirements. In addition, applicants for sediment impact zones must comply with all known available and

reasonable methods of prevention, control, and treatment (AKART), which are assumed to be equivalent to federal requirements already established in NPDES permits. Therefore, the economic analysis assumes that there will be no additional costs of attaining AKART in complying with the proposed rule. The total compliance costs for sediment impact zones may pose disproportionate costs to small businesses (50 employees or fewer) when compared with costs as a percentage of sales for large businesses. However, the total costs are not significant (1 percent of sales or less) for the industrial categories examined in detail.

For the cleanup decision process, a wide range of low, medium, and high compliance costs is used to reflect a range of actions that may be required for different sites in Puget Sound. At the lower range of costs for the cleanup decision process (including cleanup actions and monitoring), businesses may have total costs of up to approximately $256,000. The middle range of total costs (approximately $256,000 to $10,800,000) also encompasses the range of costs that have been estimated for remedial action and monitoring at eight cleanup sites within a marine Superfund site in Puget Sound. At the upper range of costs for this process, businesses could have total costs of approximately $10,800,000 to $56,000,000. Two major factors affecting these ranges in costs include the type of cleanup action (e.g., capping vs. dredging and upland disposal of contaminated sediments) and the total amount of contaminated sediment at any one site. Order-of-magnitude cost estimates were made using average unit costs of cleanup and assumptions from the record of decision for the Commencement Bay Superfund site. The amount of contaminated sediment that might be expected at a site was estimated by applying the cleanup decision process in the proposed rule to scenarios for 10 sites representing the major kinds of sediment contamination in Puget Sound. Other costs for applications, investigations, reports, and monitoring were estimated using information from Ecology and federal agencies.

For each industrial category, the cleanup cost estimates are compared with the annual sales and number of employees for both small and large businesses. Small businesses in each industrial category examined are projected to have disproportionate impacts compared with large businesses, assuming that comparable cleanup and monitoring costs could be encountered at any given site. Therefore, implementation of the cleanup decision process is considered to have disproportionate impacts on small business.

The proposed rule contains several elements that were designed to mitigate economic impacts of implementing the sediment quality standards, including provisions for temporary variances from sediment quality standards for ongoing discharges, elimination from active cleanup of small, localized areas of contamination or broader areas of minor contamination, and the ability to consider the feasibility of cleanup in setting site-specific cleanup standards (between the sediment quality standard and a minimum cleanup level). A "mixed funding" provision as provided in the Model Toxics Control Act also allows Ecology to provide cleanup funding for small businesses experiencing hardship as a result of the rule. This provision enables case-by-case evaluation of impacts and mitigation that can range, depending on need, from a partial subsidy to full funding of activities. Ecology may also provide technical support to small businesses in complying with the rule and facilitate resource sharing during data collection activities related to monitoring. In addition, Ecology has the discretion to pursue one or many potentially liable parties in enforcing cleanup requirements. This flexibility can lessen the burden on small businesses to the extent that multiple parties may share cleanup costs for a site.

PART I

SMALL BUSINESS ECONOMIC IMPACT STATEMENT

for

PROPOSED SEDIMENT MANAGEMENT STANDARDS CHAPTER 173-204 WAC

Prepared by

PTI Environmental Services

1. INTRODUCTION

1.1 PURPOSE

The Washington Department of Ecology (Ecology) is proposing a management process to implement sediment quality standards defined in Chapter 173-204 WAC and required by Element P-2 of the 1989 Puget Sound Water Quality Management Plan. The purpose of this document is to assess potential impacts of specific sections of the proposed sediment management rule on small business, in accordance with the requirements of the Regulatory Fairness Act (Chapter 19.85 RCW). Analyzed in this report are Chapters 173-204-410 through 420 WAC (sediment impact zones), Chapters 173-204-500 through 580 WAC (sediment cleanup standards), Chapter 173-204-590 WAC (sediment recovery zones), and Chapters 173-204-600 through 610 WAC (sampling plans and recordkeeping).

1.2 THE PROPOSED RULE

Sediment standards for Puget Sound are being adopted under authority of the Model Toxics Control Act (Chapter 70.105D RCW), the Water Pollution Control Act (Chapter 90.48 RCW) and the Puget Sound Water Quality Authority Act (Chapter 90.70 RCW). Additional authorities cited in the rule include the Pollution Disclosure Act (Chapter 90.52 RCW), the Water Resources Act (Chapter 90.54), and the State Environmental Policy Act [Chapter 43.21(c) RCW]. The rule provides an overall management process for implementation of sediment quality standards. Specific sections of the rule analyzed in this report are as follows:

- **Chapters 173-204-410 through 420 WAC (sediment impact zones).** Sediment impact zones may be authorized by Ecology for areas of contaminated sediment resulting from ongoing stormwater, wastewater, or nonpoint sources to a defined maximum level of contamination. Sediment impact zone authorization is available only for discharges provided with all known available and reasonable methods of prevention, control, and treatment (AKART) and best management practices (BMP) as stipulated by Ecology.
- **Chapters 173-204-500 through 580 WAC (sediment cleanup standards.** The sediment cleanup standards define a cleanup decision process for managing contaminated sediments. The process will be used to define and rank sites that will be subject to cleanup, determine site-specific cleanup standards, and authorize sediment recovery zones as necessary.

- **Chapter 173-204-590 WAC (sediment recovery zones).** Sediment recovery zones may be authorized for areas with sediment contamination levels exceeding the applicable standards as a result of historical discharge activities. There are two primary reasons for authorizing moderate levels of contamination in sediment recovery zones. First, the natural accumulation of new sediment over time at a site may reduce contamination in surface sediments to acceptable levels within a reasonable time period. Second, other technical or cost considerations may take priority over immediate cleanup at a site. In such cases, Ecology may defer cleanup actions.

An environmental impact statement has been prepared by Ecology to evaluate alternative requirements of the proposed rule (Ecology 1990). This economic impact statement evaluates potential economic impacts of the preferred alternative documented in the environmental impact statement. This alternative selects the maximum level of contamination to be allowed in sediment impact zones, the cleanup screening level used in defining cleanup sites, and the minimum cleanup level for cleanup actions.

1.3 REQUIREMENTS OF THE REGULATORY FAIRNESS ACT

The purpose of the Regulatory Fairness Act is to minimize the possibility that new rules will place disproportionately high economic burdens on small business. Small businesses as defined by the statute are those that are independently owned and operated with 50 or fewer employees. Small subsidiaries of large businesses are not small businesses under this definition. The statute does not require consideration of economic impacts on individuals or government agencies.

In accordance with the requirements of the Regulatory Fairness Act and December 1989 guidelines for complying with the act, three steps must be taken. First, an analysis must be performed to determine if the regulatory action will have an economic impact on 20 percent of all businesses in the state, or on 10 percent of the businesses in one industrial category [an industrial category is defined as any 3-digit standard industrial classification (SIC)]. Second, a small business economic impact statement must be prepared if there are economic impacts on 20 percent of all businesses or on 10 percent of businesses in one industrial category. The economic impact statement must include the following elements:

- A brief description of the reporting, recordkeeping, and other compliance requirements of the regulation
- A description of the professional services needed by a small business to assist with compliance efforts
- An analysis of the costs of compliance (including costs of additional equipment, supplies, labor, and administration) based on existing data

- A comparison, to the greatest extent possible, of the cost of compliance for small and large businesses (the basis of the cost comparison must be either a) cost per employee, b) cost per hour of labor, c) cost per $100 of sales, or d) any combination of these measurements).

The third required step is mitigation of economic impacts. If there are disproportionate impacts on small business, the impacts must be mitigated within the regulations by adjusting reporting and recordkeeping requirements, establishing performance rather than design standards, exempting small businesses from regulatory requirements, or other measures as allowable and feasible under the law.

1.4 ORGANIZATION OF THE ECONOMIC IMPACT STATEMENT

The remaining sections of this document are organized as follows:

- **Section 2 - Affected Businesses.** A list of industrial categories containing businesses that may be affected by the proposed rule is provided in this section. The procedure and assumptions used to develop this list are also described.
- **Section 3 - Costs of Compliance.** The costs of complying with the relevant sections of the proposed rule are described in this section. A description of the professional services that may be required to assist with compliance requirements is also provided. An appropriate baseline is defined for the allocation of costs resulting exclusively from the proposed rule. The baseline identifies costs attributable to compliance requirements of existing laws and regulations.
- **Section 4 - Comparison of Compliance Costs for Small and Large Businesses.** A determination of whether the compliance costs place a disproportionate burden on small business is made in this section. This determination is based on a comparison of compliance costs for small and large businesses. Compliance costs attributed exclusively to the proposed rule are included in this analysis. Primary (direct) impacts are considered in Section 4. Secondary (indirect) impacts are considered in Part II of this report.
- **Section 5 - Mitigation of Economic Impacts.** Elements of the proposed rule that mitigate economic impacts on small business are described in this section. Additional alternatives for reducing impacts on small business are identified.

2. AFFECTED BUSINESSES

This section identifies industries that are affected directly (primary impacts) or indirectly (secondary impacts) by the proposed Sediment Management Standards rule. Businesses that discharge directly into Puget Sound will experience primary impacts because they will bear the primary costs and receive the primary benefits of the proposed rule. The quantitative analysis provided in Section 4 of this document focuses on primary economic impacts. Several beneficial aspects of the rule are summarized in Section 5 as mitigation measures.

Public entities (e.g., municipalities, port associations) may also be affected by the proposed rule, although an analysis of costs to these entities is not required by the Regulatory Fairness Act. Nevertheless, secondary impacts may be passed on to private businesses that use the services of or otherwise pay fees to public entities. These businesses bear the indirect costs and receive the indirect benefits of the rule. Secondary economic impacts are addressed in Part II of this document, specifically with respect to cleanup costs that may be borne by municipalities and port districts.

For the purpose of this analysis, it is assumed that dischargers having National Pollutant Discharge Elimination System (NPDES) permits include all private businesses that may be directly impacted by the proposed rule. These NPDES permit holders are also assumed to be representative of all dischargers holding state discharge permits. It is unlikely that direct discharges by private businesses not covered by NPDES requirements would have an impact on sediment quality, with the exception of historical unpermitted discharges and current isolated cases of illegal discharges. Because such historical and illegal discharges have affected sediment quality in several areas of Puget Sound, economic impacts on current permitted dischargers may be overestimated.

In the future, the NPDES permit system will be expanded to include storm drains operated by private businesses and municipalities. These discharges can result in sediment contamination. Identification of all privately owned storm drains is beyond the scope of this analysis. However, many if not all existing NPDES dischargers also have storm drains or discharge to municipal storm drains. The largest storm drains in the Puget Sound basin are operated by municipalities. In Part II of this analysis, economic costs to municipalities are considered, including the potential for passing on significant costs to industries that contribute to municipal systems. Such costs passed on to industries result in indirect costs of the proposed rule to private businesses.

A four-step process is used to identify relevant NPDES dischargers. First, all businesses having NPDES permits for discharge into the Puget Sound basin

were identified. A list of these permits was compiled from the NPDES database maintained by the U.S. Environmental Protection Agency (EPA), Region 10. The industrial categories by which relevant NPDES dischargers are classified are listed in Table 1.

Second, businesses discharging only to nonmarine waters of the Puget Sound basin were eliminated from this list. These nonmarine waters include Lake Union, Salmon Bay, Lake Washington, and the Duwamish River upstream of Interstate 5. Discharges to the Duwamish River downstream of Interstate 5 were not eliminated because this region of the river is influenced by salt water during high tide stages.

Third, seven categories of businesses (defined by SIC codes) were eliminated because their current discharges are unlikely to contain toxic organic or inorganic contaminants in sufficient quantity to result in contaminated sediments that would exceed sediment standards. An industrial facility rating system developed by EPA (described in Appendix A) was used in making this judgment. Industries listed under SIC codes that ranked low (i.e., total toxicity number = 1) for toxicity potential were eliminated from the list shown in Table 1. Certain aquaculture operations, such as net pens and shellfish rafts, will soon be required to have NPDES permits and will likely be classified under SIC code 0921, listed in Table 1. These operations are currently not included in the economic impact analysis. However, discharges by these operations are not likely to contain toxic chemicals that are the current emphasis of the proposed rule.

Fourth, facilities operated by tribal nations and publicly owned facilities such as municipal wastewater treatment plants, public electric utilities, and public ports were eliminated because these entities are not businesses for purposes of the economic impact analysis. A total of 43 public and tribal facilities classified under seven 4-digit SIC codes are summarized in Table 2. Several of these facilities are considered in the evaluation of overall economic impacts in Part II of this economic analysis.

As a result of the screening process, 73 dischargers classified under 27 three-digit SIC codes (Table 1) are identified as more likely to be affected by the proposed rule. The 73 dischargers listed in Table 1 constitute less than 20 percent of the 117,922 businesses in Washington (U.S. Department of Commerce 1988). Under this criterion, an economic impact analysis is not required by the Regulatory Fairness Act. However, more than 10 percent of the businesses classified under each of the 10 three-digit SIC codes summarized in Table 3 are potentially affected by the proposed rule. Under this second criterion, an economic impact statement is required by the Regulatory Fairness Act, and economic impacts on small businesses must be analyzed.

TABLE 1. NPDES INDUSTRIES POTENTIALLY AFFECTED BY THE PROPOSED SEDIMENT MANAGEMENT RULE[a]

SIC Code[b]	Industry	Number of Direct NPDES Dischargers to Puget Sound	Number of Firms in State
Industries not likely to be affected (total toxicity number = 1)[c]			
0921	Fish hatcheries and preserves	1	225
2077	Animal and marine fats and oil	1	10
2082	Malt beverages	1	8
2099	Food preparations	1	32
2421	Sawmills and planing mills, general	4	223
2436	Softwood veneer and plywood	2	25
2873	Nitrogenous fertilizers	1	6
TOTAL		11	529
Industries likely to be affected (total toxicity number = 2 to 10)[c]			
2491	Wood preserving	5	15
261	Pulp mills	4	5
262	Paper mills except building paper	3	14
263	Paperboard mills	1	4
281	Industrial inorganic chemicals	9	32
2821	Plastics materials and resins	1	2
286	Industrial organic chemicals	2	9
291	Petroleum refining	7	9
295	Paving and roofing materials	2	19
3312	Blast furnaces and steel mills	2	10
332	Iron and steel foundries	2	24
333	Primary nonferrous metals	3	12
334	Secondary nonferrous metals	1	11
346	Metal forgings and stampings	1	22
3479	Metal coating and allied services	1	22
3731	Ship building and repairing	4	38
3711	Motor vehicles and car bodies	1	5
372	Aircraft and parts	1	92
3743	Railroad equipment	1	--[d]
4011	Railroads, line-haul operating	1	--[d]
423	Trucking terminal facilities	1	11
491	Electrical services	1	101
495	Sanitary services	6	69

TABLE 1. (Continued)

SIC Code[b]	Industry	Number of Direct NPDES Dischargers to Puget Sound	Number of Firms in State
516	Chemicals and allied products	1	126
517	Petroleum and petroleum products	9	250
7542	Car washes	1	123
7629	Electrical repair shops, misc.	1	159
	TOTAL	72	1,184

[a] Sources: *County Business Patterns 1986* (U.S. Department of Commerce 1988); EPA toxicity scores (Gillette, D., 23 April 1990, personal communication); and EPA NPDES database. Some dischargers may have more than one permit or may operate more than one facility. The number of direct NPDES dischargers reflects the total number of facilities at different geographic locations.

[b] Standard industrial classification code.

[c] Total toxicity number for NPDES discharge categories — the number is a relative score reflecting human and ecological toxicity based either on effluent data or EPA's best professional judgment (Gillette, D., 23 April 1990, personal communication). When more than one number is available for an industry classification (e.g., for noncontact cooling water versus electroplating discharges), then the highest of the numbers is used to score the industry. EPA's estimated toxicity score of 1 for sewer systems in general is revised based on known sediment contamination associated with some municipal discharges in Puget Sound.

[d] No data available.

TABLE 2. PUBLIC AND TRIBAL FACILITIES POTENTIALLY AFFECTED BY THE PROPOSED SEDIMENT MANAGEMENT RULE[a]

SIC Code[b]	Industry	Number of Direct NPDES Dischargers to Puget Sound
0921	Fish hatcheries and preserves (tribal)	2
4911	Electrical services	1
4952	Sewerage systems (including tribal)	35
4953	Refuse systems (tribal)	1
5171	Petroleum bulk stations and terminals (port)	1
6514	Dwelling operators, except apartments	1
9711	National security	2
	TOTAL	43

[a] Source: EPA NPDES database.

[b] Standard industrial classification code.

TABLE 3. PERCENTAGES OF FIRMS IN SELECTED SIC INDUSTRIES POTENTIALLY AFFECTED BY THE PROPOSED SEDIMENT MANAGEMENT RULE[a]

SIC Code[b]	Industry	Number of Puget Sound Permitted Dischargers	Number of Firms in State	Estimated Percentage of Firms Affected
261	Pulp mills	4	5	80.0
262	Paper mills except building paper	3	14	21.4
263	Paperboard mills	2	4	50.0
281	Industrial inorganic chemicals	9	32	28.1
282	Plastics materials and synthetics	1	2	50.0
286	Industrial organic chemicals	2	9	22.2
291	Petroleum refining	7	9	77.8
295	Paving and roofing materials	2	19	10.5
331	Blast furnaces and basic steel	2	17	11.8
333	Primary nonferrous metals	3	12	25.0

[a] Source: EPA NPDES database and County Business Patterns 1986 (U.S. Department of Commerce 1988).

[b] The three-digit standard industrial classification codes listed include all industries in which >10 percent of firms in the state are direct NPDES dischargers to Puget Sound.

2.1 BUSINESSES POTENTIALLY AFFECTED BY SEDIMENT IMPACT ZONE REQUIREMENTS

A facility whose ongoing discharge meets AKART and BMP requirements but nevertheless results in sediment contaminant accumulations that exceed sediment standards is required to apply for a sediment impact zone authorization. Based on three scenarios conducted for different conditions in Puget Sound, sediment impact zones may not be warranted for all industries that discharge toxic contaminants to Puget Sound. In particular, discharges into high-energy environments (e.g., where tidal currents are strong) may result in few cases of accumulations of contaminated sediment that exceed sediment standards. In addition, present-day discharges are improved over historical discharges to Puget Sound because of general improvements in source controls. For the purpose of the economic impact analysis, it is assumed that the costs of applying for and monitoring a sediment impact zone would have a potential impact on any business, although only a small proportion of all small businesses currently discharging to Puget Sound may ultimately require sediment impact zone authorizations. Therefore, the number of businesses that may be affected by the proposed rule for sediment impact zones may be overestimated.

2.2 BUSINESSES POTENTIALLY AFFECTED BY THE CLEANUP DECISION PROCESS AND SEDIMENT RECOVERY ZONE REQUIREMENTS

Cleanup costs may be incurred by a broader group of small businesses than those affected by sediment impact zone requirements. Both historical and ongoing sources have contributed to sediment contamination in Puget Sound. For this analysis, it is assumed that the industries identified in Table 1 are representative of the kinds of permitted and nonpermitted private dischargers that have contributed or will contribute to sediment contamination in Puget Sound.

Past contamination of sediments may have resulted from illegal dumping activities, historically permitted discharges that have since been discontinued or changed, unpermitted discharges, or discharges that are now processed through municipal treatment plants. Storm drains and combined sewer overflows have also contributed to sediment contamination. In addition to municipalities and industries, state agencies such as the Department of Transportation are responsible for maintaining public roadways that can contribute stormwater runoff to these systems. Finally, port districts and state resource agencies (e.g., the Department of Natural Resources) are owners or trustees of submerged lands in Puget Sound that have become contaminated, and these agencies participate in dredging activities as part of the normal maintenance of commercial waterways.

3. COSTS OF COMPLIANCE

In this section, compliance requirements are identified for the following sections of the rule for implementing sediment quality standards:

- **Chapters 173-204-410 through 420 WAC** establish applicability criteria and management standards for sediment impact zones
- **Chapters WAC 173-204-500 through 580 WAC** provide a comprehensive cleanup decision process
- **Chapter 173-204-590 WAC** provides applicability criteria and management standards for sediment recovery zones
- **Chapters 173-204-600 through 610 WAC** establish sediment sampling plan and recordkeeping requirements.

In each of these sections an appropriate cost baseline is also defined for quantifying the incremental costs businesses may incur as a result of the proposed rule.

3.1 DEFINITION OF APPROPRIATE COST BASELINE

Existing regulations, rules, and practices were evaluated to identify an appropriate cost basis for the proposed sediment management rule. Although no regulations exist that address sediment management standards, there are many other regulations and practices that require some compliance actions that are also required by the proposed rule. For example, some monitoring requirements of the NPDES permit process are the same as those in the proposed rule. Only incremental costs exceeding the cost baseline established by other regulations and practices are attributed to the proposed rule. These regulations and practices fall into two categories, defined in the following sections.

3.1.1 Baseline 1

Baseline 1 consists of all federal and state regulations under which a small business economic impact statement or formal review of the need for the rule have been undertaken, as required by the Administrative Procedures Act (Chapter 34.05 RCW). These regulations, described in Sections 3.3 through 3.5, constitute the legally required baseline for economic impact analysis under the Regulatory Fairness Act. Therefore, compliance costs under the proposed rule that exceed those of Baseline 1 are used to determine disproportionate economic impacts discussed in Section 4.

3.1.2 Baseline 2

To provide an alternative estimate of the increment of economic impact caused by the proposed rule, a second category of regulations and practices is identified as a cost baseline. Baseline 2 includes all regulations in Baseline 1 plus existing regulations and practices and proposed rules that have not been through the state process for determining economic impacts and the need for a formal review. Baseline 2 provides a more realistic basis than Baseline 1 for assessing the incremental costs of compliance with the proposed rule. Baseline 2 is used in Section 4 to make an alternative qualitative comparison of compliance costs.

Federal requirements and existing state regulations and practices account for most costs incurred in sediment cleanup. The proposed rule facilitates cleanup that might not otherwise take place, even though cleanup authority is established under alternative rules and regulations. Therefore, quantitative analyses using the total cost of compliance under the proposed rule are provided in Section 4 to illustrate the total impact relative to the incremental impact of the proposed rule. This quantitative analysis provides an estimate of the maximum economic impact of the proposed rule.

3.2 COST ASSUMPTIONS

When feasible, sediment cleanup costs associated with the requirements of the baseline rules and practices are calculated. The net economic impact of the proposed rule is estimated by excluding the baseline compliance cost from the overall costs of the proposed rule. For each evaluation of impacts, the following factors are considered:

- The required completion time
- The necessary level of expertise
- The average cost of any necessary legal, accounting, technical, consulting, or other professional services
- The initial or one-time adjustment costs
- The cost of any additional assets needed for compliance.

The cost estimates are calculated from the individual compliance requirements for the major components of the rule. Costs for each of these components are described in the following sections. Some costs are expressed as estimates of the average costs per unit area affected by the rule. Other costs are assumed fixed for all dischargers incurring compliance costs. Private businesses are expected to incur only a portion of the total costs of sediment cleanup. The following assumptions are made concerning allocation of costs:

1. Total costs of sediment cleanup include:

   - Costs associated with contamination from current discharges (except costs of pretreatment, which are part of attaining AKART for an effluent; these costs are not attributed to the proposed rule)
   - Costs recovered by the state for cleanup of sites contaminated by historical discharges
   - Public costs associated with cleanup of contamination from municipal discharges and stormwater runoff (e.g., from highways), and management of submerged lands
   - Costs associated with routine handling of dredged materials in navigable waterways
   - Public costs that cannot be recovered from a liable party.

2. Public funds from the state general fund or toxics control account are used for initially identifying contaminated sites through a hazard assessment. These funds may be needed to pay for the state's portion of program development and implementation, cleanup, and potentially, restoration of natural resources.

3. Private costs of the cleanup decision process include a) the cost of gathering additional data not required for an initial hazard assessment, and b) the cost of conducting a cleanup study including a work plan, study report, and cleanup decision document. Other costs may include the cost of an aquatic lands lease for sediment impact and recovery zones and costs of bonds or for monitoring to provide assurances of compliance. The costs of cleanup and routine monitoring are the major costs of compliance, which are largely attributable to existing laws and regulations.

4. Requirements for cleanup of a contaminated sediment site pursued through authority of the Model Toxics Control Act are intended to be at least as stringent as cleanup requirements under the National Contingency Plan. Cleanup under authority of the Model Toxics Control Act may be pursued at sites at which a potentially liable party is recalcitrant or at complex sites where several potentially liable parties have been identified (e.g., within the boundaries of federal Superfund sites at Commencement Bay and Harbor Island).

5. Cleanup of a contaminated sediment site pursued through authority of the Water Pollution Control Act does not necessarily require compliance with the National Contingency Plan, which implements the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). More flexibility in determining the final

cleanup decision is possible, and voluntary cleanup actions are encouraged.

Specific cost assumptions used to quantify compliance costs for sediment impact zones are summarized in Appendix B.

3.3 COSTS OF COMPLIANCE FOR SEDIMENT IMPACT ZONES

If the ongoing stormwater or wastewater discharge activities of a discharger cause contamination of surface sediments exceeding the sediment quality standards established in Chapters 173-204-320 through 340 WAC, the discharger is required to apply to Ecology for sediment impact zone authorization. Authorization will be granted only to a discharger already using AKART and BMP (as stipulated by Ecology) in connection with its discharge activities. If sediment impact zone authorization is required, the rule requires a discharger to:

- Submit an application for a sediment impact zone (minimum costs estimated at $600 to $10,000 for NPDES-permitted facilities)
- Monitor discharge activities (ranging in total cost from approximately $27,100 for a single collection event at a small site to $232,100 for two collection events and long-term sediment trap studies at a large site with multiple sources of contamination) (see assumptions presented in Appendix B)
- Maintain sediment sampling plans and other appropriate records (estimated at approximately $1,500).

These total compliance costs, ranging from approximately $27,100 to $232,100 for a 5-year permit period, are summarized in Table 4 and discussed in the following sections.

3.3.1 Application

Application for a sediment impact zone will bring a discharger's activities into interim compliance with the requirements of the new rule. Sediment impact zone applicants must include the following information in the application [Chapters 173-204-415(2) through 173-204-415(4) WAC]:

- Legal description and names and addresses of property owners (approximately $100 for a title search)
- Design information (including $500 to provide existing information plus up to $10,000 for collection, analysis, and reporting of four sediment samples; costs could be lower at small sites or higher depending on the availability of existing information and site-specific requirements)

TABLE 4. COMPLIANCE COSTS FOR SEDIMENT IMPACT ZONES

Activity	Maximum Estimated Cost ($)[a]		
	Low	Medium	High
Application	600	5,600-10,600	5,600-10,600
Maintenance monitoring	23,900	47,800	168,850
Modifications and renewals	100	100	15,100
Sampling and testing	1,000	5,000	36,000
Recordkeeping	1,500	1,500	1,500
Total incremental costs	**27,100**	**60,000-65,000**	**227,100-232,100**

[a] Costs calculated for low (small sites), medium (medium sites), and high (large, complex sites) where applicable.

- Other information as determined necessary by Ecology (site-specific costs are not included in this analysis).

Ecology is required to use reasonable methods to notify all affected property owners of the application for a sediment impact zone. The discharger must provide the legal description of the property and names and addresses of all legal property owners to facilitate Ecology's notification efforts. Reliable means of obtaining this information, such as a title search, must be used by the discharger to ensure that Ecology receives the required information.

Design information will be used by Ecology to determine the preferred location of the impact zone and degree of effects that will be allowed from discharge activities. Information supplied by the discharger will be used to run the computer models CORMIX and/or WASP4. Results of modeling will be used to estimate the impact of the discharge on the receiving water and surface sediment quality for a period of 10 years from the date of application or the starting date of the discharge, whichever is later. The data required to run the models include:

- Data reports and analytical results of all samples of wastewater or stormwater, receiving water, and surface sediments collected by any party if the data relate to the potential effects of the discharge
- Data reports and analytical results that may identify alternative chemical and biological effects of the discharge on the receiving water and surface sediments
- Data reports and analytical results that may identify areal distribution of discharged matter and location alternatives for the sediment impact zone
- Data reports and analytical results from application of CORMIX, WASP4, or other computer models to the discharge data.

It is assumed that a discharger applying for a sediment impact zone at a currently permitted facility (under NPDES or state permit) will rely on existing effluent and receiving water studies and will need only to perform a chemical analysis of sediments. For one sediment sample, collection, analysis, and reporting costs could range from $2,000 to $5,000 depending on whether an additional collection effort is needed beyond the routine monitoring already conducted for the permit.

For an impact zone at a nonpermitted facility, it is assumed that the applicant will be required to perform chemical analysis for the effluent, receiving water, and sediments and to demonstrate compliance with the requirement that AKART have been applied to control toxicants in the wastewater.

Ecology may require other information as determined necessary, which may include evidence that the discharger has adequately addressed waste reduction alternatives, or studies to support a determination by Ecology that the sediment impact zone is in the public interest. In addition, Chapter 173-204-420(3) WAC states that the location and design of the zone shall minimize impacts whenever possible on areas of special importance as determined by Ecology. Areas of special importance include (but are not limited to) spawning areas, nursery areas, waterfowl feeding areas, shellfish harvest areas, areas used by species of economic importance, tribal areas of significance, areas identified as ecologically unique, and areas frequently used for primary contact recreation. Ecology may require information to support a determination that no areas of special importance will be affected by the location of the impact zone. Collection costs for this highly site-specific information have not been estimated.

Baseline 1 (Application Requirements)—The following laws and regulations form the basis of Ecology's existing authority to require applicants for discharge permits to perform monitoring studies and control wastewater toxicants:

- State NPDES permit program requirements (Chapter 173-220 WAC)
- State waste discharge permit program requirements (Chapter 173-216 WAC)
- Federal NPDES permit regulations (Clean Water Act Section 402; 40 CFR 122-123)
- Authorization and requirements for best available technology (BAT) economically achievable (Clean Water Act Section 307, toxic and pretreatment effluent standards)
- Authorization and requirements for best practicable control technology (BPT) currently available [Clean Water Act Section 301(b)-(1)(A)]
- Authorization and requirements for best conventional pollutant control technology (BCT) (Clean Water Act Section 304, information and guidelines)
- BPT, BCT, and BAT national effluent limitations and standards for 52 categories of industries (40 CFR 405-471)
- Factors that must be considered in deriving effluent limits using best professional judgment (BPJ) (Clean Water Act Section 304; 40 CFR 125.3)
- Authorization and requirements for BMP (Clean Water Act Sections 302, 304, and 311; 40 CFR 122, 125)

- Chapters 90.52.040 and 90.48.520 RCW, requiring wastes to be provided with AKART prior to discharge.

The process and criteria for determining AKART are not given in state law. The Pollution Control Hearings Board has defined the following types of criteria for municipal discharges to marine waters:

- Status of planning needed to proceed with the proposed methods of treatment
- Environmental or siting constraints
- Economic factors.

AKART criteria are generally defined for a discharge using federal effluent guidelines or, if these are not available, on a case-by-case basis. AKART criteria have been no more stringent than federal technology-based standards because more stringent controls must be grounded in scientific evidence. The requisite research and investigation are time-consuming and expensive. Information on the cost to EPA to establish technology-based standards for primary industries was not available for this analysis. However, even water quality-based effluent standards have been prohibitively expensive for Ecology. Effluent limits based on receiving water quality have not been set for any industrial dischargers to Puget Sound (Bailey, G., 18 December 1990, personal communication). Given these considerations, it is assumed that AKART criteria are no more stringent than federal technology-based standards.

Ecology is designated (under Chapter 90.48.260 RCW) as the agency responsible for granting NPDES permits (in accordance with Clean Water Act Section 402) and state waste discharge permits (in accordance with Clean Water Act Section 307). The NPDES permit program applies to discharges of pollutants from a point source into navigable waters of the state (33 U.S.C. Section 1342; Chapter 173-220-020 WAC). A state waste discharge permit applies to discharges into sewer systems or groundwater, or to dischargers who require a permit to control material storage and handling by best management practices. Under Chapters 173-220 and 173-216 WAC, Ecology has authority to require permit holders in both programs to monitor and report their discharges.

Until recently, Ecology required little monitoring of toxic substances under NPDES and state waste discharge permits. A permit audit conducted by EPA in late 1984 and early 1985 found that the applications of 44 permittees in the Puget Sound basin reported toxic organic compounds. Of these permits, only 14 included any limits on toxic compounds (Ecology 1989). For recently renewed NPDES permits in Washington, effluent monitoring has been required for toxic compounds if these compounds are known or suspected in the effluent. Sediment monitoring has also been required. Because sediment monitoring requirements have been imposed in anticipation of adoption of the Sediment Management

Standards (Bailey, G., March 1990, personal communication), sediment monitoring costs are attributed to the proposed rule (effluent monitoring costs are not).

The application requirements of 40 CFR 122(7)(i)(A) apply to all NPDES permit holders. Each applicant must report quantitative data for conventional pollutants. In addition, testing parameters for toxic organic pollutants, metals, and other hazardous substances are specified for certain industrial processes.

The BPT, BCT, BAT, BPJ, and BMP regulations are the means by which Ecology requires wastes to be treated with AKART. BPT regulations are the first step of treatment technology for conventional pollutants. BPT treatment standards have been identified by EPA for 52 primary industry categories by surveying the treatment technology in use and defining the best average performance (Ecology 1989). BCT regulations are more stringent effluent standards for conventional pollutants based on the best available technology economically achievable. BAT regulations are the effluent standards for toxic and other nonconventional pollutants based on the best available technology economically achievable.

For some potentially affected businesses (e.g., shipyards) there are no existing federal effluent guidelines. For these dischargers, permit writers develop effluent guidelines using best professional judgment and the imposition of AKART. The process of deriving case-by-case (BPJ) effluent limits is not described in federal or state regulations. However, the factors that must be considered are specified in Clean Water Act Section 304(b) and 40 CFR 125.3. These factors include the following components:

- Age of equipment and facilities
- Manufacturing process and wastewater treatment process
- Engineering aspects of the application of various types of control techniques
- Cost of achieving effluent reduction
- Non-water quality environmental impact (including energy requirements).

Best management practices are the measures or combinations of measures which, when applied to an industrial activity, will prevent or minimize the potential for release of significant amounts of toxic or hazardous pollutants. The regulations implementing BMP (40 CFR 122, 125, and 151) require that those who must obtain a NPDES permit and who use, produce, or discharge any of the toxic and hazardous pollutants listed in Appendix A of 40 CFR 136 must develop a BMP program. Under these regulations, baseline and advanced BMP programs have been developed for prevention, containment, mitigation, and disposition of pollutants.

Baseline 2 (Application Requirements)—The following laws and regulations require applicants for discharge permits to control wastewater toxicants:

- Chapter 173-201-110 WAC, requiring Ecology to operate an effluent and receiving water surveillance program

Chapter 173-201-110 WAC (state water quality standards) requires Ecology to operate a continuing surveillance program that includes monitoring waste discharges and receiving water quality.

Cost Summary (Application Requirements)—The costs of supplying the data required for a sediment impact zone application (excluding site-specific costs) are estimated as follows:

- Permitted facilities, $600 to $5,600
- Nonpermitted facilities, $600 to $10,600.

An impact zone application is not expected to require more intensive effluent or receiving water monitoring than would be required under adopted federal and state NPDES and pretreatment regulations. Therefore, it is assumed that a discharger applying for an impact zone at a currently permitted (NPDES or state permit) facility will rely on existing effluent and receiving water studies and need only perform a priority pollutant analysis of sediments. The cost of the sediment chemical analysis is attributed to the proposed rule.

For an impact zone at a nonpermitted facility, it is assumed that the applicant will be required to perform a priority pollutant analysis of the effluent, receiving water, and sediments. Under adopted regulations, permit writers are requiring an effluent priority pollutant scan if priority pollutants are known or suspected in the effluent (Ecology 1989). Consequently, for a nonpermitted facility, only the costs of an initial receiving water and sediment chemical analysis are attributable to the proposed rule.

The costs of complying with AKART have not been calculated. Ecology has assumed for this analysis that AKART is no more stringent than federal regulations for BAT, BCT, and BPJ. Therefore, the proposed impact zone regulations do not impose requirements in addition to those already imposed by existing federal regulations.

3.3.2 Maintenance Monitoring

The discharger must perform maintenance monitoring to ensure that its activities are in compliance with the sediment impact zone authorization [Chapter 173-204-415(5) WAC]. Ecology may also require additional removal or capping of sediments for general maintenance of the impact zone or for navigational needs.

Under the proposed sediment impact zone requirements, Ecology is authorized to review effluent, receiving water, and receiving water surface sediment monitoring studies within and outside the authorized sediment impact zone. If there is clear evidence of a violation or potential for violation of the requirements (as determined by Ecology after review of the discharger's monitoring data or by direct sediment sampling or other means), Chapter 173-204-415(5)(b) WAC mandates that Ecology respond with the following sequence of steps:

1. Require reanalysis of the discharger's compliance with AKART
2. Alter the size and/or degree of effects allowed within the zone
3. Require additional discharge or sediment impact zone maintenance activities
4. Limit the quantity or quality of effluent
5. Close the sediment impact zone.

To comply with the maintenance monitoring requirements of Chapter 173-204-415(5) WAC, it is assumed that the discharger will conduct at least one set of monitoring tests during the permit cycle to provide data for the sediment impact zone model. Three levels of effort are assumed in this cost analysis:

- A low level of effort may suffice at small sites that do not overlap zones established for other discharges. This effort is assumed to include collection of sediment from at least four stations once during the initial authorization period.
- A moderate level of effort may be required at larger discrete sites. For these sites, it is assumed that sediment will be collected from at least six stations twice during the initial authorization period.
- A high level of effort may be needed at large sites at which the sediment impact zones of more than one source overlap. In these cases, a high density of stations may be needed to establish patterns of contamination, confirm multiple sources of contamination, and representatively sample the sediment impact zone. For these sites, it is assumed that sediment samples may be collected from 15 stations twice during the initial authorization period, and that up to three sediment traps may be deployed in the water column to assess long-term conditions.

Based on modeling results (Ecology 1990), in the next 30 years few existing dischargers are expected to exceed the chemical and biological requirements established for sediment impact zones. Technological improvements implemented through requirements to achieve AKART [Water Resources Act of 1971 (Chapters 90.48, 90.52, and 90.54 RCW)] are expected to result in more stringent toxic pollutant limits than now exist. These improvements will further reduce the need for sediment impact zones.

It is assumed that the average discharger who may apply for a sediment impact zone could be required to perform the following monitoring studies:

- Discharge effluent chemical analysis
- Discharge effluent bioassays
- Water column chemical analysis
- Surface sediment chemical analysis
- Surface sediment bioassays
- A one-time benthic macroinvertebrate abundance analysis.

Maintenance monitoring cost estimates are based on sampling and analysis guidelines specified in *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound* (PSEP 1989a). For the first 5-year permit cycle, total monitoring costs of $27,100, $65,000, and $232,100, respectively, are estimated for the low, moderate, and high levels of monitoring effort described in this section. Additional details on individual components of these monitoring costs are summarized in Appendix B.

Baseline 1 (Maintenance Monitoring)—The following laws and regulations currently require discharge permit holders to conduct monitoring studies:

- Federal NPDES permit regulations (Clean Water Act Section 402; 40 CFR 122-123)
- State NPDES permit program requirements (Chapter 173-220 WAC).

To comply with these requirements, a discharger applying for a sediment impact zone is assumed to already have in place an effluent and receiving water monitoring program for chemical pollutants. In addition, Ecology is phasing in biomonitoring requirements. The schedule of implementation for these requirements is being developed to address first those discharges most likely to have a toxicity problem.

Baseline 2 (Maintenance Monitoring)—No additional state regulations beyond the waste discharge permit program (Chapter 173-216 WAC) discussed in Section 3.3.1 require the monitoring and reporting of discharges.

Cost Summary (Maintenance Monitoring)—The following compliance costs are estimated for maintenance monitoring:

- Up to $1,300 per sample for discharge effluent chemical analysis

- Up to $300 per sample for discharge effluent bioassays
- Up to $1,300 per sample for water column chemical analysis
- Up to $1,500 per sample for surface sediment chemical analysis
- Up to $300 per sample for surface sediment bioassay analysis
- Between $2,000 and $5,000 per station for sediment benthic macroinvertebrate analysis.

It is assumed that adopted regulations account for 100 percent of the effluent and receiving water monitoring and bioassay costs (Baseline 1). All sediment monitoring and benthic macroinvertebrate study costs are assumed to result from maintenance requirements of the proposed rule. Including collection, analysis, reporting, and administration costs for a four- to fifteen-station array, the average discharger is expected to spend a total of $27,100 to $232,100 on maintenance monitoring per 5-year permit cycle as a consequence of the proposed sediment impact zone requirements.

3.3.3 Modifications and Renewals

If Ecology determines that modifications to the sediment impact zone authorization are necessary as a result of new information, technological advancements, statutory requirements, or evidence that the discharge has changed substantially, the discharger has the burden of rebutting the determination. Under Chapter 173-204-415(8) WAC, renewal of the authorization is allowed only on evidence that the discharge continues to be treated with AKART and BMP. The discharger must also conduct an assessment to demonstrate that elimination of the impact zone or reduction in area or contamination level is not practicable. Costs in addition to the cost of renewing a NPDES effluent permit are assumed to be no more than $15,000 for this requirement. This cost includes collection, analysis, and interpretation of four chemical samples only.

3.3.4 Sampling and Testing

Chapter 173-204-600 WAC requires any applicant for a sediment impact zone to develop, maintain, and abide by a sediment sampling plan. The sampling plan must identify sampling dates, types, depths, composites, locations, positioning methods, personnel, equipment, and quality assurance and quality control (QA/QC) procedures in accordance with Puget Sound protocols (PSEP 1989). This requirement has a zero cost baseline because there are no other existing or planned regulations that require this activity. The cost for developing a sampling plan (including QA/QC specifications) is estimated at $1,000 for a small zone for

which sampling guidance has been provided, $5,000 for a medium zone, and up to $36,000 for a large area containing overlapping sediment impact zones.

3.3.5 Recordkeeping

Chapter 173-204-610 WAC requires that any applicant for a sediment impact zone maintain the following records:

- Sediment sampling plans
- Sediment removal records
- Records and results of sediment analyses conducted under the new rule or Chapter 173-225 WAC
- Records of inspections conducted under Chapter 173-225 WAC
- Sediment treatment records
- Sediment onsite capping records
- Sediment disposal records.

All records must be maintained for at least 10 years after issuance, modification, or renewal of the permit, whichever is greater. This requirement has a zero cost baseline. The cost of record storage is estimated at $1,500.

3.4 COSTS OF COMPLIANCE FOR DISCHARGE PERMITS

Chapter 173-204-400(2) WAC requires any person proposing a new discharge to provide an evaluation of the ability of the proposed discharge to meet the sediment quality standards of Chapters 173-204-320 through 340 WAC (with exceptions provided for discharges to sediments in authorized sediment impact and recovery zones). The information required by Ecology will vary depending on the type of effluent discharged and on the environmental sensitivity of the adjacent areas.

Ecology will specify appropriate locations and methods for collection and analysis of wastewater, receiving water, and surface sediment samples, in accordance with the permit writer's manual (Ecology 1989).

3.4.1 Baseline 1 (Discharge Permits)

The federal laws governing technology-based effluent standards for NPDES-permitted facilities using BPT, BCT, BAT, BPJ, and BMP are applicable to this requirement. In addition, 40 CFR 122.21 requires the following to be included in NPDES permit applications for new discharges:

- Description of the treatment for all operations contributing wastewater to the effluent, including the average flow of each operation
- Estimates of the daily maximum and average concentrations and mass of pollutants that the applicant has reason to believe may be present in the discharges from any outfall
- Reports of any technical evaluations concerning the proposed method of treatment.

3.4.2 Baseline 2 (Discharge Permits)

The state requirements governing AKART (Chapters 90.48 and 90.52 RCW) are applicable to this compliance requirement. The engineering report mandated by Chapter 173-240 WAC must include the following:

- A description of the treatment process and operation, including a flow diagram
- Physical provision for oil and hazardous material spill control and accidental discharge prevention
- A description of results to be expected from the treatment process, including the predicted wastewater characteristics
- A statement that the effluent from the proposed facility will meet applicable permit effluent limitations and/or pretreatment standards, based on sound engineering justification through use of pilot data, results from other similar installations, or scientific evidence from the literature.

3.4.3 Cost Summary (Discharge Permits)

Cost estimates for complying with the general considerations for sediment source control standards in Chapters 173-204-400 WAC were not calculated. It is assumed that compliance with either Baseline 1 or Baseline 2 regulations would account for 100 percent of the potential compliance costs of meeting discharge permit requirements. Therefore, the cost increment for discharge permits is zero.

3.5 COSTS OF COMPLIANCE FOR THE CLEANUP DECISION PROCESS

A comprehensive cleanup decision process defined in Chapters 173-204-500 through 590 WAC includes procedures for the following steps:

1. Screen areas that may contain sediments of concern

2. Conduct hazard assessments to identify cleanup sites
3. Rank sites for cleanup
4. Determine the appropriate authority for site cleanup
5. Conduct a site cleanup study
6. Determine the site-specific cleanup standard
7. Select the appropriate cleanup action
8. Authorize a sediment recovery zone, if necessary.

Ecology has primary responsibility for all costs associated with the first four steps, although incidental costs of providing Ecology with existing information may be incurred by dischargers. The last four steps may result in more significant costs incurred by dischargers. For example, dischargers may be required to prepare site cleanup plans, conduct site cleanup studies and prepare summary reports, conduct cleanup actions, monitor the success of cleanup, and notify property owners of pending recovery zones. The estimated costs of these compliance actions are summarized in Table 5 and described in the following sections.

3.5.1 Screening Sites of Potential Concern

Generally, Ecology will perform the analyses required to screen sites under Chapter 173-204-510 WAC. Ecology may require monitoring to reevaluate and identify sites as necessary to update the inventory of sites, if new information warrants a reexamination, or if there is evidence that source control measures have not been implemented. It is assumed that public funds will be used to secure this information. Therefore, no baseline cost analysis has been performed for this portion of the proposed rule.

3.5.2 Hazard Assessment

For a site hazard assessment, Chapter 173-204-530 WAC requires landowners, lessees, and onsite and adjacent dischargers to submit all existing and available information that would facilitate Ecology's determination of the concentration, areal extent, and depth of sediment contamination. Relevant information includes:

- Identification of contaminants exceeding the sediment quality standards
- Identification of biological test toxicity levels

TABLE 5. COMPLIANCE COSTS FOR THE CLEANUP DECISION PROCESS

Activity	Maximum Estimated Cost ($)[a]		
	Low	Medium	High
Cleanup study plans			
Work plan	3,000	30,000	100,000
Sampling plan	3,000	30,000	80,000
Quality assurance plan	2,000	6,000	12,000
Health and safety plan	2,000	4,000	8,000
Subtotal	10,000	70,000	200,000
Cleanup study report	50,000	500,000	5,000,000
Recovery zone notification			
Ownership documentation	100	100	100
Review permit	400	400	400
Subtotal	500	500	500
Monitoring			
Field equipment	1,500	3,000	12,000
Personnel	1,000	2,000	8,000
Chemical analyses	9,000	15,000	60,000
Biological analyses	6,000	16,000	64,000
QA and reporting	2,000	8,000	15,000
Contingency @ 20% of field/lab	3,500	7,200	28,800
Administration @ 8%	1,600	3,500	12,700
Subtotal (annual)	24,600	54,700	200,500
Subtotal (present value; 5 years)	94,500	210,000[b]	770,000
Records management (10-year storage)	1,500	1,500	1,500
Cleanup	100,000	10,000,000[c]	50,000,000
TOTAL	$256,500	$10,782,000	$55,972,000

[a] Costs shown for low (small sites), medium (medium sites), and high (large, complex sites) categories are maximum estimates. For example, a medium site may have costs of cleanup actions that range from $100,000 to $10,000,000.

[b] Range for eight Commencement Bay cleanup sites was $57,500-$1,090,000 after recalculation for a 5-year monitoring period and 9.49 percent discount rate assumed in this analysis.

[c] Range for eight Commencement Bay cleanup sites in the final record of decision (U.S. EPA 1989a) was $0-$6,500,000.

- Identification of areas where the sediment quality standards are not exceeded
- Identification of chemical concentrations posing threats to human health
- Identification of areas where the minimum cleanup level is met
- Characterization of the source of contamination
- Identification of sensitive resources in the vicinity.

This information will be used to determine the need for further action at a site. Ecology may require source control and/or monitoring as a consequence of information yielded by the site hazard assessment if there is a known or ongoing source.

The cost of potential source control and monitoring activities is not calculated in this study. Instead, it is assumed that these costs would be incurred as a result of federally mandated technology-based effluent standards and requirements to implement best management practices.

Baseline 1 (Hazard Assessment)—The following laws and regulations affect the level of effort of contaminated sediment cleanup action studies:

- Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA/SARA)
- Model Toxics Control Act (Chapter 70.105D RCW, Chapter 173-340 WAC).

CERCLA authorizes EPA to conduct investigations and evaluations whenever there is a release or threatened release of a hazardous substance (42 U.S.C. Section 9604). Cleanup under CERCLA is guided by the National Contingency Plan. However, CERCLA is applicable as a baseline regulation only to Superfund sites in Puget Sound with contaminated sediments. These sites include Commencement Bay, Eagle Harbor, and Harbor Island in Elliott Bay. Contaminated material at these sites accounts for less than 50 percent of the sediments exceeding the minimum cleanup level in Puget Sound.

The Model Toxics Control Act provides Ecology with authority analogous to the authority provided to EPA by CERCLA and the National Contingency Plan. Under Chapter 70.105D.030 RCW, if there is a reasonable basis to believe there is a release or threatened release of a hazardous substance, Ecology is authorized to investigate the threat by physical entry onto the property and can require (by subpoena) information or documents relevant to identification of the

nature and volume of materials generated, stored, transported to, or disposed of at a facility.

Baseline 2 (Hazard Assessment)—Chapter 173-336 WAC (initial investigation regulation) authorizes Ecology to conduct cleanup investigations. The data from these investigations could supply all necessary information for completing a hazard assessment.

Cost Summary (Hazard Assessment)—The following assumptions are made to estimate the incremental effect of the proposed site hazard assessment regulations:

- A discharger will spend approximately $500 supplying Ecology with existing information for a site hazard assessment
- No dischargers are currently spending money to comply with an existing regulation
- All potentially affected dischargers in industries listed in Table 1 will be required to submit data.

Because Ecology is authorized under existing regulations to require dischargers to submit data, these assumptions are likely to result in overestimation of the incremental costs of the proposed rule.

3.5.3 Cleanup Authority

Under Chapter 173-204-550 WAC, Ecology may determine the type of cleanup action necessary and the appropriate authority for cleanup of a site on a case-by-case basis (BPJ). Ecology has the authority to commence site cleanup under Chapters 90.48 and 70.105D RCW and may seek reimbursement for its costs from potentially liable parties. Dischargers may undertake voluntary and incidental cleanups at a site. However, all such actions are subject to Ecology review and approval.

Chapter 173-204-570 WAC requires that the specific cleanup standard for a given site be defined in consideration of environmental effects, cost, and engineering feasibility. The cleanup standard should be as close to the sediment quality standards as these considerations allow, but in no case will it exceed the minimum cleanup level. The costs associated with cleanup actions are discussed in Section 3.5.7.

3.5.4 Cleanup Study Plans

Under Chapter 173-204-560 WAC, a discharger performing a cleanup action must submit a cleanup study plan to Ecology for review and written approval. The scope of the cleanup study plan may vary by site but should include:

- Public information and education plan
- Site investigation and evaluation of cleanup alternatives
- Sampling plan and description of recordkeeping activities
- Site safety plan and requirements of the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA) (Chapter 296-62 WAC).

The costs for these plans are estimated at approximately $10,000 for a small site requiring little study and public coordination, up to $70,000 for an intermediate site that may require a complex study, and up to $200,000 for a large site in an urban embayment with several potentially liable parties and active public interest. Each element of the cleanup study plan is described below, followed by a description of applicable baseline requirements and a summary of costs for each element.

Public Information and Education Plan—The cleanup study plan should encourage public participation in the cleanup action by addressing the following needs:

- Public notification and provision of a comment period
- Identification of site information repositories and methods for providing all relevant information
- Methods for identifying public concerns (e.g., interviews, questionnaires, community group meetings)
- Coordination with the public participation requirements of other regulations.

Site Investigation and Evaluation of Cleanup Alternatives—The sufficiency of the site investigation and evaluation of cleanup alternatives will depend on the type of cleanup action selected. In general, the site investigation should include a characterization of the distribution of contamination at the site and potential threats to human health and the environment. In particular, the site investigation should address:

- Surface water hydrodynamics and sediment transport mechanisms (e.g., surface water drainage patterns, quantities, flow rates,

erosion and deposition patterns, actual or potential migration routes)

- Geology and groundwater system characteristics for identification of physical properties; distribution of sediment types; and groundwater flow rate, gradient, discharge areas, and quality
- Climate characteristics likely to affect surface and groundwater patterns
- Land use patterns, to predict human exposure
- Natural resources and ecology in vicinity of site, to determine impacts of contamination
- Active and inactive waste disposal sources of sediment contamination
- Human health risks, in a baseline risk assessment.

The evaluation of cleanup action alternatives will be conducted on a site-specific basis and may include:

- Establishment of site units with associated cleanup standards in the range set forth in Chapter 173-204-570 WAC
- Establishment of one or more sediment recovery zones as set forth in Chapter 173-204-590 WAC, requiring the following additional information:
  - Projected time period during which the recovery zone will be necessary
  - Legal description of property on which the recovery zone is to be located and names and addresses of property owners
  - Monitoring plan for discharge effluent, receiving water column, surface sediment chemistry, and possibly bioassays to evaluate water quality and sediment quality within or adjacent to the sediment recovery zone.

Sampling Plan and Recordkeeping—Chapter 173-204-600 WAC requires a sampling plan describing sampling dates, types, depths, composites, locations, positioning methods, personnel, equipment, and QA/QC procedures in accordance with Puget Sound protocols (PSEP 1989).

The following records must be maintained for a sediment recovery zone:

- Sediment sampling plans

- Sediment removal records
- Records and results of sediment analyses conducted under the new rule or Chapter 173-225 WAC
- Records of inspections conducted under Chapter 173-225 WAC
- Sediment treatment records
- Sediment onsite capping records
- Sediment disposal records.

All records must be maintained for at least 10 years after issuance, modification, or renewal of the permit, or 10 years after the cleanup site is delisted, whichever is greater.

Site Safety Plan—OSHA and WISHA requirements should be addressed in a site safety plan submitted with the cleanup study.

Baseline 1 (Cleanup Study Plans)—The requirements of CERCLA/SARA and the Model Toxics Control Act described in Section 3.5.2 are also applicable here. In addition, CERCLA/SARA provides for preparation of a site safety plan and public information and education plan.

Chapter 173-340-040 WAC (implementing Chapter 70.105D RCW) authorizes Ecology to negotiate a settlement agreement that requires a remedial investigation, feasibility study, and remedial design. Chapter 70.105D.040(4) RCW does not allow settlement with potentially liable parties except in accordance with the Model Toxics Control Act (including a public hearing and court order). However, site cleanups under Chapter 90.48 RCW are not constrained in this manner.

There are no Baseline 2 regulations to consider for cleanup study plans.

Cost Summary (Cleanup Study Plans)—Completing the required cleanup study documents is estimated to cost the average discharger from $10,000 to $200,000 depending on the complexity of the particular site. These plans include a work plan ($3,000 to $100,000), a sampling plan ($3,000 to $80,000), a QA/QC plan ($2,000 to $12,000), and a health and safety plan ($2,000 to $8,000). This analysis assumes that for Superfund sites, the application of CERCLA requirements would account for 100 percent of the study costs required by the proposed rule. For non-Superfund sites, it is presumed that the level of effort of cleanup studies would be no greater than that required under federal requirements at CERCLA sites and may be much less.

3.5.5 Cleanup Study Report

Based on the cleanup study plan as approved by Ecology, the discharger must also submit a cleanup study report to Ecology under Chapter 173-204-560 WAC. The cleanup study report must include the results of the site investigations and provide proposals for the preferred and alternative cleanup action.

Baseline 1 (Cleanup Study Report)—With the exception of followup investigations at CERCLA/SARA sites, there are no existing requirements for these plans in Puget Sound.

There are no Baseline 2 regulations to consider for cleanup study reports.

Cost Summary (Cleanup Study Report)—The following costs for a cleanup report (including field investigations, laboratory analyses, and evaluations) are estimated based on a summary of costs for remedial investigations and feasibility studies (Booz-Allen and Hamilton, Inc. 1988) and information from Ecology records:

- Up to $50,000 for small sites
- Up to approximately $500,000 for intermediate sites
- Up to $1,000,000 for large sites and up to $5,000,000 for large, complex sites that may require complete characterization of multiple sources and the areal and vertical extent of contamination.

3.5.6 Sediment Cleanup Standards

Chapter 173-204-570 WAC requires that the specific cleanup standard for a given site be defined in consideration of environmental effects, cost, and engineering feasibility, and that the cleanup standard be as close to the sediment quality standards as these considerations allow, but in no case to exceed the minimum cleanup level. In certain cases where the natural background levels of the site exceed the minimum cleanup level, Ecology will use natural background levels to determine the applicable standards. There are no specific compliance costs associated with this section of the rule.

3.5.7 Cleanup Action Decision

The purpose of proposed Chapter 173-204-580 WAC (cleanup action decision) is to describe the development and evaluation of cleanup action alternatives and the process of making a cleanup decision. For any given site, the cleanup decision will be based on the cleanup study report submitted to Ecology

in accordance with Chapter 173-204-560 WAC. Ecology will approve of one or more of the alternatives provided in the cleanup study report or will disapprove of all the alternatives. The factors used to determine the acceptability of the cleanup alternatives include environmental effects, cost, and engineering feasibility. These factors are consistent with the goals of other cleanup regulations such as CERCLA and the Model Toxics Control Act.

For the purpose of simplifying cost estimation, it is assumed that compliance with the proposed cleanup decision process will result in the following decisions:

- A typical site-specific cleanup standard is midway between the sediment quality standard and the minimum cleanup level, but consideration of natural recovery may result in cleanup to no more than the minimum cleanup level. For the average site, cleanup to the minimum cleanup level is assumed to achieve the sediment quality standard within a reasonable time period through natural processes.
- Sediment recovery zones will be designated in areas containing sediments contaminated above the sediment quality standard but below the site-specific cleanup standard.
- Sediments contaminated above the site-specific cleanup standard will be either capped or dredged and disposed of in upland sites.
- Monitoring costs are not included in the cost of cleanup. Monitoring of areas subject to cleanup actions is considered separately as part of the cost of recovery zones (see Section 3.5.8).

Baseline 1 (Cleanup Action Decision)—CERCLA/SARA and the Model Toxics Control Act (Chapter 70.105D RCW) provide the basis for determining which sediments can remain undisturbed at a site and which sediments must be actively monitored, capped, or dredged. CERCLA relies on existing applicable or relevant and appropriate requirements (ARARs) to specify requirements for cleanup activities (Preston, Thorgrimson 1989). The Model Toxics Control Act (Chapter 70.105D.060 RCW, remedial actions—cleanup levels) requires that Ecology select those actions that will attain a degree of cleanup that is protective of human health and the environment. Chapter 70.105D.030(2)(d) RCW requires Ecology to set a cleanup standard that meets the ARARs of each hazardous substance. For hazardous substances for which no applicable state or federal law, regulation, or rule exists, Chapter 70.105D RCW requires Ecology to set the cleanup standard on a case-by-case basis to prevent potential harm to human health and the environment.

Chapter 173-340-040 WAC (hazardous waste cleanup settlement procedures) reinforces the cleanup standards set forth in Chapter 70.105D RCW by requiring Ecology to ensure that those cleanup levels are attained.

When dredging is required as part of the cleanup action, dredged disposal site location decisions (both in-water and upland) are determined primarily by the following laws:

- Clean Water Act Section 404 and Harbors and Rivers Act Section 10 as implemented by the U.S. Army Corps of Engineers (Section 10/404 permit)
- Clean Water Act Section 401 certification performed by Ecology.

In determining whether a Section 10/404 permit is in the public interest, the U.S. Army Corps of Engineers is required (33 CFR 320.3) to consider more than 30 federal environmental laws, regulations, policies, and executive orders (Preston, Thorgrimson 1989). Among the most stringent of these is the requirement of 40 CFR 230.10 that there be no other practicable alternatives that would have less adverse impact on the aquatic environment.

For any federally permitted project that may result in discharge into United States waters, Clean Water Act Section 401 requires certification from the state that the project will not violate any applicable federal or state effluent limits or water quality criteria [33 U.S.C. Section 1341(a)(d)]. As the federally designated agency, Ecology may use any requirement or policy of state law that protects aquatic habitat and beneficial uses in conditioning acceptance of a Section 404 permit under Section 401 [33 U.S.C. Section 1341].

Baseline 2 (Cleanup Action Decision)—There are no Baseline 2 regulations that apply directly to cleanup actions, but the following regulations and practices directly influence decisions on disposal of dredged material:

- Puget Sound Dredged Disposal Analysis (PSDDA) guidelines
- Confined disposal standards for sediments (Element S-4 of the Puget Sound Water Quality Management Plan)
- Aquatic Lands Act (Chapter 332-30-166 WAC; Chapter 79.90 RCW)
- Hydraulics Act (Chapter 220-110 WAC; Chapter 75.20 RCW)
- Shoreline Management Act (Chapters 173-14 and 173-16 WAC; Chapter 90.58 RCW).

The PSDDA nondispersive disposal site guidelines are intended to be used in support of assessments conducted under the federal 404 guidelines and under the state Section 401 water quality certification (PSDDA 1989). The PSDDA guidelines for nondispersive sites are approximately equivalent to the proposed minimum cleanup level.

The Washington Department of Natural Resources has developed disposal regulations for open-water disposal of dredged material (Chapter 79.90.550 RCW; Chapter 332-300-166 WAC). The department will approve use of an open-water disposal site under the following conditions of Chapter 332-30-166(3-4) WAC:

- There is no practical alternative upland disposal site or beneficial use of the dredged material
- All necessary federal, state, and local permits have been acquired
- EPA and Ecology have found that the dredged material is suitable for in-water disposal and does not appear to create a threat to human health, welfare, or the environment.

The Washington Hydraulics Act requires issuance of a permit for any project that may interfere with the natural flow of water. The Washington departments of Fisheries and Wildlife will not approve a project that threatens fish or fish habitat unless adequate mitigation can be assured [Chapter 220-110-030(12) WAC]. Aquatic and nearshore disposal almost always require mitigation under the program because of potential impacts on fish habitat (Preston, Thorgrimson 1989).

The following laws and requirements are not specific to dredged disposal siting, but they could add to the disposal costs or affect the feasibility of establishing sites:

- The National and State Environmental Policy Acts
- The federal Resource Conservation and Recovery Act (RCRA)
- The Washington Solid and Hazardous Waste Management Acts
- Regulations of affected local governments (shoreline and other development permits)
- Regulations of affected local health departments.

To the extent feasible, allowance for these factors is made in cost estimates.

Cost Summary (Cleanup Action Decision)—Costs for cleanup actions are the largest component of the compliance costs associated with the proposed rule. Major factors affecting these costs include the type of cleanup action selected, the size of the cleanup site, and the final cleanup standard negotiated for the site. The following order-of-magnitude costs are estimated for three site size categories:

- Approximately $100,000 is estimated for capping a small site represented by two stations.[1]
- Between $100,000 and $10,000,000 is estimated for sites of a size similar to those identified in the Commencement Bay record of decision.[2]
- Approximately $30,000,000 to cap or $130,000,000 to provide for upland disposal of contaminated sediments is estimated at the largest site among the 10 site scenarios analyzed for this evaluation. A maximum of $50,000,000 in cleanup costs is estimated[3] [excluding monitoring costs, which were included in the estimates for the site scenarios but are treated separately in this analysis (see Section 3.5.8)]. The maximum cost assumes that capping will be the primary containment method for large sites, except in shallow navigation channels.

The remedy selections made for the EPA record of decision at Commencement Bay are assumed to be representative of cleanup levels that would be attained under existing federal requirements. Therefore, most of the cleanup costs (at least at cleanup sites governed by CERCLA and the Model Toxics Control Act) derive from protection of human health and the environment as required by the National Contingency Plan. Therefore, the costs attributable to the proposed rule at CERCLA/SARA sites could be zero.

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[1] The minimum area to be capped is estimated at approximately 4,000 square yards. The smallest cleanup area was determined from analysis of the 10 site scenarios in which the smallest area associated with a sampling station is 1,984 square yards. Two such contaminated stations representing a site contaminated above the minimum cleanup level would cover approximately 4,000 square yards. Capping costs range from $17.40 to $40.72 per square yard, with a mean cost of $23.03.

[2] The preferred remedial alternative at seven cleanup sites listed in the Commencement Bay record of decision ranged in cost from $967,000 to $4,840,000, excluding total discounted monitoring costs of approximately $393,000 to $3,300,000 (U.S. EPA 1989a). Monitoring costs for the proposed rule are considered in Section 3.5.8. The Commencement Bay sites encompass contaminated sediments ranging in volume from 11,000 to 426,000 cubic yards. Costs at an eighth site are significantly less ($107,000) because no active cleanup (only monitoring) is recommended at this site.

[3] The Sinclair Inlet site encompasses a total of 4,537,057 square yards. Cleanup to the preferred minimum cleanup level at this site would result in a cleanup area of approximately 1,300,000 square yards and an estimated $30,000,000 in capping costs at $23.03 per square yard, or $129,000,000 in upland disposal costs at a mean of $98.73 per square yard (assuming a dredge lift of approximately 1 yard). These costs include an estimate of monitoring costs, which are presented separately for recovery zones in Section 3.5.8.

3.5.8 Sediment Recovery Zones

One of the cleanup decision alternatives may include designation of a sediment recovery zone if feasible cleanup actions will not attain the sediment quality standards of Chapters 173-204-330 through 340 WAC. A recovery zone will be authorized by Ecology in conjunction with its written approval of the cleanup study report, if warranted.

The proposed sediment recovery zone regulations [Chapter 173-204-590(5) WAC] authorize Ecology to request receiving water and surface sediment chemical and biological test information as part of an application for a sediment recovery zone. For the purpose of this analysis, it is assumed that recovery zone monitoring is equivalent to post-cleanup monitoring and serves the same purpose (i.e., to confirm that sediment quality standards are achieved in the long term). Therefore, all monitoring costs associated with the cleanup decision process are summarized in this section.

The proposed sediment recovery zone rule authorizes Ecology to require monitoring studies of discharge effluent, receiving water column, and surface sediment chemistry, as well as bioassays, to evaluate conditions within and adjacent to the recovery zone. Annual monitoring costs, which are the primary compliance costs associated with this section of the proposed rule, are estimated at approximately $24,600 for a small site, $54,700 for an intermediate site, and $200,500 for a large and complex site. The primary difference in these costs results from sampling density. Additional details on monitoring costs are provided in Appendix B.

The other cost assumptions made for compliance with this section are as follows:

- Ecology will design the sediment recovery zone
- The only application cost for a sediment recovery zone is $500 for an environmental consultant to review the recovery zone authorization.

There are no baseline regulations that address the requirements of this section (other than monitoring requirements that are applicable to cleanup actions under CERCLA/SARA).

4. COMPARISON OF COMPLIANCE COSTS FOR SMALL AND LARGE BUSINESSES

In the following two sections, compliance costs for sediment impact zones and the cleanup decision process are compared for small and large businesses. These costs are summarized in Table 6. The major economic impacts are associated with the cleanup decision process, which is analyzed in detail based on industries represented in the NPDES database that contain both small and large businesses.

Table 7 summarizes all industrial categories in which more than 10 percent of all businesses may be affected by the proposed sediment management rule or in which small businesses may be dischargers based on a review of the NPDES database. Small and large businesses are also listed for each industry category. Some of these industry categories include only medium or large businesses (i.e., greater than 50 employees). Economic barriers to entry are expected to continue to exclude small businesses from many of these categories in the future. Categories that do not presently include small businesses include pulp mills, paper mills, paperboard mills, and blast furnaces and steel mills. However, businesses in these categories are included in this economic impact analysis. Impacts on large businesses in the paper and pulp industries (SIC code 26), the industrial organic chemicals industry (SIC code 286), the petroleum industry (SIC code 291), and the nonferrous metals industry (SIC code 333) as well as municipalities and public ports are examined in greater detail in Part II of this analysis.

Several of the industry categories contain both small and large businesses that directly discharge to Puget Sound. In some cases, small facilities may be subsidiaries of businesses that have more than 50 employees (Table 7). For the purpose of this analysis, these businesses are included as small businesses because it is possible that the local facility could fail and exit the industry whether or not it has a parent corporation. Therefore, these small subsidiaries provide useful information on the potential for small business economic impacts even in industries in which no small business currently operates.

The Regulatory Fairness Act requires that the costs of compliance for small businesses be compared to the compliance costs for the largest 10 percent of large businesses. The comparative analysis is conducted among businesses with the same SIC code designation.

The primary cost comparison is based on cost per $100 of sales, which is preferable to the other indicators allowable under the Regulatory Fairness Act because it most directly measures the impact the rule will have on the profits of

TABLE 6. SUMMARY OF COMPLIANCE COSTS

Rule Section	Cost ($) Low	Medium	High
3.1 SEDIMENT IMPACT ZONES			
173-204-420(3) Application			
Title search	$100	$100	$100
Provide existing data	500	500	500
Collect sediment data	0	10,000	10,000
173-204-420(6) Monitoring[a]	23,900	47,800	168,900
173-204-420(9) Modifications and renewals	100	100	15,100
173-204-600 Sampling and QA plans	1,000	5,000	36,000
173-204-610 Recordkeeping (10 years)	1,500	1,500	1,500
TOTAL	$27,100	65,000	232,100
3.2 DISCHARGE PERMITS, WAC 173-204-400(2)		no incremental costs	
3.3 CLEANUP DECISION PROCESS			
173-204-510 Site screening		no incremental costs	
173-204-530 Site hazard assessment			
Provide existing data	500	500	500
173-204-560 Cleanup study			
Cleanup study plans	10,000	70,000	200,000
Cleanup study report	50,000	500,000	5,000,000
173-204-580 Cleanup action decision	100,000	10,000,000	50,000,000
173-204-590 Sediment recovery zones			
Monitoring[b] (includes cleanup sites)	94,500	210,000	770,000
173-204-610 Recordkeeping	1,500	1,500	1,500
TOTAL	$256,500	$10,782,000	$55,972,000

[a] The monitoring cost for sediment impact zones is the total cost without applying a discount rate; monitoring of sediment impact zones will occur only once (low-level) or twice (medium- and high-level) in the initial 5-year authorization period.

[b] The monitoring cost for the cleanup decision process is the present value of annual monitoring over a 5-year period, discounted at a rate of 9.49 percent.

TABLE 7. NUMBER OF SMALL BUSINESSES IN SELECTED INDUSTRIES AFFECTED BY THE PROPOSED SEDIMENT MANAGEMENT RULE

SIC Code[a]	Industry	Number of Puget Sound Permitted Dischargers	Number of Firms with ≤50 Employees	Number of Firms with >50 Employees
2491	Wood preserving	5	2 (1)[b]	2
261	Pulp mills	4	--[c]	4
262	Paper mills except building paper	3	--	3
2631	Paperboard mills	2	(1)[d]	1
2813	Industrial gases	3	(1)[e]	2
2819	Industrial inorganic chemicals	4	2 (1)[b]	1
2821	Plastics materials and resins	1	--	1
2865	Cyclics, crudes and intermediates	1	1	--
2869	Industrial organic chemicals, misc.	1	--	1
2911	Petroleum refining	7	(2)[d]	5
2951	Paving mixtures and blocks	1	(1)[d]	--
2952	Asphalt felts and coatings	1	(1)[d]	--
3312	Blast furnaces and steel mills	2	--	2
3321	Gray iron foundries	1	(1)[b]	--
3331	Primary copper	1	(1)[d]	--
3341	Secondary nonferrous metals	1	(1)[e]	--
3479	Metal coating and allied services	2	1	1
3731	Ship building and repairing	4	(2)[d,e]	2
4011	Railroads, line-haul operating	1	(1)[e]	--
4231	Trucking terminal facilities	1	(1)[d]	--
4952	Sewerage systems	6	(6)[b]	--
5161	Chemicals and allied products	1	(1)[d]	--
5171	Petroleum bulk stations and terminals	5	(3)[d,e]	2
5172	Petroleum products, misc.	1	(1)[b]	--
7542	Car washes	1	(1)[b]	--
	TOTAL (for selected SIC codes)	60	6 (27)	27

[a] Reflects SIC codes listed in Table 3, other SIC codes for which a small business is reported as a NPDES discharger, and key business data for Washington corporations.

[b] No employee or financial data are available for the firms indicated in parentheses.

[c] No Puget Sound dischargers are confirmed in this category.

[d] One or more of the parent firms indicated by the number in parentheses are not small businesses, although the local operation has ≤50 employees. In SIC code 3731, one of the two firms shown in parentheses fits this category; in SIC code 5171, two of the three firms shown in parentheses fit this category.

[e] One or more of the parent firms indicated by the number in parentheses are not small businesses, but no local employee data are available. In SIC code 3731, one of the two firms shown fits this category; in SIC code 5171, one of the three firms shown in parentheses fits this category.

affected businesses. In addition to comparisons of costs as percentages of sales, compliance costs are compared in the following sections as percentages of the numbers of employees and of total assets, depending on the availability of financial data. When data for the specific firms are not available, average sales per firm and assets per firm are estimated using national data collected by ICF Incorporated on all owners and operators of hazardous waste treatment, storage, and disposal facilities regulated under RCRA Subtitle C. These data are available for the same industrial categories used in each analysis and for different sizes of firms.

4.1 COMPARISON OF COSTS OF SEDIMENT IMPACT ZONES

A sediment impact zone is specific to a particular discharger. It is assumed that both small and large businesses could require these zones and that the compliance costs for application, monitoring, and maintenance of records could be similar for all sizes of businesses. Both small and large businesses have discharges scored by EPA as potentially toxic (Appendix A). In addition, small businesses may have fewer resources with which to control sources of contamination. Therefore, their discharges could result in similar or in some cases greater sediment contamination than discharges of larger businesses. Even if it is assumed that small businesses will have proportionately smaller impact zones (because of smaller discharges) that require less monitoring, disproportionate impacts could still result unless monitoring costs are more than proportionately reduced.

The total estimated compliance cost for application, monitoring, and recordkeeping associated with sediment impact zones ranges from $27,100 to $232,100 (Table 6). This cost for permitted facilities is attributed to the proposed rule under either Baseline 1 or Baseline 2. The cost is annualized at a discount rate of 9.49 percent[4] over a 10-year period.

This annualized cost is compared in Tables 8 and 9 for small and large businesses classified under the following two 2-digit SIC codes[5] that contain 19 of the 60 businesses[6] counted in Table 7:

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[4] The discount rate of 9.49 percent is the rate used by ICF (1990) in the companion small business economic impact statement for the Model Toxics Control Act. The analysis calculated a weighted average cost of capital for a number of industries likely to generate, treat, or dispose of hazardous waste (ICF 1988).

[5] These two 2-digit SIC codes were selected because the largest number of small and large firms were represented by these two groups, and local or national financial data were available for firms of different sizes in each group.

[6] Firms for which employee data could not be obtained are excluded.

TABLE 8. SEDIMENT IMPACT ZONE SCENARIOS FOR SIC CODE 28 (CHEMICALS AND ALLIED PRODUCTS)

(industry financial data from ranges for Puget Sound businesses)

Low-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
Compliance Costs ($000) One-Time and Capital Costs:	n/a	$4	$4	$4	$4	$4	$4	$4	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	$17.5	$17.5	$17.5	$17.5	$17.5	$17.5	$17.5	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$3.5	$3.5	$3.5	$3.5	$3.5	$3.5	$3.5	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	0.35%	0.14%	0.02%	0.04%	0.01%	0.01%	0.00%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	$0.58	$0.29	$0.05	$0.04	$0.01	$0.02	$0.01	n/a	n/a	n/a	

TABLE 8. (Continued)

Medium-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
Compliance Costs ($000) One-Time and Capital Costs:	n/a	$17	$17	$17	$17	$17	$17	$17	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	$47.8	$47.8	$47.8	$47.8	$47.8	$47.8	$47.8	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$10.3	$10.3	$10.3	$10.3	$10.3	$10.3	$10.3	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	1.0%	0.4%	0.1%	0.1%	0.02%	0.02%	0.01%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	$1.72	$0.86	$0.14	$0.11	$0.04	$0.07	$0.02	n/a	n/a	n/a	

TABLE 8. (Continued)

High-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
Compliance Costs ($000) One-Time and Capital Costs:	n/a	$63	$63	$63	$63	$63	$63	$63	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	$169.0	$169.0	$169.0	$169.0	$169.0	$169.0	$169.0	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$37.0	$37.0	$37.0	$37.0	$37.0	$37.0	$37.0	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	3.7%	1.5%	0.2%	0.4%	0.07%	0.07%	0.05%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	$6.16	$3.08	$0.51	$0.41	$0.14	$0.25	$0.08	n/a	n/a	n/a	

TABLE 9. SEDIMENT IMPACT ZONE SCENARIOS FOR SIC CODE 29 (PETROLEUM AND COAL PRODUCTS)

(industry financial data from statewide summaries)

Low-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
												0.0%
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				
												0.0
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$3	n/a	$3	n/a	$3	$3	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	n/a	$23.9	n/a	$23.9	n/a	$23.9	$23.9	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$4.3	n/a	$4.3	n/a	$4.3	$4.3	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	0.17%	n/a	0.17%	n/a	0.001%	0.0005%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	0.002%	n/a	0.002%	n/a	0.003%	0.001%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$0.15	n/a	$0.15	n/a	$0.03	$0.00	n/a	n/a	n/a	

TABLE 9. (Continued)

Medium-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
												0.0%
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				0.0
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$17	n/a	$17	n/a	$17	$17	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	n/a	$47.8	n/a	$47.8	n/a	$47.8	$47.8	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$10.3	n/a	$10.3	n/a	$10.3	$10.3	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	0.4%	n/a	0.4%	n/a	0.003%	0.001%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	0.013%	n/a	0.013%	n/a	0.017%	0.008%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$0.36	n/a	$0.36	n/a	$0.07	$0.01	n/a	n/a	n/a	

TABLE 9. (Continued)

High-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
												0.0%
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				
												0.0
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$63	n/a	$63	n/a	$63	$63	n/a	n/a	n/a	
Total Monitoring Cost:	n/a	n/a	$168.9	n/a	$168.9	n/a	$168.9	$168.9	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$36.9	n/a	$36.9	n/a	$36.9	$36.9	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	1.4%	n/a	1.4%	n/a	0.01%	0.005%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	0.05%	n/a	0.05%	n/a	0.06%	0.03%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$1.27	n/a	$1.27	n/a	$0.26	$0.03	n/a	n/a	n/a	

- **Chemicals and allied products (SIC code 28)**—Businesses with 1-50 employees and with 51-500 employees will have impact zone-related costs that average less than 1 percent of sales under each of the cost scenarios. Although the smallest firms (less than 10 employees) will have disproportionate costs of approximately 3.7 percent of sales under the highest cost scenario, the degree of impact is still small (Table 8).

- **Petroleum and coal products (SIC code 29)**—Small subsidiaries with 50 or fewer employees in this industrial category face proportionately greater costs than larger businesses (Table 9), but the impact is no more than 1.4 percent of sales under the highest cost scenario and less than 0.05 percent of assets.

No significant economic impacts are likely as the result of implementing the proposed rule for sediment impact zones. In addition, the positive economic benefits of deferring more costly cleanup action by maintaining a sediment impact zone provide mitigation for all businesses.

4.2 COMPARISON OF COSTS OF THE CLEANUP DECISION PROCESS AND SEDIMENT RECOVERY ZONES

Compliance costs for the cleanup decision process are large and widely variable, primarily because of factors affecting actual cleanup costs outlined in Section 3.5.7. Three ranges of total estimated compliance cost for the cleanup decision process and recovery zones are provided in Table 6. The total costs are annualized at an interest rate of 9.49 percent over a 10-year period. This annualized cost is compared in Tables 10-12 for small and large businesses in the following three SIC code designations that contain 24 of the 60 businesses[7] counted in Table 7:

- **Wood preserving (SIC code 2491)**—Businesses with 50 or fewer employees will bear significant impacts as a percentage of sales under both the medium- and high-cost scenarios for site cleanup (Table 10). Cleanup costs exceeding 200 percent of sales are found for firms with 50 or fewer employees under the high-cost scenario, compared with costs of approximately 100 percent of sales for firms in the 100-240 employee category. This industry evidences disproportionate costs for small businesses of approximately a factor of 2, although capital costs as a percentage of total assets are comparable between the two groups.

[7] Firms for which employee data could not be obtained are excluded.

TABLE 10. CLEANUP SCENARIOS FOR SIC CODE 2491 (WOOD PRESERVING)

(industry financial data from statewide summaries)

Low-Cost Scenario for SIC Code 2491

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				2	2	2						4
Percent of Estb:	n/a	n/a	n/a	50.0%	50.0%	50.0%	n/a	n/a	n/a	n/a	n/a	100.0%
No. of Employees:				60	60	149						209
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	30.0	30.0	74.5	n/a	n/a	n/a	n/a	n/a	104.5
Sales Per Estb ($000):				$3,832	$3,832	$8,481						
Assets Per Estb ($000):				$5,965	$5,965	$5,655						
LOW Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	n/a	$162	$162	$162	n/a	n/a	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	n/a	$24.6	$24.6	$24.6	n/a	n/a	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$94.5	$94.5	$94.5	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	n/a	$40.8	$40.8	$40.8	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	1.1%	1.1%	0.5%	n/a	n/a	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	2.7%	2.7%	2.9%	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$0.68	$0.68	$0.27	n/a	n/a	n/a	n/a	n/a	

TABLE 10. (Continued)

Medium-Cost Scenario for SIC Code 2491

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				2	2	2						4
Percent of Estb:	n/a	n/a	n/a	50.0%	50.0%	50.0%	n/a	n/a	n/a	n/a	n/a	100.0%
No. of Employees:				60	60	149						209
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	30.0	30.0	74.5	n/a	n/a	n/a	n/a	n/a	104.5
Sales Per Estb ($000):				$3,832	$3,832	$8,481						
Assets Per Estb ($000):				$5,965	$5,965	$5,655						
MEDIUM Compliance Costs ($000)												
One-Time and Capital Costs:	n/a	n/a	n/a	$10,572	$10,572	$10,572	n/a	n/a	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	n/a	$54.7	$54.7	$54.7	n/a	n/a	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$210.1	$210.1	$210.1	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	n/a	$1,716.5	$1,716.5	$1,716.5	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	44.8%	44.8%	20.2%	n/a	n/a	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	177.2%	177.2%	186.9%	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$28.61	$28.61	$11.52	n/a	n/a	n/a	n/a	n/a	

TABLE 10. (Continued)

High-Cost Scenario for SIC Code 2491

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				2	2	2						4
Percent of Estb:	n/a	n/a	n/a	50.0%	50.0%	50.0%	n/a	n/a	n/a	n/a	n/a	100.0%
No. of Employees:				60	60	149						209
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	30.0	30.0	74.5	n/a	n/a	n/a	n/a	n/a	104.5
Sales Per Estb ($000):				$3,832	$3,832	$8,481						
Assets Per Estb ($000):				$5,965	$5,965	$5,655						
HIGH Compliance Costs ($000)												
One-Time and Capital Costs:	n/a	n/a	n/a	$55,202	$55,202	$55,202	n/a	n/a	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	n/a	$200.5	$200.5	$200.5	n/a	n/a	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$770.1	$770.1	$770.1	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	n/a	$8,910.6	$8,910.6	$8,910.6	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	232.5%	232.5%	105.1%	n/a	n/a	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	925.4%	925.4%	976.2%	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$148.51	$148.51	$59.80	n/a	n/a	n/a	n/a	n/a	

TABLE 11. CLEANUP SCENARIOS FOR SIC CODE 28 (CHEMICALS AND ALLIED PRODUCTS)

(industry financial data from ranges for Puget Sound businesses)

Low-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
LOW Compliance Costs ($000) One-Time and Capital Costs:	n/a	$162	$162	$162	$162	$162	$162	$162	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	$24.6	$24.6	$24.6	$24.6	$24.6	$24.6	$24.6	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	$94.5	$94.5	$94.5	$94.5	$94.5	$94.5	$94.5	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$40.8	$40.8	$40.8	$40.8	$40.8	$40.8	$40.8	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	4.1%	1.6%	0.3%	0.5%	0.1%	0.1%	0.1%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	$6.81	$3.40	$0.57	$0.45	$0.16	$0.27	$0.09	n/a	n/a	n/a	

TABLE 11. (Continued)

Medium-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
MEDIUM Compliance Costs ($000)												
One-Time and Capital Costs:	n/a	$10,572	$10,572	$10,572	$10,572	$10,572	$10,572	$10,572	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	$54.7	$54.7	$54.7	$54.7	$54.7	$54.7	$54.7	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	$210.1	$210.1	$210.1	$210.1	$210.1	$210.1	$210.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$1,716.5	$1,716.5	$1,716.5	$1,716.5	$1,716.5	$1,716.5	$1,716.5	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	171.6%	68.7%	11.4%	20.5%	3.4%	3.4%	2.3%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	$286.08	$143.04	$23.84	$19.07	$6.58	$11.44	$3.81	n/a	n/a	n/a	

TABLE 11. (Continued)

High-Cost Scenario for SIC Code 28

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:		1	1	2	4	4	1	2				11
Percent of Estb:	n/a	9.1%	9.1%	18.2%	36.4%	36.4%	9.1%	18.2%	n/a	n/a	n/a	100.0%
No. of Employees:		6	12	72	90	261	150	450				951
Avg. No. of Employees Per Establishment:	n/a	6.0	12.0	36.0	22.5	65.3	150.0	225.0	n/a	n/a	n/a	462.8
Sales Per Estb ($000):		$1,000	$2,500	$15,000	$8,375	$50,000	$50,000	$75,000				
Assets Per Estb ($000):					$0							
HIGH Compliance Costs ($000) One-Time and Capital Costs:	n/a	$55,202	$55,202	$55,202	$55,202	$55,202	$55,202	$55,202	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	$200.5	$200.5	$200.5	$200.5	$200.5	$200.5	$200.5	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	$770.1	$770.1	$770.1	$770.1	$770.1	$770.1	$770.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	$8,910.6	$8,910.6	$8,910.6	$8,910.6	$8,910.6	$8,910.6	$8,910.6	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	891.1%	356.4%	59.4%	106.4%	17.8%	17.8%	11.9%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	********	$742.55	$123.76	$99.01	$34.14	$59.40	$19.80	n/a	n/a	n/a	

TABLE 12. CLEANUP SCENARIOS FOR SIC CODE 29 (PETROLEUM AND COAL PRODUCTS)

(industry financial data from statewide summaries)

Low-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
LOW Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$162	n/a	$162	n/a	$162	$162	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$24.6	n/a	$24.6	n/a	$24.6	$24.6	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$94.5	n/a	$94.5	n/a	$94.5	$94.5	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$40.8	n/a	$40.8	n/a	$40.8	$40.8	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	1.6%	n/a	1.6%	n/a	0.0%	0.0%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	0.1%	n/a	0.1%	n/a	0.2%	0.1%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$1.41	n/a	$1.41	n/a	$0.29	$0.03	n/a	n/a	n/a	

TABLE 12. (Continued)

Medium-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
MEDIUM Compliance Costs ($000)												
One-Time and Capital Costs:	n/a	n/a	$10,572	n/a	$10,572	n/a	$10,572	$10,572	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$54.7	n/a	$54.7	n/a	$54.7	$54.7	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$210.1	n/a	$210.1	n/a	$210.1	$210.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$1,716.5	n/a	$1,716.5	n/a	$1,716.5	$1,716.5	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	66.9%	n/a	66.9%	n/a	0.5%	0.2%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	7.8%	n/a	7.8%	n/a	10.3%	4.8%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$59.19	n/a	$59.19	n/a	$12.26	$1.43	n/a	n/a	n/a	

TABLE 12. (Continued)

High-Cost Scenario for SIC Code 29

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			2		2		1	4				7
Percent of Estb:	n/a	n/a	28.6%	n/a	28.6%	n/a	14.3%	57.1%	n/a	n/a	n/a	100.0%
No. of Employees:			29		29		140	1200				1369
Avg. No. of Employees Per Establishment:	n/a	n/a	14.5	n/a	14.5	n/a	140.0	300.0	n/a	n/a	n/a	454.5
Sales Per Estb ($000):			$2,567		$2,567		$380,345	$814,156				
Assets Per Estb ($000):			$136,311		$136,311		$102,751	$219,947				
HIGH Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$55,202	n/a	$55,202	n/a	$55,202	$55,202	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$200.5	n/a	$200.5	n/a	$200.5	$200.5	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$770.1	n/a	$770.1	n/a	$770.1	$770.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$8,910.6	n/a	$8,910.6	n/a	$8,910.6	$8,910.6	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	347.1%	n/a	347.1%	n/a	2.3%	1.1%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	40.5%	n/a	40.5%	n/a	53.7%	25.1%	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$307.26	n/a	$307.26	n/a	$63.65	$7.43	n/a	n/a	n/a	

- **Chemicals and allied products (SIC code 28)**—Significant costs as a percentage of sales are observed only for small businesses under the high-cost scenario for this industry, although costs are approximately 20 percent of sales under the medium category (Table 11). This industry category shows the least overall impact among the three SIC codes described in this section, but disproportionate impacts are still observed. Costs to businesses of 50 or fewer employees are approximately 5-10 times higher compared with costs as a percentage of sales for businesses in the 51-500 employee category. Significant disproportionate impacts are clear in this industry.

- **Petroleum and coal products (SIC code 29)**—Economic impacts in businesses in this industry are the highest among the three categories but are still relatively insignificant under the low-cost scenario (approximately 1.6 percent of sales). As in the other industry categories, disproportionate economic impacts are clear, especially under the medium- and high-cost scenarios (Table 12). Costs as a percentage of sales are approximately 100 times higher for small businesses than for large businesses under the high-cost scenario, exceeding 300 percent of sales. Also, capital costs are more than 40 percent of total assets for small businesses and some of the large business categories under the high-cost scenario.

Additional tables providing comparisons for businesses under SIC codes 3731 (ship building and repairing) and 5171 (petroleum bulk stations and terminals) are provided in Appendix B. These costs address the full potential costs of the cleanup decision process rather than the incremental costs related to the unique requirements of the proposed rule relative to existing requirements. Because cleanup costs at federal Superfund sites in Puget Sound are of a comparable magnitude to those of the medium-cost scenario, the proposed rule may result in no greater costs that would otherwise be incurred over time. The incremental cost of the cleanup decision process is uncertain, because there is a wide variation in kinds of sites and the potential extent of cleanup that may be required. However, the estimated costs of compliance with the proposed cleanup decision process summarized in Table 6 include the following costs that may be attributed to Baseline 1 regulations:

- Cleanup study plan costs ranging from $10,000 to $200,000 could be incurred under Baseline 1 at CERCLA sites, which include Commencement Bay, Harbor Island, and Eagle Harbor sites in Puget Sound, and at Model Toxics Control Act sites, which are assumed to comprise approximately 50 percent of the remaining contaminated sites in Puget Sound.

- Cleanup study report costs ranging from up to $50,000 and in some cases up to $5,000,000 could be incurred under Baseline 1 at CERCLA and Model Toxics Control Act sites.
- Cleanup costs ranging from $100,000 to $50,000,000 could be incurred under Baseline 1 at CERCLA and Model Toxics Control Act sites.

In consideration of these additional Baseline 1 costs, total incremental costs associated with the proposed rule for the cleanup decision process could be as low as approximately $100,300 at CERCLA and Model Toxics Control Act sites that are cleaned up and monitored. No difference in the incremental cost would be expected at other sites not covered by these regulations.

The additional consideration of Baseline 2 regulations does not significantly affect costs of the compliance program. However, the hazard assessment under Chapter 173-336 WAC (initial investigations) may require dischargers to submit existing data. Therefore, the estimated cost of approximately $500 for this reporting activity may be attributed to Baseline 2 regulations.

5. MITIGATION OF ECONOMIC IMPACTS

Under some circumstances, the Regulatory Fairness Act requires mitigation of economic impacts caused by regulations, if the regulations may result in disproportionate economic impacts on small businesses. Pursuant to this requirement, Ecology must undertake one or more of the following actions, providing the actions are feasible and legal:

- Establish differing compliance or reporting requirements or timetables for small businesses
- Clarify, consolidate, or simplify compliance and reporting requirements for small businesses
- Establish performance rather than design standards
- Exempt small businesses from any or all requirements of the rule.

As indicated in Section 4, the proposed Sediment Management Standards are likely to result in disproportionate economic impacts on small business. For example, implementation of the rule will result in costs per $100 of sales that range from 2 to over 100 times higher for small businesses than for other businesses. These costs stem primarily from requirements for cleanup actions that may be governed by other federal and state requirements.

The proposed rule and relevant adopted regulations (e.g., Model Toxics Control Act) contain several elements that are designed to mitigate economic impacts of implementing the Sediment Management Standards:

1. An ongoing discharger of contaminants can apply for a temporary variance from sediment quality standards if its discharge activities meet requirements for AKART but nevertheless result in sediment contamination that exceeds established standards (Chapter 173-204-415 WAC). This variance provides economic mitigation by exempting the discharger from requirements for active cleanup of contaminated sediments within the authorized zone.

2. The provision for recovery zones in the proposed rule is a form of institutional controls that will mitigate economic impacts on small businesses. Moderate contamination resulting from either historical or ongoing discharges may be allowed to exceed sediment quality standards for two reasons. First, such contamination may be reduced to levels below the sediment quality standards solely because of natural processes over a reasonable time period. In these areas, businesses will not be required to undertake cleanup

actions, and corresponding economic impacts will be avoided. Second, other technical or cost considerations may result in a management decision to not require cleanup actions.

3. Small, localized areas of contamination that do not exceed screening criteria defined in the proposed rule will not be defined as contaminated sites. These screening criteria are less stringent than the sediment quality standards. Economic mitigation is provided by not identifying these areas for cleanup actions.

4. The cost of cleanup is a key criterion in setting the final cleanup standard for a site. A minimum cleanup level is defined in the proposed rule that is less stringent than the sediment quality standards. The final cleanup standard determined for a contaminated site will be within the range defined by the sediment quality standards and the minimum cleanup level. Therefore, economic mitigation is provided through consideration of the site-specific cost of cleaning up contaminated sediments.

5. Ecology wishes to avoid the collection of unnecessary information at any stage of a site investigation and cleanup, so that cleanups may proceed in a timely and cost-effective manner. Depending on the complexity of a particular site, flexibility is allowed in both the level of detail and in the scope of actions or investigations required. Ecology may take several factors into account to reduce costs when negotiating the scope of cleanup study plans [Chapter 173-204-560(2) WAC]. For example, a phased evaluation of cleanup alternatives may be appropriate at some sites. An initial screening of alternatives could reduce the number of potential remedies that must be considered in a final evaluation, thereby reducing costs.

   In addition, Ecology's streamlined procedures for routine cleanups (Chapter 173-340-130 WAC) provide for mitigation of economic impacts. A cleanup action may be considered routine if a) choices for cleanup methods are obvious and limited, b) the selected cleanup method has been proven capable of achieving the cleanup standards, c) Ecology has experience with similar actions at other sites, and d) an environmental impact statement is not required. For example, a cleanup action that involves routine dredging operations in a navigation channel may meet these criteria.

6. In specifying the need for and scope of monitoring efforts, Ecology may consider multiple factors relating to the potential for a discharge to result in contaminated sediments that exceed sediment quality standards [Chapter 173-204-400(5) WAC]. Economic mitigation is provided through consideration of appropriate monitoring conditions on a site-specific basis.

7. The proposed rule allows information from a wide variety of sources to be used in establishing or monitoring sediment impact zones or in making cleanup decisions. Although both large and small businesses are likely to be favorably affected by this provision, small businesses may receive a greater relative benefit because their cost savings in acquiring data or other information are likely to have a greater effect on revenue.

8. The state toxics control account can be used to provide cleanup funding for small businesses experiencing hardship as a result of the proposed rule. Funding needs are evaluated on a case-by-case basis, and funding can range from a partial subsidy to a complete subsidy for cleanup activities.

9. Ecology can provide technical support to small businesses (and municipalities) for developing applications for sediment impact and recovery zones. In addition, Ecology can provide technical support for NPDES permits and completing the sediment cleanup process. Ecology may be able to provide small businesses with a variety of technical support functions ranging from scoping and drafting of sampling and analysis plans to providing assistance in sampling, analysis, and data interpretation.

10. Direct financial assistance can be provided in meeting the costs of cleanup actions under the mixed funding provision of the Model Toxics Control Act (Chapter 173-340-560 WAC). Assistance may be provided in the form of a loan or a contribution in cash or in kind. To be eligible for mixed funding, a potentially liable party must have entered into a consent decree with Ecology that describes terms of the mixed funding agreement, including the manner in which cleanup action costs will be divided. Actual funding decisions are the responsibility of the Director and will depend on the availability of funds.

    The Model Toxics Control Act allows Ecology to grant financial assistance (using any available funds generated by the act) to either large or small businesses when the assistance will *both* achieve a more expeditious or enhanced cleanup than would otherwise occur, *and* prevent or mitigate unfair economic hardship. Ecology will consider the size of the potentially liable party when allocating public cleanup funds in the required settlement agreement. Because of the potentially greater economic hardship imposed by the rule on small businesses relative to larger businesses, classification as a small business would be viewed as a contributing factor toward a determination of financial need.

11. Ecology can facilitate resource sharing during data collection activities related to monitoring. For example, Ecology may be able to facilitate resource sharing among applicants in areas where there are several dischargers or potentially liable parties in close proximity. Ecology can also provide data available from compliance monitoring programs (e.g., Class II inspection surveys).

12. Many contaminated sediment sites have multiple sources of contamination. Ecology has enforcement discretion to pursue one or many potentially liable parties in enforcing cleanup requirements. This flexibility can lessen the burden on small businesses to the extent that multiple parties share cleanup costs for a site.

13. Ecology has a provision establishing an administrative process for issuing agreed orders that will help to mitigate the impacts of the proposed rule on small businesses (Chapter 173-340-530 WAC). As opposed to a consent decree or a unilateral order, an agreed order may be more desirable to potentially liable parties because of the relatively streamlined process associated with this kind of order (e.g., the assistance of an attorney is not necessarily required). Agreed orders may be used for all cleanup actions except for those sites where nonroutine cleanup actions and interim actions constitute a substantial majority of cleanup actions likely to be selected. Because they represent a simplified means of complying with some of the requirements of the cleanup decision process, agreed orders are especially well suited for small businesses.

14. Ecology expects to mitigate small business economic impacts by considering deadline extensions for Model Toxics Control Act sites requiring investigations. Although the existing deadlines under the Model Toxics Control Act allow up to 18 months to complete a remedial investigation and feasibility study after the signing of an order or decree, Ecology may extend this deadline by up to 12 months if circumstances at a specific site merit an extension.

15. Interim actions (Chapter 173-340-430 WAC) provide a means of economic mitigation for small businesses. Interim cleanup of a site may be required to reduce threats from contamination while a complete investigation is being performed. Interim actions do not completely achieve cleanup standards at a site. However, the interim action must be consistent with the final cleanup action, or, if the cleanup action is not known, the interim action must not eliminate reasonable cleanup alternatives. To the extent that interim actions are taken to address problems before they become worse with time, this provision may also contribute to an overall reduction in the total cleanup cost that may be borne by small businesses.

PART II

ECONOMIC IMPACT ANALYSIS

for

PROPOSED SEDIMENT MANAGEMENT STANDARDS
WAC 173-204

Prepared by

ICF Incorporated
and
PTI Environmental Services

1. INTRODUCTION

1.1 PURPOSE

The Washington Department of Ecology (Ecology) is proposing a management process for implementing sediment standards pursuant to requirements of the Model Toxics Control Act (RCW 70.105D), the Water Pollution Control Act (RCW 90.48) and the Puget Sound Water Quality Authority Act (RCW 90.70). The management standards will establish surface sediment quality standards (WAC 173-204-300 through 350) and define procedures for use in source control and cleanup of contaminated sediment sites. The proposed rule is summarized in Part I, Section 1.2 of this document. The following discussion of economic impacts supplements the analysis of small business impacts presented in Part I. Several assumptions described in Part I are applicable to these discussions. In particular, assumptions concerning the allocation of public and private costs are listed in Part I, Section 3.2 (*Cost Assumptions*).

1.2 REQUIREMENTS OF THE ECONOMIC POLICY ACT

The Economic Policy Act (RCW 43.21h) requires that the rule-making agency adopt methods and procedures that ensure that economic values are given appropriate consideration in the rule-making process along with environmental, social, health, and safety considerations. The statute does not specify methods for assessing economic impacts and is not limited to small business. This economic impact analysis addresses the requirements of the Economic Policy Act.

This economic impact analysis is presented in three sections. First, impacts of the proposed Sediment Management Standards are analyzed for local governments that operate municipal treatment plants discharging to Puget Sound. Although an analysis of impacts on local government is beyond the scope of the small business impact statement in Part I of this document, local governments may be significantly affected by the costs of complying with the proposed rule, and those costs are analyzed here. Private dischargers to municipal treatment plants may also experience secondary economic impacts through increases in user fees. The analysis of local governments focuses on the potential costs of sediment cleanup, which is the largest cost component of the proposed rule.

Next, impacts of the proposed rule on four selected industries are examined in greater detail than that presented in Part I of this study. These analyses are intended to provide a more thorough evaluation of the potential impacts on profitability of each industry, impacts that typify those that may be faced by firms

in other industries. Finally, impacts of the proposed rule are evaluated for port districts in Puget Sound. These districts may incur costs either through discharges to Puget Sound or as the result of routine dredging operations to maintain navigation channels.

There may also be impacts on other state agencies affected by the proposed rule. For example, the Washington Department of Natural Resources has responsibilities for submerged lands that may become contaminated by discharges to Puget Sound. Also, the Washington Department of Transportation maintains highways that may contribute contaminated stormwater to Puget Sound. Costs incurred by state agencies must be accommodated by existing budgets, enhanced revenues, or additional appropriations from the state budget process. These costs, which are most likely to be transferred to the general public in the form of a reduction in services or higher user fees, are not evaluated further in this study.

2. IMPACTS ON LOCAL GOVERNMENT DISCHARGERS TO PUGET SOUND

Local government owners of facilities that release wastes found in sediment sites may be liable, at least in part, for the cleanup of those sites. A sample of these local governments was analyzed to determine the potential economic impacts of sediment site cleanups. This analysis was conducted in three steps:

- Identify local governments subject to sediment site cleanup costs
- Establish cost data on sediment cleanups
- Establish a measure for impacts and calculate impacts.

These steps are described in the following sections.

2.1 LOCAL GOVERNMENTS AFFECTED BY THE SEDIMENT MANAGEMENT STANDARDS

A list of 43 public facilities that discharge effluent into Puget Sound was compiled from permits listed in the National Pollutant Discharge Elimination System (NPDES) database. This list was matched with U.S. Census data (i.e, population and total expenditures) on the local governments that own or operate the facilities.[1] This process resulted in a list of 18 local government entities that could be analyzed for potential economic impacts. The remaining 26 facilities from the original NPDES list are either federal facilities, which are exempt from state requirements; port facilities, which are analyzed separately in Section 4 below; water and sewer districts, for which there are insufficient census data on population and expenditures; or facilities operated by tribal nations, for which financial data are not available.

2.2 COST DATA ON SEDIMENT CLEANUP ACTIVITIES

For this analysis, the range of low, medium, and high cost estimates for the cleanup decision process discussed in Part I of this report was used. These costs were annualized using financial assumptions tailored specifically to government entities:

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[1] Population data came from the 1980 U.S. Census; financial information on local governments came from the 1982 Census of Governments.

- Financing of the cleanup costs is spread over a period of 20 years
- The discount rate for annualizing costs is 3 percent.[2]

Using this approach, annual costs for the next 20 years were developed for each cleanup cost estimate.

2.3 MEASURES FOR IMPACTS AND CALCULATION OF IMPACTS

Evaluating impacts on local governments requires use of different approaches than those used to evaluate impacts on private firms. The need for separate methods is attributable primarily to three important differences between local government entities and private firms:

- Standard financial measures for private firms are generally not applicable to local governments. In fact, because governments do not invest assets for the purpose of gaining profits, private sector measures are often meaningless. For example, while the net worth of a private firm represents the investors' share in the firm and the reserves over which management has discretionary control, the "net worth" section of a local government's balance sheet merely shows excess fund balances that are often pre-designated for use in government programs. Thus, typical financial measures such as sales, net worth, and profitability are not useful for calculating potential impacts of regulations on local governments.
- Whereas financial impacts may drive a private firm into bankruptcy, local governments almost never go bankrupt, and even when they do, they can be expected to meet all financial obligations in the long run. Therefore, measures based on the potential for bankruptcy are inapplicable to local governments.
- The financial statements of local governments do not reveal the main asset underlying the financial strength of any local government, that is, the right to levy taxes. Because standard financial measures are not applicable to local governments and do not take into account the tax revenue of such entities, measures used to assess financial and economic impacts on local governments should be tailored to address the economic base of the government entity.

In this analysis, cost as a percentage of total government expenditures is used as the measure of impact because it evaluates the extent to which current services are disrupted. The costs of complying with a new regulation may force a local

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[2] The discount rate of 3 percent is generally accepted for discounting for government entities (ICF 1986).

government to cease offering certain services. Alternatively, if a local government does not reduce current services, it may be necessary to raise taxes or fees in order to continue offering those services. Thus, the impact measure used assesses the extent to which services are directly threatened by the costs of the new rule.

The cost analysis for municipalities is based on costs for a single discharge. However, additional costs will likely be incurred when other municipal discharges such as storm drains are permitted. The proposed rule does not specify strict data requirements; rather, it presents a flexible decision-making and data-gathering process that takes into account efficiency and cost, and encourages maximizing the use of existing data. In addition, the rule provides an exemption to SIZ_{max} requirements for some municipal storm water discharges.

Table 1 shows the results of calculating costs as a percentage of expenditures for all governments in the sample. The table shows that almost no governments will face significant impacts from the low cleanup cost estimate, and large governments will face minimal impacts from the medium cleanup cost estimates. However, governments with populations in the 0 to 50,000 range may face substantial difficulty in addressing cleanup costs of medium and high magnitude. If these governments must pay over 30 percent of total expenditures for cleanup costs, they may face significant pressure on current services. In addition, even large local governments may face costs of up to 5 percent of expenditures for the high cost estimate, which could affect ongoing services.

Table 2 shows a more detailed breakdown of cost as a percentage of expenditures for local governments by population category. The percentage of local governments for which the cleanup cost exceeds 1 percent of annual expenditures is presented for various population categories. The U.S. Environmental Protection Agency (EPA) has used a 1 percent threshold to judge significant impacts for local governments in regulatory impact analyses for local government entities (U.S. EPA 1989b). Table 2 reveals that the smallest of governments will be most severely affected by sediment site cleanups at the medium- and high-cost levels, and the large majority of governments will face significant impacts from the high-cost levels.

Finally, compliance costs associated with the sediment impact zone portion of the proposed rule are on the same order of magnitude as the low level for cleanup costs. Therefore, almost no local governments are expected to face significant impacts as the result of establishing sediment impact zones.

TABLE 1. AVERAGE ANNUAL COMPLIANCE COST AS A PERCENTAGE OF EXPENSES

	Local Government Population (thousands)				All Local Governments
	0-10	10-50	50-100	100-500	
Low-Cost Assumption					
Number of Governments in Sample	5	8	1	4	18
Average Total Expenses (in thousands)	$2,628	$12,626	$36,491	$157,399	$43,347
Average Cleanup Cost (in thousands)	$16.8	$16.8	$16.8	$16.8	$16.8
Weighted Average Cost as a Percent of Total Expenses	0.7	0.2	0.0	0.0	0.3
Middle-Cost Assumption					
Number of Governments in Sample	5	8	1	4	18
Average Total Expenses (in thousands)	$2,628	$12,626	$36,491	$157,399	$43,347
Average Cleanup Cost (in thousands)	$726	$726	$726	$726	$726
Weighted Average Cost as a Percent of Total Expenses	29.1	8.7	2.0	1.0	12.3
High-Cost Assumption					
Number of Governments in Sample	5	8	1	4	18
Average Total Expenses (in thousands)	$2,628	$12,626	$36,491	$157,399	$43,347
Average Cleanup Cost (in thousands)	$3,764	$3,764	$3,764	$3,764	$3,764
Weighted Average Cost as a Percent of Total Expenses	150.9	44.8	10.3	5.0	63.5

TABLE 2. LOCAL GOVERNMENTS WITH COSTS EXCEEDING ONE PERCENT OF TOTAL EXPENDITURES

Population (thousands)	Percent of Local Governments
Low-Cost Assumption	
0-10	0
10-50	0
50-100	0
100-500	0
Total	0
Medium-Cost Assumption	
0-10	100
10-50	100
50-100	100
100-500	25
Total	83
High-Cost Assumption	
0-10	100
10-50	100
50-100	100
100-500	75
Total	94

3. IMPACTS ON SELECTED INDUSTRIES

Impacts of the sediment cleanup requirements were analyzed for the following industries that are likely to incur the costs (at least in part) of sediment site cleanups:

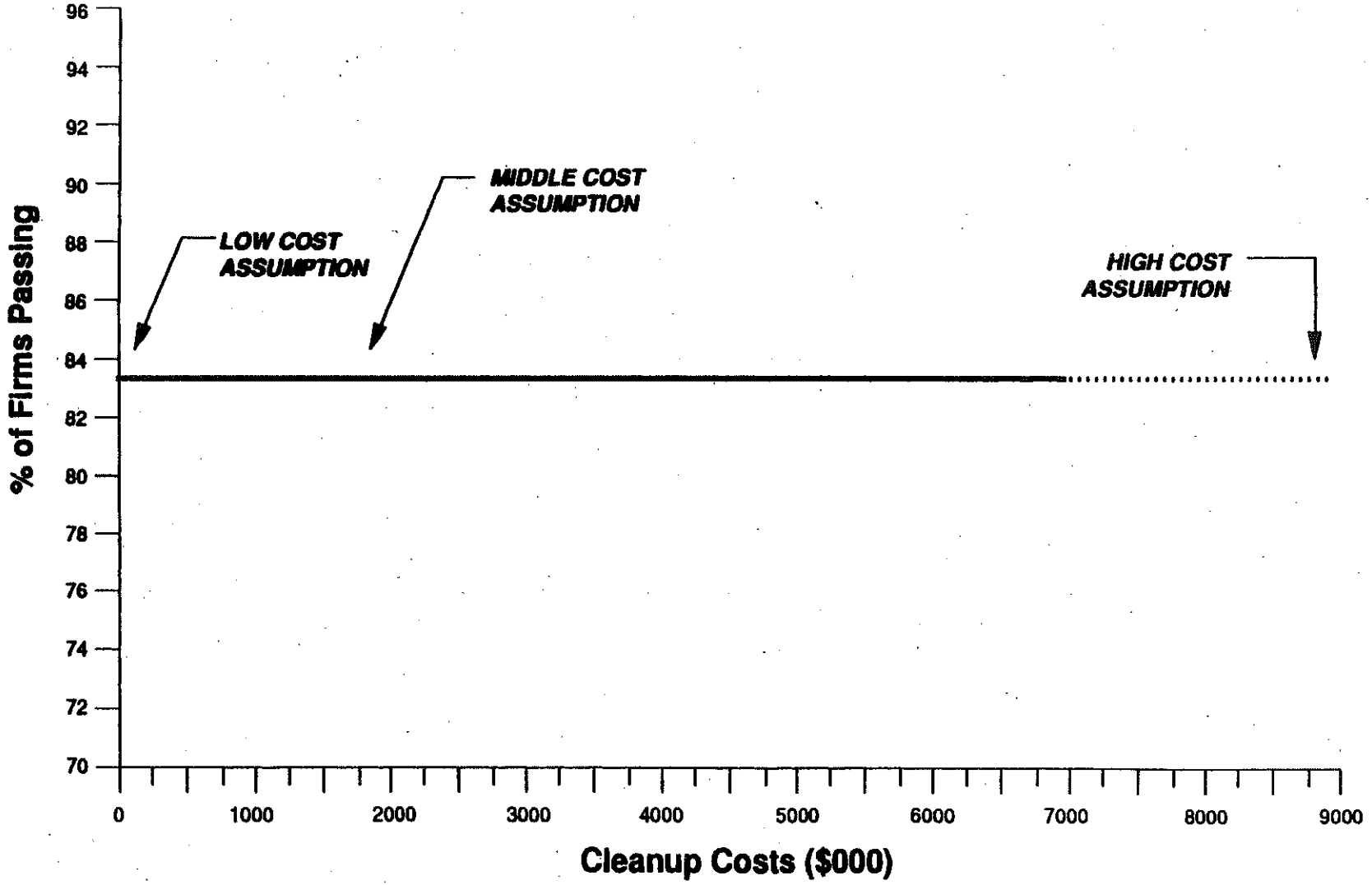
- Paper and pulp industries [standard industrial classification (SIC) code 26]
- Industrial organic chemicals industry (SIC code 286)
- Petroleum industry (SIC code 291)
- Nonferrous metals industry (SIC code 333).

Although the Regulatory Fairness Act requires Ecology to assess regulatory impacts on the basis of cost per employee or cost as a percent of sales, a better picture of the direct financial impact of regulatory costs may be obtained by measuring costs in relation to corporate profits. Specifically, cash flow (i.e., the sum of net income, depreciation, depletion, and amortization) ratios incorporating the effects of regulatory costs reveal the ability of a firm to generate the cash necessary to meet regulatory obligations and still meet other obligations in order to sustain the operations of the firm. Therefore, to analyze further the impacts of the proposed rule, firms in the industries listed above were analyzed on the basis of the following ratio (also known as the Beaver ratio): cash flow minus annual cleanup costs divided by total liabilities (Beaver 1966). If this ratio is less than 10 percent, then a firm is considered to face significant impacts and may be unable to sustain profitable operation. The 10 percent threshold for this ratio, which was established in a seminal study of bankruptcies, is used by EPA in the current financial test for owners and operators of hazardous waste treatment, storage, and disposal facilities.[3]

Figures 1, 2, 3, and 4 show the results of an analysis of firms in the four listed industries in terms of their ability to pay regulatory costs of varying levels. For SIC codes 286, 291, and 333, the firms selected for this analysis were drawn from a database of treatment, storage, and disposal facility owners and operators developed by ICF Incorporated. Thus, the firms in these SIC code categories are known to be engaged in operations that could result in hazardous discharge.

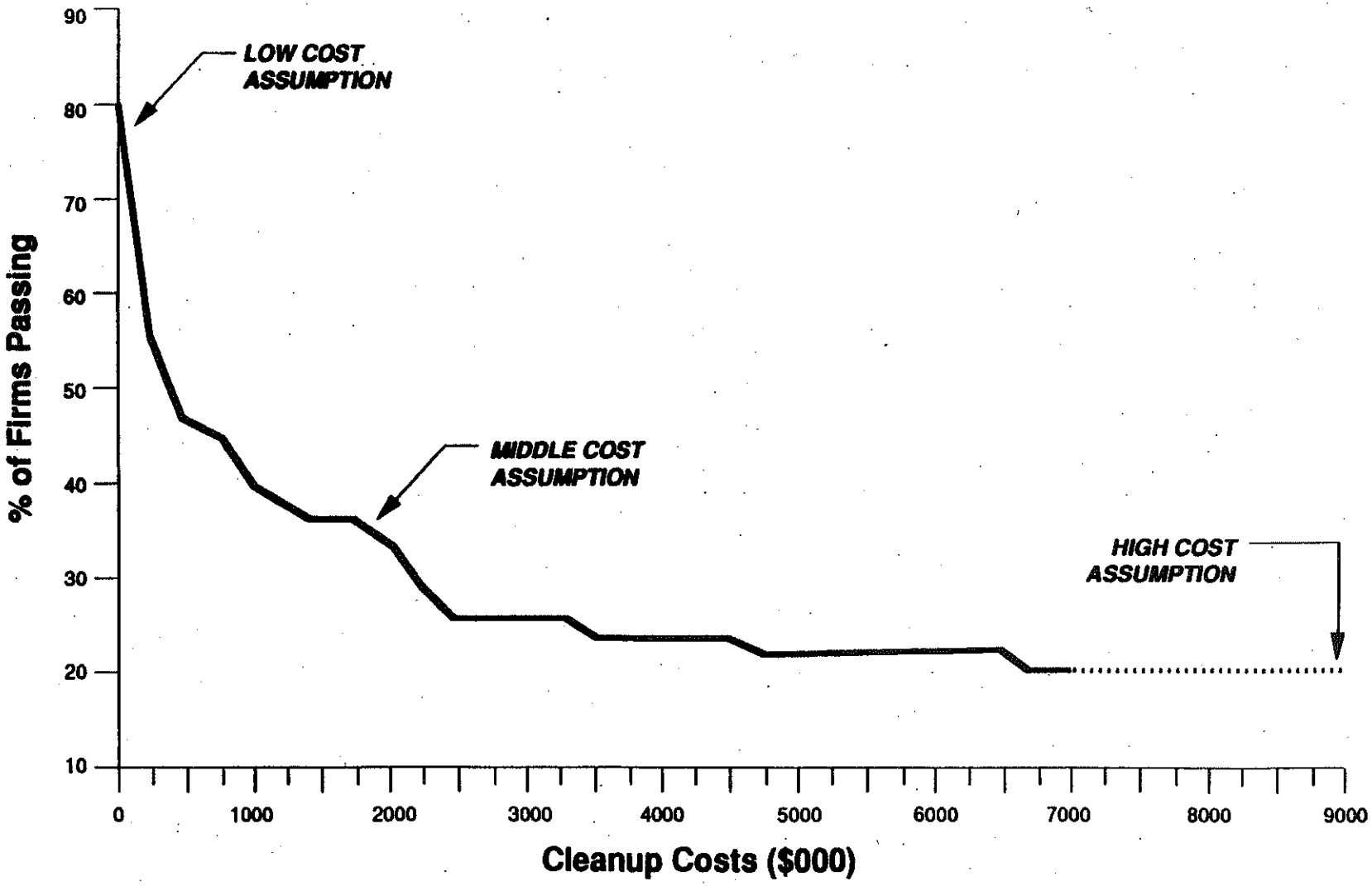
[3] Beaver (1966) found that the ratio of cash flow to total liabilities with a 0.1 threshold was the best predictor of future bankruptcy among a number of candidate ratios. The Beaver ratio was also one of the most effective single ratio tests among bankruptcy predictors identified by U.S. EPA (1981).

FIGURE 1. PERCENT OF FIRMS PASSING ABILITY TO PAY TEST FOR CLEANUP COSTS
SIC Code 26 (Pulp and Paper Industry)



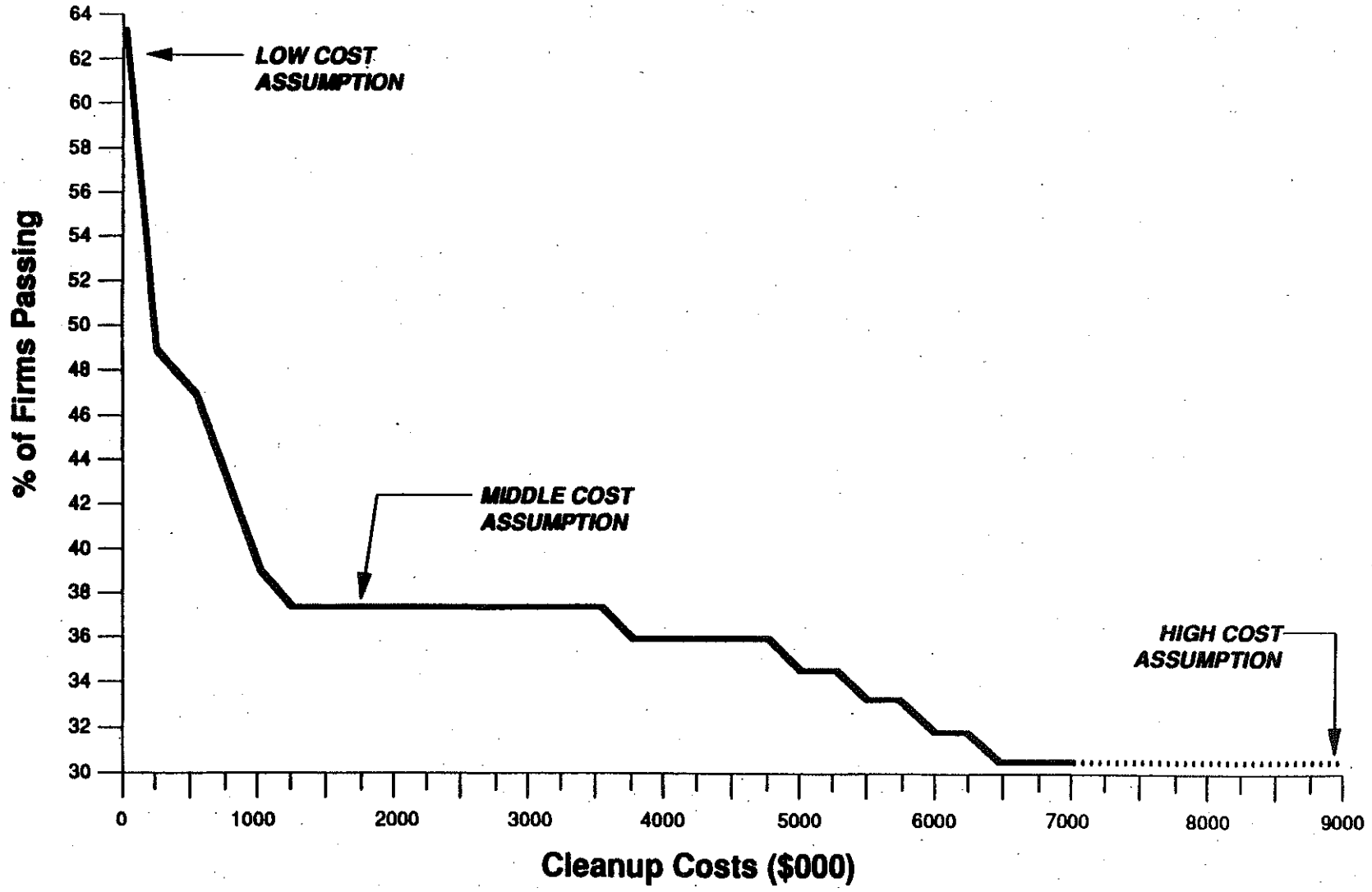
6 Firms Analyzed

FIGURE 2. PERCENT OF FIRMS PASSING ABILITY TO PAY TEST FOR CLEANUP COSTS
SIC Code 286 (Industrial Organic Chemicals Industry)



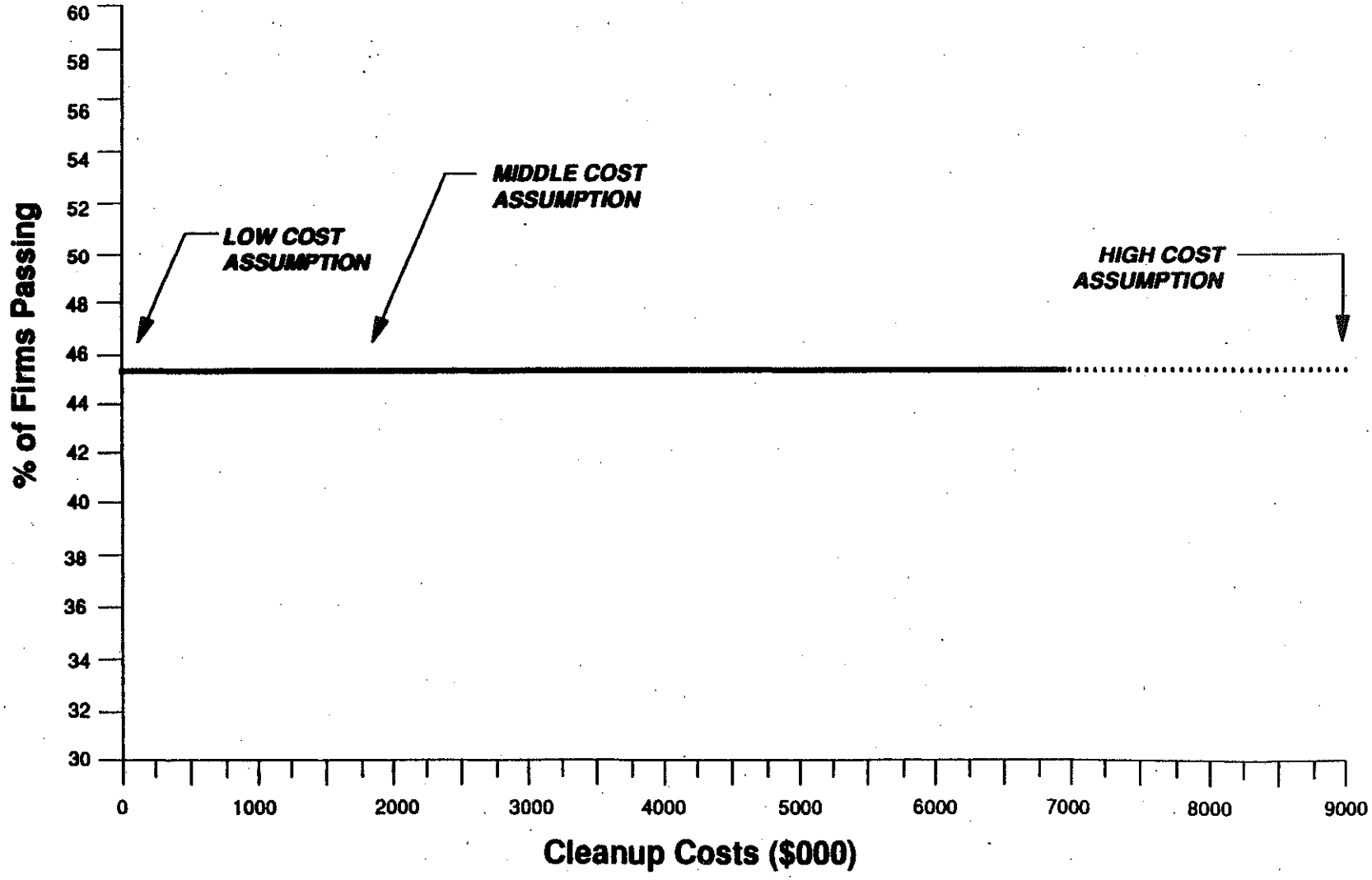
55 Firms Analyzed

FIGURE 3. PERCENT OF FIRMS PASSING ABILITY TO PAY TEST FOR CLEANUP COSTS
SIC Code 291 (Petroleum Industry)



72 Firms Analyzed

FIGURE 4. PERCENT OF FIRMS PASSING ABILITY TO PAY TEST FOR CLEANUP COSTS
SIC Code 333 (Non-ferrous Metals Industry)



11 Firms Analyzed

Because the ICF database did not contain sufficient information on firms in the pulp and paper industries (SIC code 26), a group of seven key firms in this industry were selected that were known dischargers of effluent into Puget Sound.[4]

The figures show that the ability of firms to pay for cleanup costs within the 10 percent threshold drops as the level of potential cleanup costs increases. In each figure, the low, medium, and high sediment site cleanup cost estimates are shown. The corresponding percentages reflect percentage of firms that can be expected to meet the costs and still maintain ongoing profitable operations.

Medium and high sediment cleanup costs are likely to be incurred at sites with several responsible parties. At these sites, the costs illustrated in Figures 1-4 are likely to be shared among these parties, which would reduce the cost burden on any one facility. In addition, impacts illustrated in this section may be incurred eventually as a result of requirements under currently adopted regulations (e.g., CERCLA and the Model Toxics Control Act).

[4] These firms were ITT Rayonier, Scott Paper, Weyerhaeuser, Georgia Pacific, Simpson Paper Co., and Boise Cascade.

4. IMPACTS ON PORT DISTRICTS

Port districts in the Puget Sound area may own facilities that discharge effluent into the sound, and more important, ports help to maintain navigation channels by conducting dredging projects. Through these projects, port districts may be liable, at least in part, for the cleanup of sediment sites. Therefore, the financial statements of three ports, Port of Everett, Port of Tacoma, and Port of Seattle, were examined to determine the potential impacts of sediment site cleanup on these entities.

Impacts were analyzed on ports under three cost scenarios, using the range of costs discussed above. These scenarios annualize the cleanup costs using the same assumptions used for the local government analysis in Section 2 (i.e., annualized over 20 years at 3 percent).

Several assumptions may result in a tendency to underestimate or overestimate the costs illustrated in this section. For example, the analyses are based on cleanup costs for one site. Total cleanup costs may be higher for ports with more than one contaminated site. In addition, medium and high sediment cleanup costs are likely to be shared by several responsible parties, and these costs may be incurred eventually as a result of requirements under CERCLA and the Model Toxics Control Act. It is also recognized that ports are publicly accountable entities that have reserve funds earmarked for improvement or maintenance projects. If a port eases the impact of cleanup costs by reducing these cash reserves, then the ability of a port to provide (or improve) its services may be affected.

Scenario 1: Low-Cost Site

Low-cost sites are estimated at $0 to $256,000 per site. Assuming this cost is annualized over 20 years at 3 percent, a port will face a maximum annual cost of approximately $20,000 ($17,207) per year for 20 years.

Scenario 2: Medium-Cost Site

Medium-cost sites are estimated at $256,001 to $10,800,000 per site. Assuming this cost is annualized over 20 years at 3 percent, a port will face a maximum annual cost of approximately $730,000 ($725,930) per year for 20 years.

Scenario 3: High-Cost Site

High-cost sites are estimated at $10,800,001 to $56,000,000 per site. Assuming this cost is annualized over 20 years at 3 percent, a port will

face a maximum annual cost of approximately $3,800,000 ($3,764,080) per year for 20 years.

4.1 PORT OF EVERETT

The Port of Everett had net income of approximately $7.8 million in 1989 (Port of Everett 1989, Annual Report, p. 6).[5] The port spent $5,012,966 and $3,296,706 on capital in 1989 and 1988, respectively, or about $4.2 million per year on average. In addition, the port has over $70 million in cash and temporary investments, over 8.5 times its total annual expenses.

The impact of cleanup costs on the Port of Everett are evaluated below in terms of potential impact on annual income (assumed constant[6]) and on average annual spending for capital improvements.

Scenario 1: Insignificant Economic Impact

- The port could afford cleanup costs with almost no change in income (less than 0.5 percent decrease).
- The port could afford cleanup costs with almost no change in capital spending (less than 0.5 percent decrease).

Scenario 2: Moderate Economic Impact

- The port could afford cleanup costs, although income would decrease by up to 10 percent.
- The port could afford cleanup costs with a moderate decrease in annual capital spending (about 17 percent).

Scenario 3: Significant Economic Impact

- The port could afford costs and stay profitable, but income would be reduced by 48 percent due to the cleanup.
- The port could afford cleanup costs with a significant decrease in capital spending (about 90 percent).

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[5] The port's actual net income for 1989 was $15,288,716. For purposes of this analysis, however, this figure is reduced by $7,483,159 to adjust for income received from a one-time sale of property.

[6] While the port's income increased from 1988 to 1989 (1988 income was $5.6 million), performance could decrease in the event of a national or international recession. However, further analysis would be required to determine the likely impact of an economic slowdown.

The port could readily ease these impacts by drawing on its cash reserves of over $70 million as needed. However, use of these reserves for cleanup activities may affect the port's ability to provide other services for which the reserves were originally planned.

4.2 PORT OF TACOMA

The Port of Tacoma had net income of over $14 million in 1989 (Port of Tacoma 1989, Annual Report, p. 18). The port plans to spend over $135 million in capital improvement funds during the next 5 years, or over $27 million per year, on average.[7]

The impact of cleanup costs on the Port of Tacoma are evaluated below in terms of potential impact on annual income (assumed constant[8]) and on average annual spending for capital improvements.

Scenario 1: Insignificant Economic Impact

- The port could afford cleanup costs with almost no change in income (less than 0.5 percent decrease).
- The port could afford cleanup costs with almost no change in capital spending (less than 0.5 percent decrease).

Scenario 2: Minor Economic Impact

- The port could afford cleanup costs with a small decrease in income (less than 6 percent).
- The port could afford cleanup costs with a small decrease in capital spending (less than 3 percent).

Scenario 3: Moderate Economic Impact

- The port could afford costs and stay profitable, but income would be reduced by 27 percent due to the cleanup.

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[7] In 1989 and 1988, the Port of Tacoma invested over $17.2 million and 32.4 million, respectively, on acquisition and construction of capital assets.

[8] While the port's income increased from 1988 to 1989 (1988 income was over $11 million), performance could decrease in the event of a national or international recession. However, further analysis would be required to determine the likely impact of an economic slowdown.

- The port could afford cleanup costs with a moderate[9] change in capital spending (about a 13 percent decrease).

4.3 PORT OF SEATTLE

The Port of Seattle's annual financial report does not show net income. The port's net income for 1989 is estimated at $22,873,000.[10] Capital improvements have averaged over $64 million per year for the past 5 years (Port of Seattle 1989, Annual Report, p. 29).[11]

The impact of cleanup costs on the Port of Seattle are evaluated below in terms of potential impact on annual income (assumed constant[12]) and on average annual spending for capital improvements.

Scenario 1: Insignificant Economic Impact

- The port could afford cleanup costs with almost no change in income (less than 0.5 percent decrease).
- The port could afford cleanup costs with almost no change in capital spending (less than 0.5 percent decrease).

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[9] The extent of impact depends in part on the nature of the investment activities displaced by the cleanup. For example, the required cleanup may be included in the $135 million figure cited above, causing the impact estimated above to be overstated. This may be likely given the port's claims to be "strongly committed to the responsible use and preservation of the environment," and to have "developed a pro-active environmental management plan designed to minimize the impact to the unique resources, wildlife, and livability of the Pacific Northwest..." (1989 Annual Report, p. 13). However, the port also recognizes various "environmental protection matters" which it has not reflected in its financial statements (1989 Annual Report, p. 24).

[10] For the Port of Seattle, net income may be approximated by summing changes in equity from 1988 to 1989 and subtracting the net decrease in total liabilities over the same period. This calculation conservatively implies $21,453,000 of new equity that cannot be attributed to operating income. While the Port of Tacoma and the Port of Everett classify similar items resulting from taxes, grants, and donations as "non-operating income," the Port of Seattle treats them as direct contributions to equity, similar to sale of stock by a private corporation. Either classification is valid.

[11] Capital expenditures were $58,556,000 in 1989 and $51,604,000 in 1988 (p. 21).

[12] The port's financial performance could decrease in the event of a national or international recession. However, further analysis would be required to determine the likely impact of an economic slowdown.

Scenario 2: Minor Economic Impact

- The port could afford cleanup costs with a minor change in income (less than 4 percent decrease).
- The port could afford cleanup costs with only a minor change in capital spending (less than 2 percent decrease).

Scenario 3: Moderate Economic Impact

- The port could afford costs and stay profitable, but income would be reduced by 16 percent due to the cleanup.
- The port could afford cleanup costs with a minor change in capital spending (about a 6 percent decrease).

The Port of Seattle, like other port districts, is also somewhat like local governments in that cash reserves are allocated to services. Although the Port of Seattle may be able to afford cleanup costs under all scenarios, paying for cleanup could result in some reduction in services.

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APPENDIX A

NPDES Discharges to Puget Sound

and

NPDES Industrial Facility Rating System Procedure for Developing Toxicity Ranking Scores

TABLE A-1. LIST OF NPDES DISCHARGES TO PUGET SOUND AND KEY BUSINESS INFORMATION

Facility Name	SIC	SIC Description	Corporate Employees	Local Employees	Corporate Sales (Million)	Local Sales (Million)	NPDES Classification (Major/Minor)
Private Facilities with EPA Toxicity Number=1 and Potentially 50 Local Employees or Less:							
Allison Trout Farm	921	Fish Hatcheries and Preserves	N/A	N/A	N/A	N/A	MINOR
Puget Sound By Products	2077	Animal and Marine Fats and Oil	1,400	N/A	$100	N/A	MINOR
M & R Timber	2421	Sawmills & Planing Mills Gen	N/A	N/A	N/A	N/A	MINOR
Stauffer Chemical Company	2873	Nitrogenous Fertilizers	52,700	11	$52,700	$0.5 - $1	MINOR
Private Facilities with EPA Toxicity Number=1 and >50 Employees:							
Pabst Brewing Company	2082	Malt Beverages	3,500	800	$752	$100 +	MINOR
Fleischmann's	2099	Food Preparations Nec	N/A	61	N/A	$5 - $10	MINOR
Delson Lumber Inc.	2421	Sawmills & Planing Mills Gen	100	100	$10 - $25	$10 - $25	MINOR
Weyerhaeuser Co.	2421	Sawmills & Planing Mills Gen	37,447	10,000	$10,000	$10,000	MINOR
Weyerhaeuser Co.	2421	Sawmills & Planing Mills Gen	37,447	10,000	$10,000	$10,000	MAJOR
St. Regis Paper Co.	2421	Sawmills & Planing Mills Gen	30,700	85	N/A	$6	MINOR
Anacortes Plywood, Inc.	2435	Hardwood Veneer and Plywood	200	200	$0.25 - $0.5	$0.25 - $0.5	MINOR
Buffelin Woodworking	2435	Hardwood Veneer And Plywood	500	500	$25 - $100	$25 - $100	MINOR
Simpson Timber Company	2435	Hardwood Veneer and Plywood	2,031	100	$100 +	$100 +	MINOR
ITT Rayonier Inc.	2436	Softwood Veneer And Plywood	120,000	3,500	$19,300	$100 +	MINOR
Puget Sound Plywood Inc.	2436	Softwood Veneer And Plywood	160	160	$16	$16	MINOR

Facility Name	SIC	SIC Description	Corporate Employees	Local Employees	Corporate Sales (Million)	Local Sales (Million)	NPDES Classification (Major/Minor)
Private Facilities with EPA Toxicity Number >1 and Potentially 50 Local Employees or Less:							
R.G. Haley International Corp.	2491	Wood Preserving	N/A	N/A	N/A	N/A	MINOR
Oeser Company	2491	Wood Preserving	20	20	$1 - $5	$1 - $5	MINOR
Frank Brooks Manufacturing	2491	Wood Preserving	40	40	$10 - $25	$10 - $25	MINOR
Sonoco Products Co.	2631	Paperboard Mills	14,000	20	$1,600	$10 - $25	MAJOR
Liquid Carbonic Corporation	2813	Industrial Gases	12,000	12	$1,400	N/A	MINOR
Allied Chemical Corporation	2819	Industrial Inorganic Chemicals	N/A	N/A	N/A	N/A	MINOR
Olympic Chemical Corporation	2819	Industrial Inorganic Chemicals	6	6	$1 - $5	$1 - $5	MINOR
North Coast Chemical Co, Inc.	2819	Industrial Inorganic Chemicals	30	30	$1 - $5	$1 - $5	MINOR
Reichhold Chemicals Inc.	2865	Cyclic Crudes And Intermediate	4,359	42	$873	$25 - $100	MINOR
Lilyblad Petroleum Inc.	2911	Petroleum Refining	32,641	10	$21,400	N/A	MINOR
Sound Refining Co.	2911	Petroleum Refining	99	19	N/A	N/A	MAJOR
Union Oil Company of Cal.	2951	Paving Mixtures and Blocks	18,235	N/A	$8,900	N/A	MINOR
Pabco Roofing Products	2952	Asphalt Felts and Coatings	11,000	N/A	$2,160	N/A	MINOR
Fick Foundry Company	3321	Gray Iron Foundries		N/A			MINOR
Asarco, Inc.	3331	Primary Copper	8,200	10	$2,000	N/A	MINOR
Quemetco, Inc.	3341	Secondary Nonferrous Metals	400	N/A	$80	N/A	MINOR
Ace Galvanizing, Inc.	3479	Metal Coating & Allied Services	50	50	$1 - $5	$1 - $5	MINOR
Zidell Dismantling Inc.	3731	Ship Building and Repairing	350	N/A	N/A	N/A	MINOR
United Marine Shipyards	3731	Ship Building And Repairing	1,850	50	$168	N/A	MAJOR
Chicago, Milwaukee, St. Paul	4011	Railroads, Line-Haul Operating	32,000	4	$4,700	N/A	MINOR
Bedford Properties	4231	Trucking Terminal Facilities	4,300	25	$521	N/A	MINOR
Ketron Island Enterprises	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Taylor Bay Beach Club, Inc.	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Carlyon Beach Country Club	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Wollochet Harbor Club, Inc.	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Seashore Villa Mobile Home	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Beverly Beach Utilities Assn.	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Purex Corporation Ltd	5161	Chemicals and Allied Products	4,500	N/A	$870	N/A	MINOR
Purex Corporation Ltd	5161	Chemicals and Allied Products	4,500	N/A	$870	N/A	MINOR
Union Oil Company of Cal.	5171	Petroleum Bulk Stations and Term	18,235	N/A	$8,900	N/A	MINOR
GATX Tank Storage Terminals	5171	Petroleum Bulk Stations and Term	1,900	10	$587	$1 - $5	MINOR
Chevron USA Inc.	5171	Petroleum Bulk Stations and Term	51,700	25	$27,800	$25 - $100	MINOR
Chevron USA Inc.	5171	Petroleum Bulk Stations and Term	51,700	25	$27,800	$25 - $100	MINOR
Chevron USA Inc.	5171	Petroleum Bulk Stations and Term	51,700	25	$27,800	$25 - $100	MINOR
Superior Oil Company	5172	Petroleum Products, NEC	N/A	N/A	N/A	N/A	MINOR
Pres-Sure-Matic Inc.	7542	Car Washes	N/A	N/A	N/A	N/A	MINOR

Facility Name	SIC	SIC Description	Corporate Employees	Local Employees	Corporate Sales (Million)	Local Sales (Million)	NPDES Classification (Major/Minor)
Private Facilities with EPA Toxicity Number >1 and >50 Employees							
Cascade Pole Company	2491	Wood Preserving	130	90	$15 - $25	$10 - $25	MINOR
Cascade Pole Company	2491	Wood Preserving	130	90	$15 - $25	$10 - $25	MINOR
Cascade Pole Company	2491	Wood Preserving	130	90	$15 - $25	$10 - $25	MINOR
Port Townsend Paper Co.	2611	Pulp Mills	400	400	$25 - $100	$25 - $100	MAJOR
Scott Paper Co.	2611	Pulp Mills	25,400	1,300	$4,700	$101 - $250	MAJOR
Scott Paper Company	2611	Pulp Mills	25,400	1,300	$4,700	$101 - $250	MINOR
ITT Rayonier Inc.	2611	Pulp Mills	120,000	3,500	$19,300	$100 +	MINOR
ITT Rayonier, Inc. (Pt. Ang)	2611	Pulp Mills	120,000	3,500	$19,300	$100 +	MAJOR
Weyerhaeuser Co. (Everett)	2611	Pulp Mills	37,447	10,000	$10,000	N/A	MAJOR
Weyerhaeuser Company	2611	Pulp Mills	37,447	10,000	$10,000	$10,000	MINOR
Daishowa America Company	2621	Paper Mills Exc Building Paper	5,000	350	$170	$25 - $100	MAJOR
Boise Cascade Corp.	2621	Paper Mills Exc Building Paper	19,835	100	$4,100	$10 - $25	MAJOR
Simpson Tacoma Kraft Co.	2621	Paper Mills Exc Building Paper	535	535	$25 - $100	$25 - $100	MAJOR
Georgia-Pacific Corp.	2631	Paperboard Mills	44,000	150	$9,500	$25 - $100	MAJOR
Occidental Chemical Corp.	2812	Alkalies And Chlorine	9,600	200	$1,500	$25 - $100	MAJOR
Pennwalt Corporation	2812	Alkalies And Chlorine	9,000	250	$1,020	$100 +	MAJOR
Airco Welding Co.	2813	Industrial Gases	10,000	51	$100 +	$100	MINOR
Liquid Air Corp.	2813	Industrial Gases	140	80	$100	$1 - $5	MINOR
Rhone Poulenc	2819	Industrial Inorganic Chemicals	5,800	65	$52,700	$25 - $100	MINOR
Georgia Pacific Corporation	2821	Plastics Materials And Resins	44,000	150	$9,500	$25 - $100	MINOR
Rhone Poulenc	2869	Indust. Organic Chemicals, Nec	5,800	65	$52,700	$25 - $100	MINOR
U.S. Oil & Refining Co.	2911	Petroleum Refining	140	140	$100 +	$100 +	MAJOR
Bp Oil Refinery	2911	Petroleum Refining	40,599	300	$20,500	$100 +	MAJOR
Texaco Inc	2911	Petroleum Refining	54,481	350	$34,400	$100 +	MAJOR
Shell Oil Co.	2911	Petroleum Refining	32,641	350	$21,400	$25 - $100	MAJOR
Atlantic Richfield Co. (Arco)	2911	Petroleum Refining	26,600	400	$8,900	$100 +	MAJOR
Salmon Bay Steel Corporation	3312	Blast Furnaces and Steel Mills	1,800	320	$117	$10 - $25	MINOR
Seattle Steel, Inc.	3312	Blast Furnaces And Steel Mills	800	800	$100 +	$100 +	MINOR
Earle M. Jorgensen Co.	3325	Steel Foundries, NEC	2,040	250	$341	$25 - $100	MINOR
Kaiser Aluminum & Chemical	3334	Primary Aluminum	13,454	330	$2,200	$25 - $100	MAJOR
Intalco Aluminum Corporation	3334	Primary Aluminum	2,000	1,200	$4,000	N/A	MAJOR
Atlas Foundary and Machine Co.	3462	Iron and Steel Forgings	400	400	$25 - $100	$25 - $100	MINOR
Kennworth Truck Company	3711	Motor Vehicles and Car Bodies	13,800	1,400	$3,100	$100 +	MINOR
Boeing Aerospace Company	3721	Aircraft	153,000	1,500	$16,900	$100 +	MINOR
Boeing Aerospace Company	3721	Aircraft	153,000	1,500	$16,900	$100 +	MINOR
Boeing Company	3724	Aircraft Engines & Engine Parts	153,000	153,000	$16,900	$16,900	MINOR

Facility Name	SIC	SIC Description	Corporate Employees	Local Employees	Corporate Sales (Million)	Local Sales (Million)	NPDES Classification (Major/Minor)
Boeing Aerospace Co.	3728	Aircraft Equipment, Nec	153,000	1,500	$16,900	$100 +	MINOR
Lockheed Shipbuilding Corp.	3731	Ship Building And Repairing	86,800	800	$10,600	$100 +	MINOR
Todd Pacific Shipyards Corp.	3731	Ship Building And Repairing	4,400	1,000	$351	$25 - $100	MINOR
Pacific Car And Foundry Co.	3743	Railroad Equipment	13,800	13,800	$3,100	$3,100	MINOR
Puget Sound Power and Light	4911	Electric Services		N/A			MINOR
Simpson Timber Company	4911	Electric Services	2,031	100	$100 +	$100 +	MINOR
Shell Oil Company	5171	Petroleum Bulk Stations and Term	32,641	350	$21,400	$25 - $100	MINOR
Shell Oil Company	5171	Petroleum Bulk Stations and Term	32,641	350	$21,400	$25 - $100	MINOR
Texaco Refining and Marketing	5171	Petroleum Bulk Stations and Term	54,481	350	$34,400	$100 +	MINOR
Boeing Aerospace Company	7629	Electrical Repair Shops, NEC	153,000	1,500	$16,900	$100 +	MINOR
TOTAL PRIVATE NPDES DISCHARGE	97	(includes multiple discharges for some firms)					

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Municipalities, Federal Facilities, Port Authorities, and Indian Tribal Facilities

Nisqually Indian Community	921	Fish Hatcheries and Preserves	N/A	N/A	N/A	N/A	MINOR
The Tulalip Tribes	921	Fish Hatcheries and Preserves	N/A	N/A	N/A	N/A	MINOR
Seattle, City Of Dept Of Light	4911	Electric Services	N/A	N/A	N/A	N/A	MINOR
Metro	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Metro (West Point Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Mount Vernon, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Bremerton, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Olympia, City Of (Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Des Moines Sewer District	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Pierce Count (Stp) Chambers	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Enumclaw, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Port Angeles, City Of (Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Federal Way Water & Sewer Dist	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Puyallup, City Of (Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Kitsap County Public Works	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Defense, Army	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Southwest Suburban Sewer Dist	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Edmonds, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Tacoma, City Of #2(Stp)West	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Everett, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Metro	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR

Facility Name	SIC	SIC Description	Corporate Employees	Local Employees	Corporate Sales (Million)	Local Sales (Million)	NPDES Classification (Major/Minor)
Federal Way Water & Sewer Dist	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Anacortes, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Tacoma, City Of #1(Stp)Cntrl	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Bellingham, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Sumner, City Of (Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Lynnwood, City Of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Shelton, City Of (Stp)	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Metro	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Metro	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Tacoma, City Of #3(Stp)North	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Southwest Suburban Sd	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MAJOR
Seattle, Port of	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Lummi Indian Business Council	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Ludlow Utilities	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Lummi Indian Business Council	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Ludlow Utilities	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
The Tulalip Tribes	4952	Sewerage Systems	N/A	N/A	N/A	N/A	MINOR
Tulalip Tribes of Washington	4953	Refuse Systems	N/A	N/A	N/A	N/A	MINOR
Seattle, Port of	5171	Petroleum Bulk Stations and Term	N/A	N/A	N/A	N/A	MINOR
Seattle, City Of	6514	Dwelling Operators, Exc. Apart					MINOR
Defense, Navy	9711	National Security					MAJOR
Defense, Navy	9711	National Security					MAJOR

TOTAL PUBLIC (INCLUDING TRIBAL) 43

TOTAL PUBLIC PLUS PRIVATE 140 (including multiple disharges for some firms or public entities)

NPDES INDUSTRIAL FACILITY RATING SYSTEM
PROCEDURE FOR DEVELOPING TOXICITY RANKING SCORES

The potential for an industrial effluent to cause significant toxic effects in exposed organisms, including humans, is measured by the magnitude, duration and frequency of exposure to concentrations exceeding levels of toxicological concern. In the absence of whole effluent toxicity data, or where human health impacts are to be addressed, a chemical-by-chemical approach to the development of potential toxicity ranking for industrial subcategories is appropriate. To simulate the toxicity of a complex effluent, additivity of the toxicities of the individual contaminants is assumed.

The acute, chronic and long-term potential toxicity of an effluent can thus be defined by the sum of the ratios of the daily maximum, monthly average and long-term average concentration of each pollutant in the effluent to its corresponding water quality criteria. If the sum of the ratios exceeds unity, potential effluent toxicity is assumed. The greater the magnitude of the sum, the greater the potential toxicity of the effluent.

The following equations express the chemical-specific potential toxicity of an effluent from industrial subcategory (k) containing pollutants (i):

Potential Acute Toxicity:

$$\sum_i \frac{C^*_{ik}}{ATN_i} = A_k$$

Potential Chronic Toxicity:

$$\sum_i \frac{\bar{Q}^*_k \cdot \bar{C}^*_{ik}/(\bar{Q}^*_k + 7Q10)}{CTN_i} = C_k$$

Potential Long-Term Toxicity:

$$\sum_i \frac{\bar{Q}_k \cdot \bar{C}_{ik}/(\bar{Q}_k + \bar{Q}_r)}{LTN_i} = L_k$$

where:

C^*_{ik} = The daily maximum concentration of pollutant (i) in the effluent from industrial subcategory (k) at BAT

ATN_i = The acute toxicity number for pollutant (i)

$\overline{C}^*_{ik}$ = The monthly maximum concentration of pollutant (i) from industrial subcategory (k) at BAT

7Q10 = The nationally representative once-in-ten year, 7-day low flow

CTN_i = The chronic toxicity number for pollutant (i)

C_{ik} = The long-term average concentration of pollutant (i) from industrial subcategory (k) at BAT

$\overline{Q}^*_k$ = The representative monthly maximum effluent from flow industrial subcategory (k)

$\overline{Q}_k$ = The representative average effluent flow from industrial subcategory (k)

$\overline{Q}_r$ = The nationally representative receiving water mean flow

LTN_i = The long-term toxicity number for pollutant (i)

An integer toxicity score from 1 to 10 is then assigned to the industrial subcategory based on the sum of the individual scores of the acute, chronic and long-term toxicity potentials.

In the absence of statistically-derived, nationally representative effluent and receiving water flows that translate into representative dilution factors for each industrial category/subcategory, default values of 5 for chronic exposures (i.e., 7Q10 flow) and 30 for long-term average exposures (i.e., mean flow), were used. In this way the relative proportions among acute, chronic and long-term exposures for the same effluent are preserved.

Effluent concentration data for 28 primary industrial subcategories were obtained from a report prepared for EPA's Monitoring and Data Support Division, entitled: Summary of Effluent Characteristics and Guidelines for Selected Industrial Point Source Subcategories: Industry Status Sheets (Interim Final Report, Volume I, February 1986). Acute, chronic and long-term human health water quality criteria and lowest toxicity endpoint values were obtained from the Summary of Water Quality Criteria (Gold Book) published by EPA's Office of Water Regulations and Standards in 1987. Other chronic criteria were obtained from a database developed by an EPA contractor for use in identifying candidate stream segments for the Section 304(l) lists. Table 1 summarizes the criteria used in this analysis.

The integer toxicity score was assigned based on the following ranges:

Integer Toxicity Value	Criterion Score	Integer Toxicity Value	Criterion Score
1	<1	6	16 - <32
2	1 - <2	7	32 - <64
3	2 - <4	8	64 - <128
4	4 - <8	9	128 - <256
5	8 - <16	10	≥ 256

Comparisons between the scores assigned under the existing and proposed approaches indicate that the proposed approach assigns higher scores than expected to industrial categories discharging high concentrations of metals (e.g., battery manufacturing, porcelain enameling) and assigns lower scores than expected to industrial categories with high concentrations of organic chemicals (e.g., organic chemicals manufacturing). This may in part be due to one or more of the following: 1) there are criteria for a greater percentage of the metals than organic

APPENDIX B

Additional Cost Scenario Data

INPUT DATA FOR SIZ COMPLIANCE COSTS

interest rate:	9.49%
annualization period (yrs):	10
SIZ permit period (yrs):	5

Costs ($000):	LOW	MEDIUM	HIGH
TOTAL	27.1	65.0	232.1
Application for SIZ			
Title Search	0.1	0.1	0.1
Provide Existing Data	0.5	0.5	0.5
Collect Sediment Data		10	10
Records Management	1.5	1.5	1.5
Modifications and Renewals	0.1	0.1	15.1
Sampling and QA Plans	1	5	36
Permit Monitoring	23.9	47.8	168.85
Field Equipment	1	2	12
Personnel	1	2	6.75
Chemical Analyses	9	18	51.3
Biological Analyses	6	12	45
QA and Reporting	2	4	20
Contingency (@20% field/lab)	3.4	6.8	23
Administration (@8%)	1.5	3	10.8

INPUT DATA FOR CLEANUP DECISION PROCESS
COMPLIANCE COSTS

interest rate:	9.49%
annualization period (yrs):	10
monitoring period (yrs):	5

Costs ($000):	LOW	MEDIUM	HIGH
Total Cleanup Study Plan	10	70	200
Work Plan	3	30	100
Sampling Plan	3	30	80
QA Plan	2	6	12
Health and Safety Plan	2	4	8
Cleanup Study Report	50	500	5,000
Recovery Zone Notification			
Title Search	0.1	0.1	0.1
Permit Review	0.4	0.4	0.4
Records Management	1.5	1.5	1.5
Containment	100	10,000	50,000
Permit Monitoring	24.6	54.7	200.5
Field Equipment	1.5	3	12
Personnel	1	2	8
Chemical Analyses	9	15	60
Biological Analyses	6	16	64
QA and Reporting	2	8	15
Contingency (@20% field/lab)	3.5	7.2	28.8
Administration (@8%)	1.6	3.5	12.7

TABLE B-1a. LOW COST CLEANUP SCENARIO FOR SIC 3731 (SHIP BUILDING AND REPAIR)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				1	1					1	1	3
Percent of Estb:	n/a	n/a	n/a	33.3%	33.3%	n/a	n/a	n/a	n/a	33.3%	33.3%	100.0%
No. of Employees:				50	50					800	1000	1850
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	50.0	50.0	n/a	n/a	n/a	n/a	800.0	1000.0	1850.0
Sales Per Estb ($000):				$4,500	$4,500					$100,000	$100,000	
Assets Per Estb ($000):					$0							
LOW Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	n/a	$162	$162	n/a	n/a	n/a	n/a	$162	$162	
Annual Monitoring Cost	n/a	n/a	n/a	$24.6	$24.6	n/a	n/a	n/a	n/a	$24.6	$24.6	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$94.5	$94.5	n/a	n/a	n/a	n/a	$94.5	$94.5	
Annualized Compliance Cost:	n/a	n/a	n/a	$40.8	$40.8	n/a	n/a	n/a	n/a	$40.8	$40.8	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	0.9%	0.9%	n/a	n/a	n/a	n/a	0.0%	0.0%	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$0.82	$0.82	n/a	n/a	n/a	n/a	$0.05	$0.04	

TABLE B-1b. MEDIUM COST CLEANUP SCENARIO FOR SIC 3731 (SHIP BUILDING AND REPAIR)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				1	1					1	1	3
Percent of Estb:	n/a	n/a	n/a	33.3%	33.3%	n/a	n/a	n/a	n/a	33.3%	33.3%	100.0%
No. of Employees:				50	50					800	1000	1850
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	50.0	50.0	n/a	n/a	n/a	n/a	800.0	1000.0	1850.0
Sales Per Estb ($000):				$4,500	$4,500	$50,000	$50,000	$75,000		$100,000	$100,000	
Assets Per Estb ($000):					$0							
MEDIUM Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	n/a	$10,572	$10,572	n/a	n/a	n/a	n/a	$10,572	$10,572	
Annual Monitoring Cost	n/a	n/a	n/a	$54.7	$54.7	n/a	n/a	n/a	n/a	$54.7	$54.7	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$210.1	$210.1	n/a	n/a	n/a	n/a	$210.1	$210.1	
Annualized Compliance Cost:	n/a	n/a	n/a	$1,716.5	$1,716.5	n/a	n/a	n/a	n/a	$1,716.5	$1,716.5	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	38.1%	38.1%	0.0%	0.0%	0.0%	n/a	1.7%	1.7%	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$34.33	$34.33	n/a	n/a	n/a	n/a	$2.15	$1.72	

TABLE B-1c. HIGH COST CLEANUP SCENARIO FOR SIC 3731 (SHIP BUILDING AND REPAIR)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:				1	1					1	1	3
Percent of Estb:	n/a	n/a	n/a	33.3%	33.3%	n/a	n/a	n/a	n/a	33.3%	33.3%	100.0%
No. of Employees:				50	50					800	1000	1850
Avg. No. of Employees Per Establishment:	n/a	n/a	n/a	50.0	50.0	n/a	n/a	n/a	n/a	800.0	1000.0	1850.0
Sales Per Estb ($000):				$4,500	$4,500					$100,000	$100,000	
Assets Per Estb ($000):					$0							
HIGH Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	n/a	$55,202	$55,202	n/a	n/a	n/a	n/a	$55,202	$55,202	
Annual Monitoring Cost	n/a	n/a	n/a	$200.5	$200.5	n/a	n/a	n/a	n/a	$200.5	$200.5	
PV of Total Monitoring Cost:	n/a	n/a	n/a	$770.1	$770.1	n/a	n/a	n/a	n/a	$770.1	$770.1	
Annualized Compliance Cost:	n/a	n/a	n/a	$8,910.6	$8,910.6	n/a	n/a	n/a	n/a	$8,910.6	$8,910.6	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	n/a	198.0%	198.0%	n/a	n/a	n/a	n/a	8.9%	8.9%	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	n/a	$178.21	$178.21	n/a	n/a	n/a	n/a	$11.14	$8.91	

TABLE B-2a. LOW COST CLEANUP SCENARIO FOR SIC 5171 (PETROLEUM BULK TERMINALS)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			1	1	2			2				4
Percent of Estb:	n/a	n/a	25.0%	25.0%	50.0%	n/a	n/a	50.0%	n/a	n/a	n/a	100.0%
No. of Employees:			10	25	35			680				715
Avg. No. of Employees Per Establishment:	n/a	n/a	10.0	25.0	17.5	n/a	n/a	340.0	n/a	n/a	n/a	357.5
Sales Per Estb ($000):			$2,500	$50,000	$26,250			$88,000				
Assets Per Estb ($000):					$0							
LOW Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$162	$162	$162	n/a	n/a	$162	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$24.6	$24.6	$24.6	n/a	n/a	$24.6	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$94.5	$94.5	$94.5	n/a	n/a	$94.5	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$40.8	$40.8	$40.8	n/a	n/a	$40.8	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	1.6%	0.1%	0.2%	n/a	n/a	0.0464%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$4.08	$1.63	$1.17	n/a	n/a	$0.06	n/a	n/a	n/a	

TABLE B-2b. MEDIUM COST CLEANUP SCENARIO FOR SIC 5171 (PETROLEUM BULK TERMINALS)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			1	1	2			2				4
Percent of Estb:	n/a	n/a	25.0%	25.0%	50.0%	n/a	n/a	50.0%	n/a	n/a	n/a	100.0%
No. of Employees:			10	25	35			680				715
Avg. No. of Employees Per Establishment:	n/a	n/a	10.0	25.0	17.5	n/a	n/a	340.0	n/a	n/a	n/a	357.5
Sales Per Estb ($000):			$2,500	$50,000	$26,250			$88,000				
Assets Per Estb ($000):					$0							
MEDIUM Compliance Costs ($000)												
One-Time and Capital Costs:	n/a	n/a	$10,572	$10,572	$10,572	n/a	n/a	$10,572	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$54.7	$54.7	$54.7	n/a	n/a	$54.7	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$210.1	$210.1	$210.1	n/a	n/a	$210.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$1,716.5	$1,716.5	$1,716.5	n/a	n/a	$1,716.5	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	68.7%	3.4%	6.5%	n/a	n/a	2.0%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$171.65	$68.66	$49.04	n/a	n/a	$2.52	n/a	n/a	n/a	

TABLE B-2c. HIGH COST CLEANUP SCENARIO FOR SIC 5171 (PETROLEUM BULK TERMINALS)

(industry financial data from ranges for Puget Sound businesses)

	Employment Size Class											
	1-4	5-9	10-19	20-50	Subtotal 1-50	51-99	100-249	250-499	250-499	500-999	>1000	TOTALS
Number of Establishments:			1	1	2			2				4
Percent of Estb:	n/a	n/a	25.0%	25.0%	50.0%	n/a	n/a	50.0%	n/a	n/a	n/a	100.0%
No. of Employees:			10	25	35			680				715
Avg. No. of Employees Per Establishment:	n/a	n/a	10.0	25.0	17.5	n/a	n/a	340.0	n/a	n/a	n/a	357.5
Sales Per Estb ($000):			$2,500	$50,000	$26,250			$88,000				
Assets Per Estb ($000):					$0							
HIGH Compliance Costs ($000) One-Time and Capital Costs:	n/a	n/a	$55,202	$55,202	$55,202	n/a	n/a	$55,202	n/a	n/a	n/a	
Annual Monitoring Cost	n/a	n/a	$200.5	$200.5	$200.5	n/a	n/a	$200.5	n/a	n/a	n/a	
PV of Total Monitoring Cost:	n/a	n/a	$770.1	$770.1	$770.1	n/a	n/a	$770.1	n/a	n/a	n/a	
Annualized Compliance Cost:	n/a	n/a	$8,910.6	$8,910.6	$8,910.6	n/a	n/a	$8,910.6	n/a	n/a	n/a	
Annualized Compliance Cost as a Percentage of Sales:	n/a	n/a	356.4%	17.8%	33.9%	n/a	n/a	10.1%	n/a	n/a	n/a	
One-Time and Capital Costs as a Percentage of Assets:	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Annualized Compliance Cost Per Employee:	n/a	n/a	$891.06	$356.42	$254.59	n/a	n/a	$13.10	n/a	n/a	n/a	