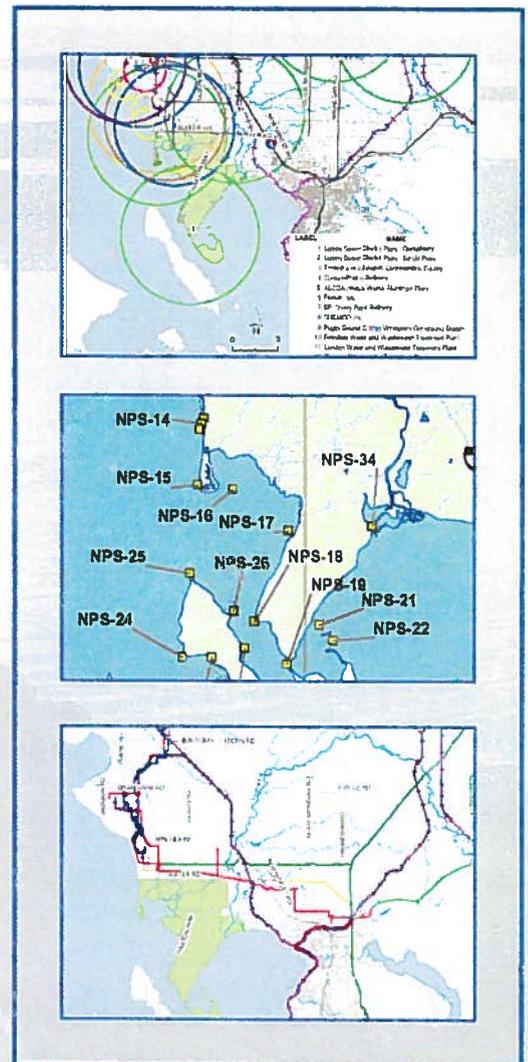


# LUMMI NATION SPILL PREVENTION AND RESPONSE PLAN

WATER RESOURCES DIVISION  
LUMMI NATURAL RESOURCES DEPARTMENT



October 2005



**LUMMI NATION  
SPILL PREVENTION AND RESPONSE PLAN**



**October 2005**

**Version 1.1**

**LUMMI NATION**  
**SPILL PREVENTION AND RESPONSE PLAN**

**Prepared for:**

**Lummi Indian Business Council  
(LIBC)**

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## EXECUTIVE SUMMARY

Large amounts of crude oil, petroleum products, and other hazardous materials are transported and stored on or near the Lummi Indian Reservation (Reservation). These hazardous materials are transported by ships, pipelines, trucks, and railroad and are used, produced, and/or stored throughout the Reservation area, particularly in the Cherry Point Heavy Impact Industrial Zone just north of the Reservation. Accidents, equipment failure, and human error have the potential to result in large spills and disastrous human and environmental consequences. Some of these hazardous materials are toxic to people and animals if inhaled or contacted. Oil and chemical spills or releases to waters on or adjacent to the Reservation have the potential to destroy some of the most productive and valuable ecosystems in the world. Spills or releases of petroleum products, chemicals, or other hazardous materials to land can threaten public safety, public health, and the environment. To date, there has not been a large hazardous material spill on the Reservation that has impacted Lummi Nation Waters. However, future residential and economic growth on the Reservation, in the adjacent Cherry Point Heavy Impact Industrial Zone, and in areas upstream from the Reservation will increase the risk of a hazardous material emergency on the Reservation. Because of the potential consequences, it is important for the Lummi Nation to develop and implement a plan to effectively respond to a hazardous material spill or release on and/or adjacent to the Reservation.

The Lummi Nation finds that hazardous material spills on and adjacent to the Reservation have a direct, serious, and substantial effect on the political integrity, economic security, health, and welfare of the Lummi Nation, its members, and all persons present on the Reservation. Further, the Lummi Nation finds that those activities that potentially increase the frequency or severity of damages from hazardous material spills, if left unregulated or unaddressed, will eventually cause such damages. Accordingly, the Lummi Natural Resources Department (LNR) is developing the Lummi Nation Spill Prevention and Response Plan (SPRP) for the Reservation. The purpose of this SPRP is to guide current and future efforts to effectively reduce the potential for damage from hazardous material spills on the Reservation and, in coordination with other jurisdictions as appropriate, to reduce the potential for damage from spills near the Reservation or that cross the Reservation boundaries.

The following actions are intended to reduce the probability of hazardous material spills and to improve the Lummi Nation's response to spills:

- Implement the Emergency Planning and Community Right to Know Act (EPCRA) on the Reservation through the formation of a Tribal Emergency Response Commission (TERC). A Lummi Nation TERC would coordinate and implement emergency response activities according to EPCRA including acquisition of Federal grant funds, develop and review LEPC plans, and establish procedures for public information.
- The TERC should coordinate with the other area spill response organizations such as the Region 10 Regional Response Team, the Northwest Area Committee, the Washington State SERC, and the Whatcom County LEPC.
- Establish a Lummi Nation Spill Response Team. This team should consist of tribal members and staff who are familiar with the Lummi Nation Waters, shorelines, and tidelands and who can commit to participating in training and to incident response.

By establishing a designated team, training resources can be focused on a set group of people who will have the time, capability, and interest to provide effective response.

- Assess and acquire appropriate training for the TERC, the Spill Response Team, Lummi Indian Business Council (LIBC) personnel, and community members.
- Maintain inventory of communication and response equipment and upgrade as needed.
- Establish a schedule and conduct appropriate spill response drills.
- Develop or review Pollution Prevention Plans (P3s) for Reservation facilities as necessary.
- Establish and/or maintain appropriate coordination with the Whatcom County Division of Emergency Management (DEM) and other agencies.
- Establish Mutual Aid Agreements with Whatcom County DEM and facilities near the Reservation.
- Offer public education opportunities specific to hazardous materials spills such as the four-hour First Responder Awareness Level hazardous materials training.
- Develop a plan for providing spill information to Reservation residents through coordination of the LIBC Safety Office and the LIBC Communication Office with established Whatcom County DEM and radio public information procedures and public meetings.
- Continue to review and provide comments to the Northwest Area Committee and the Region 10 Regional Response Team on the Geographic Response Plans for adequate protection of tribal resources.
- Participate on the Washington State Department of Ecology Spills Program Resource Damage Assessment (RDA) committee or other appropriate groups for spills that impact the Reservation and the Lummi Usual and Accustomed hunting, fishing, and gathering grounds and stations to ensure consideration and best possible protection of tribal resources.
- Identify and pursue potential federal, state, and local funding for training, purchase of additional equipment, maintenance of existing equipment, and tidegate repair.

It is anticipated that these actions will be pursued in coordination with the LIBC Safety Office and the Lummi Nation Comprehensive Emergency Management Plan that is being developed by the Safety Office.

The best way to protect human health and the environment from hazardous materials spills and to minimize the costs of environmental protection and restoration is to prevent the release of oil or hazardous substances. In general terms, a prevention and response plan for spills of hazardous materials (spill prevention and response plan) is a set of

measures to prevent the release of oil or hazardous substances as well as a system of contingency plans that outline steps to be taken by local entities in the event of a spill, including individual responsibilities and a chain of command. Such a plan is designed for any incident involving hazardous material that, when uncontrolled, may be harmful to life, property, or the environment.

Preventing spills and minimizing damage from spills are important elements of spill plans. This SPRP represents a further step toward effective spill prevention and response for the Lummi Nation. The Lummi Nation has already taken significant steps including implementation of environmental, development, and construction regulations (e.g., the Land Use, Zoning, and Development, Water Resources Protection, Flood Damage Prevention, Building, and Solid Waste Control and Disposal codes) and review of spill prevention and response plans. In addition to existing federal regulations, implementation of development regulations and review of projects by the LIBC Technical Review Committee will continue to help reduce the potential for hazardous material spills, particularly smaller scale spills. The potential for larger scale spills primarily exists off-Reservation and is addressed by federal and state regulation.

The Lummi Nation can help protect its people and resources by reviewing spill prevention and response plans for facilities in the Reservation area, participating in their spill response drills, and by ensuring that pollution prevention plans are developed for facilities on the Reservation. Implementation of the proposed actions in this plan should significantly reduce potential spill damages on the Reservation. Consistent attention and adequate funding to implement these actions will be required to maximize the spill prevention and response benefits of protecting public health and safety, protecting cultural and natural resources, and protecting the political integrity, economic security, and welfare of Reservation residents.

## 1. INTRODUCTION

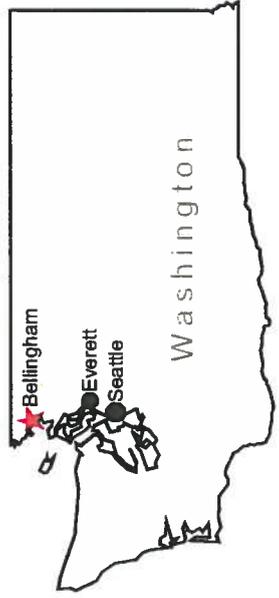
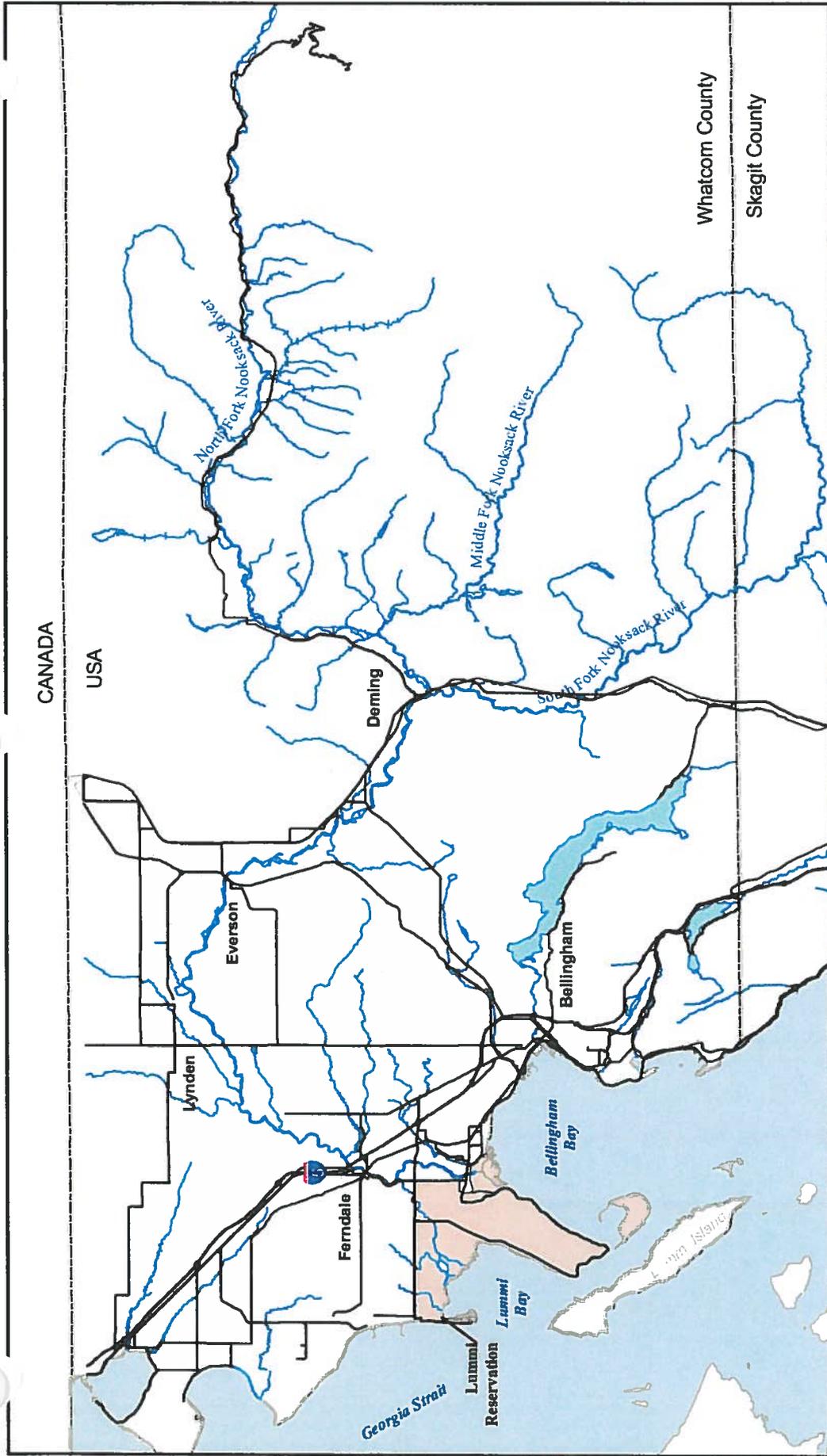
Hazardous pollutants are released into the environment from a variety of sources ranging from small businesses, motor vehicles, and farms to large oil refineries, power plants, and other industrial sources. Spills occasionally happen anywhere hazardous materials are handled or transported in the course of daily commerce. In Washington State, billions of gallons of oil and hazardous chemicals are transported through the Puget Sound region each year by ship, pipeline, rail, and road. According to the 2001 Annual Report of the Washington State Department of Ecology (Ecology), more than 16 billion gallons of petroleum oil product moves through the state annually. A large portion of this oil and fuel is transported by tanker ships and pipelines to and from two oil refineries that are located within five miles of the Lummi Indian Reservation (Reservation) and two other oil refineries located approximately 15 air miles from the Reservation. In the Reservation area, a total of over ten billion pounds of hazardous materials are shipped, stored, processed, or manufactured in or through Whatcom County each year (Whatcom County 2003).

The hazardous properties of chemicals, petrochemical products, radioactive substances, and other materials range from being a health threat to being dangerously toxic or explosive. The uncontrolled release or spillage of hazardous substances may pose a serious threat to life, property, and the environment. For example, the 1999 fuel spill and explosion from the Olympic (now BP Olympic Pipeline Co.) pipeline in Bellingham released more than 200,000 gallons of gasoline, killed three people, and caused extensive environmental damage. The incident highlighted the risk posed by petroleum transmission pipelines and the relative risks posed by storage and transport of large volumes of hazardous materials by other means.

The impacts of hazardous material incidents vary depending upon factors such as the materials involved, the quantity released, and the location of the incident relative to surface water, populated areas, transportation, and evacuation routes. Other factors include time of day and weather conditions. In the case of airborne hazardous material releases, wind speed and direction are very important, as well as the immediate response capability. In the Reservation area, the number of large fixed facilities using hazardous materials, the amount of hazardous materials being stored and/or transported, the proximity of local populations, and the existence of many environmentally sensitive areas combine to produce a high level of risk and vulnerability to hazardous material incidents. The variety of potential incidents and effects involving hazardous materials is such that the involvement of several government agencies and private industries is often required during the response to a specific incident.

### 1.1 DESCRIPTION OF THE LUMMI RESERVATION

As shown in Figure 1.1, the Lummi Reservation is located in northwest Washington at the mouth of the Nooksack River and along the western border of Whatcom County. The Nooksack River drains a watershed of 786 square miles, flows through the Reservation near the mouth of the river, and discharges to Bellingham Bay (and partially to Lummi Bay during high flows). The Reservation includes the Nooksack and Lummi river deltas and all tidelands adjacent to upland areas of the Reservation. In addition to riverine and coastal floodplain areas, the Lummi Reservation has two relatively large



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Figure 1.1 Regional Location of the Lummi Indian Reservation

forested upland areas and a smaller forested upland area on Portage Island. The Reservation includes approximately 12,500 acres of uplands and 7,000 acres of tidelands. The Reservation is located at the southern extent of the Strait of Georgia and the northern extent of Puget Sound. Approximately 38 miles of highly productive marine shoreline surround the Reservation uplands on all but the north and northeast borders. The Reservation features relatively low topographic relief and a temperate marine climate.

The Reservation waters (a.k.a. Lummi Nation Waters) contain significant resources for both the Lummi Nation and the region. Numerous economically and culturally important species, including herring, salmon, oyster, manila clam, little neck clam, butter clam, horse clam, and Dungeness crab, are present in Lummi Nation Waters. Estuarine waters of the Nooksack and Lummi River deltas form the interface between marine water and fresh water. Estuarine waters have a unique importance for fish habitat, as juvenile salmon reside in these waters during their acclimatization to saltwater and adult salmon during their acclimatization to fresh water. Because these water resources are vital for economic stability, growth, and the cultural and spiritual life of the community, the potential contamination of Lummi Nation surface waters has a direct, serious, and substantial effect on the health and welfare of the Lummi Nation, its members, and all persons present on the Reservation.

In addition, because of the geographic and hydrogeologic conditions in the area, ground water resources on the Reservation are vulnerable to pollution. Over 95 percent of the residential water supply for the Reservation is currently pumped from local ground water wells. The contamination of these aquifers would adversely affect the health of persons drinking or using water from these supplies. Ground water resources are vulnerable to contamination from agricultural, residential, municipal, commercial, and industrial land uses. Ground water contamination could lead to the loss of the primary potable water supply source for the Reservation because water supply wells are difficult to replace, ground water contamination is very expensive to treat, and some damages to ground water caused by contamination may be impossible or unfeasible to mitigate.

Potential sources of hazardous pollutants to surface and ground waters in the immediate vicinity of the Reservation include oil refineries, an aluminum smelter, electrical generation plants, chemical factories, and other facilities. Many small businesses, such as dry cleaners or auto body paint shops, are also potential sources of contamination. There are numerous industrial facilities in very close proximity to the Lummi Reservation (e.g., ConocoPhillips refinery, Alcoa-Intalco Works aluminum smelter, Tenaska Washington Cogeneration facility, and BP Cherry Point refinery) as well as three wastewater treatment facilities (i.e., Ferndale, Lynden, and Everson) with outfalls that discharge to the Nooksack River. There are several facilities that store pollutants within the Reservation (e.g., the two Lummi Tribal Sewer and Water District wastewater treatment plants, in-line chlorinators associated with water supply wells, Lummi Shell gas station, and Fisherman's Cove gas station/mini-mart) as well as a major interstate/international freeway, a railroad, oil and fuel pipelines, industries, and other potential contaminant sources within several miles of the Reservation boundaries. Future residential and economic growth on the Reservation, in the Cherry Point Heavy Impact Industrial Zone, and in the area upstream from the Reservation will increase the risk of a hazardous material emergency on the Reservation.

## 1.2 DEFINITION OF SPILL PREVENTION AND RESPONSE

Hazardous materials are substances that are toxic, corrosive, flammable, and/or explosive. This is a general description of hazardous materials that encompasses the many interconnected federal regulatory definitions. In many instances, hazardous materials have the potential to cause injury to life and/or damage to water and other environmental resources. In addition to accidental spills, hazardous materials may also be released as a secondary result of natural disasters such as earthquakes and floods or deliberately by someone dumping wastes or by an act of terrorism.

The best way to protect human health and the environment from hazardous materials spills and to minimize the costs of environmental protection and restoration is to prevent the release of oil or hazardous substances. In general terms, a prevention and response plan for spills of hazardous materials (spill prevention and response plan) is a set of measures to prevent the release of oil or hazardous substances as well as a system of contingency plans that outline steps to be taken by local entities in the event of a spill, including individual responsibilities and a chain of command. Such a plan is designed for any incident involving hazardous material that, when uncontrolled, may be harmful to life, property, or the environment.

Hazardous material spills are situations of a potentially serious nature, developing suddenly and unexpectedly, and demanding immediate action. There are four interrelated steps involved in reducing the frequency and potential effects of spills:

- **Prevention:** Spill prevention measures include proper storage and handling of materials, effective training for hazardous material handlers, adequate staffing of facilities, and an emphasis on safety.
- **Preparation:** Preparation includes having plans, trained staff, and response materials in place before an emergency occurs. Preparedness can reduce the likelihood that an emergency will occur and can also reduce the extent of a hazardous spill.
- **Response:** Response is how quickly a community can react to an emergency and should improve with preparedness. Rapid response is very important for reducing the impacts of a hazardous material emergency.
- **Recovery:** Recovery is how well events are managed to return the environment to a pre-accident condition. In general, recovery costs are minimized if the preparedness and response steps are performed well.

All four of these steps were the focus of federal legislation and the development of implementing regulations that address each step. The primary legislation and regulations are summarized in Section 2 and described in detail in Appendices A and B.

## 1.3 GOALS AND OBJECTIVES

The overall goal of this spill prevention and response plan is to minimize the adverse effects of incidents involving hazardous materials on or adjacent to the Lummi Reservation. Minimizing spill impacts is accomplished by proactively implementing spill prevention measures and, in the event of a spill, providing timely and competent response. Having a plan in place and practicing appropriate responses to hazardous

spills can prevent or minimize surface water, ground water, and other environmental contamination, thereby ensuring the highest feasible quality for water and other valuable environmental resources. Such actions will reduce or eliminate costly spill recovery efforts, potential loss of valuable resources, and the potential need to find expensive alternate sources of water. Having a good spill response plan in place is an element of proactive prevention that results from a better understanding of the consequences of improperly stored or handled hazardous substances.

This Spill Prevention and Response Plan (SPRP) is intended to help protect public health, public safety, and the environment on the Reservation by developing a spill prevention, preparedness, and response program that provides appropriate guidance to Lummi Indian Business Council (LIBC) staff and community members. This plan focuses on steps that are intended to prevent oil and chemical spills to Lummi Nation waters and lands, outlines steps that ensure effective response to spills of oil and hazardous substances, and details training requirements for key personnel.

#### **1.4 ORGANIZATION OF REPORT**

This plan is organized into the following five sections:

- Section 1 is this introductory section;
- Section 2 briefly describes the legal context of spill prevention and response and introduces federal, state, and local spill response plans and resources;
- Section 3 describes potential spill sources on and near the Reservation;
- Section 4 describes Lummi Nation spill prevention and response measures including recommendations for training and equipment, identification of potential funding sources, and a recommended action plan;
- Section 5 summarizes this SPRP.

The references cited in this plan and the acronyms and abbreviations used in this plan follow Section 5. The appendices attached to this plan contain supplemental information and the accompanying Spill Response Binder contains information, forms, and procedures to be used during a spill response.

## **2. FEDERAL, STATE, AND REGIONAL SPILL PREVENTION AND RESPONSE CONTEXT**

This section gives a brief overview of the federal and tribal laws that direct spill prevention and response and the national, regional, and local level plans and resources that are available to the Lummi Nation. These laws and plans are outlined in Tables 2.1 and 2.2 and explained in further detail in Appendix A and B.

### **2.1 FEDERAL AND TRIBAL LAWS**

The United States Environmental Protection Agency (EPA) is the primary federal regulatory agency responsible for the development of policies to protect the population and environment of the United States from adverse effects of pollution. The EPA is required by law to implement the requirements of many congressional acts, including four that are particularly important to spill prevention and response: the Clean Water Act (CWA), the Emergency Planning and Community Right-to-Know Act (EPCRA), the Oil Pollution Act of 1990 (OPA), and the Clean Air Act (CAA). Additionally, Titles 15, 15A, 17, and 18 of the Lummi Nation Code of Laws include provisions to protect the Lummi Nation Waters from hazardous substance spills.

The focus of the Clean Water Act (CWA) is on reducing pollution to the waters of the United States. The CWA pertains to spill prevention and response by authorizing the determination of quantities of oil that would be harmful if discharged; requiring the development of the National Oil and Hazardous Substances Pollution Contingency Plan or National Contingency Plan (NCP), to minimize damage from oil discharges; and establishing the Oil Pollution Prevention regulation which requires the Spill Prevention, Control, and Countermeasure Program (SPCC) and the development of Facility Response Plans. The Oil Pollution Prevention regulation requires owners and operators of regulated facilities to prepare a Facility Response Plan (FRP) and the SPCC program seeks to prevent oil spills from certain aboveground and underground storage tanks. The CWA also establishes the National Pollutant Discharge Elimination System (NPDES) to regulate discharges of all pollutants to waters of the United States<sup>1</sup>. The 1987 amendments to Section 518 of the CWA authorized the EPA to treat qualified Indian tribes as states by delegating regulatory authority for specified sections of the Act. Delegated activities include the authority to grant water quality certifications (§401), to grant discharge permits under the NPDES (§402), to grant dredge and fill permits under §404, and to set water quality standards under §303 (Slade and Stern 2004).

The focus of the Emergency Planning and Community Right-to-Know Act (EPCRA) is on helping local communities protect public health and safety and the environment from chemical hazards. To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). Each SERC was required to divide their state into Emergency Planning Districts and to name a Local Emergency Planning

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<sup>1</sup> Waters of the United States include all waters currently or historically used for interstate or foreign commerce, including waters subject to the ebb and flow of tides and many lakes, rivers, streams and wetlands.

Table 2.1 Summary of Federal and Tribal Laws

Law	Spill Type	Summary
<p><b>Water Pollution Control Act Amendments of 1972 (Clean Water Act or CWA)</b></p>	<p>All pollutants</p>	<ul style="list-style-type: none"> <li>• Focuses on reducing water pollution.</li> <li>• Established the National Pollutant Discharge Elimination System (NPDES).</li> <li>• Developed the National Contingency Plan (NCP).</li> <li>• Authorizes the EPA to delegate authority to tribes.</li> <li>• Includes the Oil Pollution Prevention Regulation.</li> </ul>
<p><b>Emergency Planning and Community Right-to-Know Act (EPCRA) 1986</b></p>	<p>Toxic chemicals</p>	<ul style="list-style-type: none"> <li>• Designed to help local communities protect themselves from chemical hazards.</li> <li>• Requires each state to appoint a State Emergency Response Commission (SERC).</li> <li>• Requires SERCs to divide states into Emergency Planning Districts with a Local Emergency Planning Committee (LEPC) for each district. Tribes can appoint a TERC.</li> <li>• Has 4 major provisions: planning, notification, reporting, and inventory.</li> </ul>
<p><b>The Oil Pollution Act of 1990 (OPA)</b></p>	<p>Oil</p>	<ul style="list-style-type: none"> <li>• Provides national planning and preparedness provisions for oil spills.</li> <li>• Expanded the NCP into a three tiered approach:                             <ul style="list-style-type: none"> <li>o Federal government directs public and private response efforts.</li> <li>o Area Committees develop location-specific Area Committee Plans.</li> <li>o Vessel and facility owners/operators prepare facility response plans.</li> </ul> </li> <li>• Created the Oil Spill Liability Trust Fund to provide cleanup funds.</li> </ul>
<p><b>The Clean Air Act (CAA) 1970</b></p>	<p>Hazardous air pollutants (HAPs)</p>	<ul style="list-style-type: none"> <li>• Gave the EPA the authority to list and regulate Hazardous Air Pollutants (HAPs).</li> <li>• Requires the EPA and OSHA to issue regulations for chemical accident prevention.</li> <li>• Requires certain facilities to prepare a Risk Management Program (RMP).</li> <li>• Eligible tribes can apply to EPA for authorization to administer the RMP program.</li> </ul>
<p><b>Lummi Nation Code of Laws Title 15, Land Use, Zoning, and Development Code</b></p>	<p>All pollutants</p>	<ul style="list-style-type: none"> <li>• Forms the Technical Review Committee which reviews land use permit applications and stipulates project design standards and best management practices that reduce the potential for hazardous materials spills.</li> <li>• Limits where land use activities that store, use, or generate hazardous materials can be located on the Reservation</li> </ul>
<p><b>Lummi Nation Code of Laws Title 15A, Flood Damage Prevention Code</b></p>	<p>All pollutants</p>	<ul style="list-style-type: none"> <li>• Aims to minimize flood damage to treaty protected resources.</li> <li>• Requires service facilities (which may contain pollutants) to be floodproofed.</li> <li>• Requires on-site waste disposal systems to be located to avoid damage and contamination to floodwaters.</li> </ul>
<p><b>Lummi Nation Code of Laws Title 17, Water Resources Protection Code</b></p>	<p>All pollutants</p>	<ul style="list-style-type: none"> <li>• Prohibits unauthorized discharges to Lummi Nation Water.</li> <li>• Provides for wellhead protection.</li> <li>• Provides storm water management requirements.</li> <li>• Provides stream and wetland management regulations.</li> <li>• Requires the establishment of water quality standards to protect Reservation surface waters.</li> </ul>
<p><b>Lummi Nation Code of Laws Title 18, Solid Waste Control and Disposal Code</b></p>	<p>Solid waste</p>	<ul style="list-style-type: none"> <li>• Provides for proper control and disposal of solid wastes on the Reservation.</li> <li>• Makes dumping of solid waste into the water unlawful.</li> <li>• Prohibits the accumulation of solid waste.</li> <li>• Prohibits landfills on the Reservation.</li> </ul>

Committee (LEPC) for each district. Similarly, tribes can appoint a Tribal Emergency Response Commission (TERC) to coordinate and implement emergency response activities.

These tribal, state, and local organizations implement the four provisions of EPCRA: planning, reporting, notification, and inventory. One aspect of the reporting provision is the requirement for certain facilities to annually submit a hazardous chemical inventory in the form of a Tier I or Tier II report. Washington State requires facilities to submit Tier II reports which include chemical name, quantity, storage, and location. The inventory provision requires certain facilities to complete and submit a Toxic Chemical Release Inventory (TRI) form annually for specified chemicals. The TRI requirement was expanded by the Pollution Prevention Act of 1990 which requires facilities that submit TRI reports to develop Pollution Prevention Plans (EPA 2004b). These plans are intended to reduce hazardous substance use and hazardous waste generation.

The Oil Pollution Act (OPA) of 1990 provides planning and preparedness provisions for oil spills similar to the provisions that EPCRA provides for extremely hazardous substances. These provisions include the expansion of the NCP into a three-tiered approach (federal, area, and owners/operators), the creation of the Oil Spill Liability Trust Fund, increased penalties for noncompliance, broadened federal responsibility for response and enforcement, and preservation of state authority to establish laws governing oil spill prevention and response. The OPA plans offer an opportunity for the LEPCs formed in compliance with the EPCRA to coordinate their plans with area and facility oil spill plans covering the same geographical area (EPA 2003a).

The Clean Air Act gives the EPA the authority to list air toxins for regulation and then to regulate these chemicals. The 1990 Clean Air Act amendments include a list of 189 hazardous air pollutants (HAPs) selected by Congress on the basis of potential health and/or environmental hazard. To improve spill prevention and response, the 1990 CAA amendments also require the EPA and OSHA to issue regulations for chemical accident prevention. Under CAA Section 112(r), all chemical facilities with processes that exceed a threshold quantity for one of 77 acutely toxic substances (such as chlorine and ammonia) or one of 63 highly volatile, flammable substances (when not used as a fuel) must develop a Risk Management Plan (RMP) to identify and evaluate hazards and manage those hazards safely. These facilities must submit a summary of the RMP to the EPA or its delegated agency. The SERCs, TERCs, and LEPCs can access off-site consequence analysis (OCA) information about facilities that have submitted an RMP (EPA 2002). Tribes that the EPA finds eligible for treatment in the same manner as a state under the CAA Tribal Air Rule (40 CFR Part 49) can apply for authorization to administer the RMP program.

Lummi Nation laws that relate to spill prevention and response include the Land Use, Zoning, and Development Code (Title 15), Flood Damage Reduction Code (Title 15A), the Water Resources Protection Code (Title 17), and the Solid Waste Control and Disposal Code (Title 18) of the Lummi Nation Code of Laws. The Land Use, Zoning, and Development Code works to prevent spills of hazardous substances by land use zoning and land use permitting processes. The Flood Damage Reduction Code works to prevent spills of hazardous substances by placing requirements on structures built within the floodplain and therefore keeping associated hazardous materials out of the floodplain and out of flood waters. Title 17 works to protect the surface and ground

water of the Reservation from the adverse effects of pollution and includes permit requirements for discharges, the establishment of sanitary control areas around wells and springs, prohibition of landfills in Wellhead Protection Areas, and a permit requirement for activities that would introduce pollutants to wetlands or result in a physical or chemical change of wetland water quantity and quality. The Lummi Natural Resources Department administers the Water Resources Protection Code, Title 17 of the Lummi Nation Code of Laws, as part of its Comprehensive Water Resources Management Program (CWRMP). Title 18 prevents spills to Lummi Nation Waters by making dumping of solid waste illegal, prohibiting the accumulation of solid waste, and prohibiting the construction of landfills on the Reservation.

## 2.2 SPILL RESPONSE RESOURCES

The National Contingency Plan (NCP) is the federal plan for responding to both oil spills and hazardous substance releases. It is the result of efforts to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans. The NCP describes the National Response System (NRS) and establishes the National Response Team (NRT) and the 13 Regional Response Teams (RRTs). The NCP provides the framework for the NRS and establishes how it works. The NRS is a multi-layered system of individuals and teams from local, state, and federal agencies; industry; and other organizations that share expertise and resources to ensure that oil spill control and cleanup activities are timely and efficient and that activities minimize threats to human health and the environment (EPA 2003b). The NRS includes four levels of contingency planning (federal, regional, area and local, and site-specific industry) that guide response efforts and provides a framework for coordination among these levels (NRT 1998).

The hierarchical, cross-jurisdictional approach of the NRS is the result of the application of the Incident Command System/ Unified Command (ICS/UC). ICS is a standardized on-scene incident management concept designed specifically to allow responders to adopt an integrated organizational structure

### National Contingency Plan (NCP)

- Required by the CWA and expanded by CERCLA and OPA
- Federal plan for response to oil and hazardous substance releases
- Provides national response capability
- Promotes coordination among responders and plans
- Establishes the NRT and 13 RRTs
- Describes the NRS

### National Response System (NRS)

- Coordinates agencies for a focused response
- Includes four levels of contingency planning: federal, regional, area, and local
- Requires development of Regional Contingency Plans by RRTs
- Is 3-tiered: NRT, RRT, OSC

### National Response Team (NRT)

- Chaired by EPA, USCG serves as Vice-Chair
- Membership of 16 federal agencies
- Three major activities
  1. information distribution
  2. emergency planning
  3. emergency training
- Manages the NRS
- Operates the NRC
- Monitors Regional Response Teams

### Regional Response Team (RRT)

- Develops RCP to define roles of responders
- Co-chaired by EPA and USCG
- Provides assistance as requested by OSC
- May request assistance from NRT

### Area Committees

- Develop Area Contingency Plans with detailed response information
- ACP must be consistent with local LEPC response plan

Table 2.2 Summary of Federal, State, and Local Spill Response Resources

<b>Jurisdiction</b>	<b>Resource</b>	<b>Summary</b>
<b>Federal Plans and Resources</b>	National Contingency Plan (NCP)	<ul style="list-style-type: none"> <li>The federal plan for oil and hazardous substance spill response</li> <li>Provides the framework for the National Response System – a hierarchical system for multi-jurisdictional response</li> </ul>
	Incident Command System (ICS)	<ul style="list-style-type: none"> <li>An on-scene incident management concept that divides response efforts into five functions</li> <li>The structure for the NCP</li> </ul>
<b>Regional Plans and Resources</b>	Northwest Area Contingency Plan (NWACP)	<ul style="list-style-type: none"> <li>Serves as the Regional and Area Contingency Plans for the Northwest</li> <li>Developed by the Region 10 RRT</li> </ul>
	Geographic Response Plans (GRPs)	<ul style="list-style-type: none"> <li>Provides specific response plans for public waters</li> <li>Seeks to protect sensitive natural and cultural resources</li> </ul>
	Pacific States/ British Columbia Oil Spill Task Force	<ul style="list-style-type: none"> <li>Created by Memorandum of Cooperation between the province of BC and the states of AK, WA, OR, CA and HI.</li> <li>Provides a shared commitment to protect marine resources</li> </ul>
<b>State Plans and Resources</b>	Ecology Spill Prevention, Preparedness, and Response Program	<ul style="list-style-type: none"> <li>Carries out activities and programs for spill prevention, response, and assessment including the Resource Damage Assessment committee.</li> </ul>
<b>Local Plans and Resources</b>	Whatcom County LEPC	<ul style="list-style-type: none"> <li>Produced a Hazardous Materials Plan in compliance with EPCRA</li> </ul>
	Whatcom County Specialized Emergency Response Program	<ul style="list-style-type: none"> <li>Public/private cooperative effort</li> <li>Administers a Hazmat Unit, the Major Incident Support Team (MIST), and the Community Alert Network (CAN).</li> </ul>
<b>Facilities and Vessels</b>	Facility and Vessel Response Plans Risk Management Plans	<ul style="list-style-type: none"> <li>Details pollution response action plans</li> <li>Outlines prevention and response plans for facilities with large volumes of hazardous substances</li> </ul>

equal to the complexity and demand of any single incident or multiple incidents without being hindered by jurisdictional boundaries (NRT date unknown). The National Contingency Plan states that the NRS will function as an ICS under the direction of the federal On-Scene Coordinators; its use is also endorsed by the National and Regional Response Teams (NRT and RRT). In 1980, federal officials transitioned ICS into a national program called the National Interagency Incident Management System (NIIMS) and its use has since been endorsed or mandated by many federal agencies (NRT date unknown). The ICS divides emergency response into five manageable functions: command, operations, planning, logistics, and finance and administration. Unified Command (UC) is a structure that brings together the incident commanders established by ICS of all major organizations involved in the incident to coordinate an effective response to large, multi-jurisdictional incidents.

The Northwest Area Contingency Plan (NWACP) is the response plan developed by the Regional Response Team for Region 10 (Washington, Oregon, and Idaho) and serves as the Area and Regional Contingency Plan (ACP and RCP) under the NRS. The Northwest Area Contingency Plan (NWACP) identifies resources at risk, response resources, and cleanup strategies within its area. Although they are distributed and revised separately, one component of the NWACP is the Geographic Response Plans (GRPs) which identify sensitive resources in the region and describe and prioritize response strategies to protect these resources (RRT 2002). The Lummi Reservation area is covered by the North Puget Sound GRP (see Appendix F). A second regional plan is the Pacific States/British Columbia Oil Spill Task Force created by a Memorandum of Cooperation between Alaska, Washington, Oregon, and California and the Canadian province of British Columbia.

At the state level, the Washington State Department of Ecology's Spill Prevention, Preparedness, and Response Program implements state laws pertaining to oil and hazardous substance spills. The Program carries out both spill prevention and response activities such as vessel inspections, operation of the Neah Bay Rescue Tug, review of facility plans, 24-hour statewide response, and natural resource damage assessment. Locally, the Whatcom County Local Emergency Planning Committee (LEPC) has developed a Hazardous Materials Plan that satisfies the community planning provision of EPCRA. Whatcom County also operates the Specialized Emergency Response Program (SERP) Team, the Major Incident Support Team (MIST), and the Community Alert Network (CAN). The Lummi Nation has coordinated with the Whatcom County Division of Emergency Management (WCDEM) during past spill response efforts. Future coordination should benefit both jurisdictions.

The final tier of plans forming the National Response System is Facility Response Plans and Vessel Response Plans. These are required for oil cargo handling facilities or vessels. These plans detail pollution response action plans for the specific facility or vessel, and must be submitted for review and approval to the EPA or USCG, depending on the threat to the environment. Facilities that store large volumes of highly flammable or toxic chemicals are also required to develop and implement Risk Management Plans (RMPs) in compliance with the Clean Air Act that outline how the facility will prevent and respond to a release. These vessel and facility plans represent the first line of defense against the impacts of a hazardous materials spill.

The National Response Team has developed an Integrated Contingency Plan (ICP or "One Plan") Guidance document that provides a way to consolidate the multiple plans that a facility may have prepared to comply with various regulations into one functional emergency response plan. Facilities near the Reservation that have prepared ICP response plans and/or Clean Air Act Risk Management Plans include:

- British Petroleum (BP) Cherry Point Oil Refinery (formerly ARCO)
- ConocoPhillips Oil Refinery (formerly Tosco/Mobil)
- ALCOA-Intalco Works Aluminum Smelter
- Tenaska Cogeneration Plant
- Georgia-Pacific West Paper Mill
- BP Olympic Pipeline (Gasoline, Jet Fuel)
- Terasen Pipeline (Crude Oil)
- Cascade Natural Gas Pipeline

### **3. POTENTIAL SPILL SOURCES ON AND NEAR THE RESERVATION**

The Lummi Nation Wellhead Protection Plan, Phase I (LWRD 1997) inventoried potential sources and associated potential contaminants in the two wellhead protection areas on the Reservation and presented a community involvement plan. As part of this effort, a ranking system for the potential ground water contaminant sources was developed. The ranking system was based on three factors:

- Location of the potential source relative to ground water supply wells.
- The quantity of potential contaminants either on site or associated with the potential source.
- The hazard posed by the contaminants either to public health or the ground water resource.

The inventory in the Lummi Nation Wellhead Protection Plan included both point and non-point pollution sources. Point sources of pollution are commonly associated with a specific point of discharge or emission (e.g., a wastewater treatment plant). Non-point pollution sources, such as motor vehicles, animals, and atmospheric deposition, are generally diffuse and would not be the subject of a spill response effort. The inventory of potential pollution sources was updated and/or modified in the Lummi Reservation Storm Water Management Program Technical Background Document (LWRD 1998b) and the Lummi Nation Nonpoint-Source Assessment Report (LWRD 2001b). The potential sources in these inventories that could produce a large spill requiring a clean-up effort are described in this section. Contact information for on- and off-Reservation facilities that store or transport hazardous materials is listed in Appendix F.

#### **3.1 ON-RESERVATION SOURCES**

##### **3.1.1 Lummi Tribal Sewer and Water District**

The Lummi Tribal Sewer and Water District (LTSWD) distributes potable water to Reservation residents that are connected to the water system, and collects and treats wastewater from the Reservation at its two treatment plants, one each on the Lummi and Sandy Point peninsulas. Storm water runoff is not collected for treatment, except from the wastewater treatment plants where runoff from the asphalt is caught in basins designed primarily to catch overflows from the treatment process. Potable water is either pumped from wells on the Reservation or purchased from the City of Bellingham. The LTSWD is governed by a board of directors; four of the board members are elected and one is appointed by the Lummi Indian Business Council. Administratively, the quasi-autonomous LTSWD is a subdivision of the Lummi Nation Planning Department.

The LTSWD operates under a National Pollution Discharge Elimination System (NPDES) permit that was re-issued in 2004 by the EPA. Wastewater is treated to meet the standards set forth in the permit, which requires that fecal coliform colonies in discharged water not exceed 400 per 100 ml of water during once a week testing; that the average of four tests in a month not exceed 200 colonies per 100 ml; and that chlorine levels in discharged water may not exceed daily effluent concentrations of 0.65 mg (Sandy Point) and 0.52 mg (Gooseberry Point) of chlorine per liter.

The LTSWD currently uses chlorine to treat wastewater before it is discharged and expects to add ultraviolet treatment at the Gooseberry Point treatment plant in 2005. To meet the 2004 maximum daily effluent concentrations of 0.65 mg (Sandy Point) and 0.52 mg (Gooseberry Point) of chlorine per liter, the wastewater plants dechlorinate the water with sodium metabisulfite. The District keeps 2,500 pounds of sodium metabisulfite on hand for this process (McCourt 2005). The district also has approximately 400 pounds of fluoride for the fluoridation of drinking water (Solomon 2005).

A non-hazardous chlorine solution, similar to strong bleach, is used to treat water at the wellheads before it is delivered into the water system. However, very hazardous pure chlorine is used and stored in a maximum of six to seven 150-pound cylinders inside separate buildings at each wastewater treatment plant. These small block buildings are only used for chlorine storage and remain locked at all times. The storage building at each plant has an automatic chlorine leak alarm. There is one self-contained breathing apparatus located at each treatment plant, which is used as a safety measure each time a cylinder is changed (usually once a month). There is also a policy that there should be two employees present when the chlorine cylinders are changed, with the second employee prepared to pull the employee that is changing cylinders out of the building with a rope attached to his/her waist. When the Gooseberry wastewater treatment plant is switched to ultraviolet treatment, only two or three chlorine cylinders will be stored at this plant (Brionez 2004).

The LTSWD also has one 500-gallon diesel storage tank at each sewer treatment plant to power backup generators. In addition, the LTSWD currently has two 50-gallon diesel generator sets: one along Haxton Way and one on Cagey Road. The District also has one portable diesel generator and expects to add six propane generator sets along Lummi Shore Road in the future (McCourt 2005).

Potential municipal sources of ground water contamination include the sewer lines of the LTSWD. Although a sewer system protects ground water quality by replacing septic systems, municipal sewer systems are subject to leaks or malfunctions that could result in spills or overflows. Spills or leaks could also result from damage during construction activities or damage caused by natural events (e.g., floods, earthquakes). However, the alarm and emergency response system of the LTSWD should minimize the impact of any spills in its service area (LWRD 1997). LTSWD personnel must be prepared to respond to possible sewer line breaks or a spill of chemicals or bio-solids that occurs either on-site or during transport. All biosolids spills or leaks are responded to according to the LTSWD response procedures (Appendix F).

The LTSWD also operates the Lummi Nation Biosolids Application site, a dedicated and enclosed 12.5 acre forested site on the Lummi Reservation which is managed according to the Lummi Biosolids Land Application Site Operation Plan. Sewage sludge from both wastewater treatment plants is transported by truck to the site and applied by a spray cannon mounted on the rear of a tanker truck (LIBC 1996). The biosolids are tested annually for pollutants including fecal coliform and heavy metals. Any spills during transport from the plants to the site are responded to by following the LTSWD response procedure (Appendix F).

### **3.1.2 Fisherman's Cove**

The LIBC owns the Fisherman's Cove mini-mart and a boat storage and launching facility at Gooseberry Point. The LIBC Fisherman's Cove pier is used to moor, unload, refuel, repair, and lift boats to and from the water. In addition, the Lummi Island ferry terminal operated by Whatcom County is adjacent to the commercial pier. In September 1986, and again in December 2002, a commercial fishing boat swamped at Gooseberry Point and sank at the dock as high winds and up to five-foot waves washed over the dock. A third fishing vessel was swamped in December 2004 while tied-up at the adjacent fish processing dock. In 1962, the Lummi Island ferry, Chief Kwina, sank during the Columbus Day windstorm. Incidents such as these pose a significant threat of fuel or oil spills. Since this location is a past and potential source of spills, and is close to important intertidal resources, it is an important target for spill prevention and response. With its shoreline location, the potential impacts of a fuel spill are greater at Fisherman's Cove than at the Lummi Shell gas station described below.

There is a gasoline pump at the Fisherman's Cove mini-mart and another pump on the pier with a hose extending to the water for boats. Both of these pumps are served by double-walled fiberglass pipes from a single underground double-walled fiberglass storage tank. This 12,000-gallon tank was installed in 1987 and is ventilated through a vent pipe that is approximately 12 feet above ground surface. There is also an aboveground propane storage tank at both the mini-mart and a short distance inland from the pier. Only the propane tank near the pier is used for sales to the public. No diesel fuel is stored at these facilities. Preventative measures at the mini-mart and pier, which meet all EPA regulations for Underground Storage Tanks (USTs) and retail fuel systems, include automatic shut-off valves on fuel lines and approved leak detectors and monitors on the gasoline tank. The gasoline system passed a comprehensive inspection most recently in 2003 (Roberts 2004).

Gasoline is supplied to the Fisherman's Cove tank by McEvoy Oil Company, which is responsible for cleaning up any spills from their trucks and carries spill kits on their trucks. In the event of a spill, McEvoy calls Cascade Sorbent in Bellingham to respond and clean up spilled fuel. To clean up small spills caused by customers, a 20-gallon and a 30-gallon spill kit, containing absorbent pads and socks and personal protective gear for employees, was recently acquired for the pier and the mini-mart, respectively. The Lummi Commercial Company, which manages the Fisherman's Cove area and the Shell gas station, will maintain this equipment to soak up small spills in the water (a skimmer or similar device would be needed for larger spills) or if there is a spill on the dock or surrounding area.

### **3.1.3 Lummi Shell Gas Station**

The Lummi Shell gas station and mini-mart, built in 1996 at the corner of Slater Road and Haxton Way, sells vehicle fuels, including two grades of gasoline, diesel, and propane. To prevent spills, fuel lines have automatic shut-off valves and gasoline and diesel are stored in fiberglass underground tanks (holding 13,000 and 12,000 gallons, respectively) constructed with double walls, with approved leak detectors and monitors, and meeting all EPA regulations. This fuel system also passed a comprehensive inspection most recently in 2003 (Roberts 2004). Gas and diesel pumps are protected by steel poles. Propane is stored in an aboveground tank that is surrounded by concrete

blocks. None of these fuels are stored in an amount that requires a Risk Management Plan. Similar to Fisherman's Cove, gasoline and diesel fuel is supplied to the mini-mart by McEvoy Oil Company, which is responsible for cleaning up any spills from their trucks. In the event of a spill, McEvoy calls Cascade Sorbent in Bellingham to respond and clean up spilled fuel. To clean up small spills caused by customers, the mini-mart recently acquired a 30-gallon spill kit containing absorbent pads and socks and personal protective gear for employees.

#### **3.1.4 Sandy Point Marina**

In aerial photographs taken in March 2004, approximately 170 boats (mostly pleasure and a few commercial boats) were moored within the Sandy Point Marina, with approximately 130 additional empty mooring spaces available. Most of the boats in the marina are moored year-round. Some of the empty berths in March are likely filled during the summer months. Because these boats operate and are maintained in the water, they can cause water quality problems in the coastal waters of the Reservation. Since the marina is a protected water body, potential oil or fuel spills are less likely to be weather-related than at Fisherman's Cove, which is in open water. Spills at the Sandy Point Marina are more likely to be caused by accidents in the harbor or grounding of boats in the shallow entrance channel at lower tides.

The EPA has identified the following potential environmental impacts from boating and marinas: high toxicity in the water, increased pollutant concentrations in aquatic organisms and sediments, increased erosion rates, increased nutrients leading to an increase in algae and a decrease in oxygen (eutrophication), and high levels of pathogens. Water pollution from boating and marinas is linked to several sources including poorly flushed waterways, boat maintenance, discharge of sewage from boats, storm water runoff from marina parking lots, and the physical alteration of shorelines, wetlands, and aquatic habitat during the construction and operation of marinas. In addition, construction at marinas can lead to the physical destruction of sensitive ecosystems and bottom-dwelling communities (EPA 1996).

Significant amounts of solvents, paints, oils, and other pollutants can seep into ground water or be washed directly into surface water from activities that occur at marinas. Many boat cleaners contain chlorine, ammonia, and phosphates – substances that can harm plankton and fish. Small oil spills released from motors and refueling activities contain petroleum hydrocarbons that tend to attach to waterborne sediments. These persist in aquatic ecosystems and can harm organisms in the marine food chain (EPA 1996).

#### **3.1.5 Roads**

Roads are a potential source of spills when accidents involve tanker trailers or, to a lesser degree, vehicles with large fuel tanks. Slater Road, along the north boundary of the Reservation, is a main route to the industrial area located directly north of the Reservation and therefore represents one of the greatest road hazards in the area for spills of hazardous materials. The hazardous materials transported most frequently on Slater Road are fuels (e.g., gasoline, diesel, and propane), with chemicals such as ammonia, acids, and chlorine transported less frequently. Descriptions of individual off-Reservation facilities in the next section list hazardous materials that are transported to

and from the Cherry Point Heavy Impact Industrial Zone by road. Haxton Way is the main road traversing the Lummi Peninsula, including transportation to the Fisherman's Cove area and the Lummi Island ferry. The most likely larger spills on Haxton Way would be from fuel trucks serving the facilities and the Lummi Island Ferry at Gooseberry Point.

### **3.1.6 Construction Sites**

Chemicals, lubricants, hydraulic fluid, and fuels that are used or stored at construction sites are potential sources of relatively small spills. While they would generally not represent an emergency situation, such spills do cause environmental harm and preventative measures (e.g., providing secondary containment, covering fuel stations) and spill response measures to ensure appropriate clean-up should be in place. The LNR has purchased four spill kits that are available for use at construction sites.

## **3.2 OFF-RESERVATION SOURCES**

There are various potential off-Reservation sources of spills that represent a threat to the Reservation or to resources in the Lummi Usual and Accustomed hunting, fishing, and gathering grounds and stations. These spill sources include facilities, shipping routes, pipelines, railroads, and road transportation near the Reservation that could directly affect the Reservation and the Nooksack River and adjacent watersheds. The source of the largest potential damages is the Cherry Point Heavy Impact Industrial Zone and the associated transportation of hazardous materials to and from the facilities in this zone.

The Cherry Point Heavy Impact Industrial Zone is located immediately north of the Lummi Reservation. This heavy impact industrial zone, the largest such zone in Whatcom County, currently contains two petroleum refineries (ConocoPhillips and BP Cherry Point), an aluminum plant (Alcoa-Intalco Works), and two gas-fired co-generation plants (Tenaska and Puget Sound Energy). The construction of a third cogeneration plant by BP Cherry Point was approved by Governor Locke and the Energy Facility Site Evaluation Council (EFSEC) in 2004. One of the oil refineries (ConocoPhillips) and a gas-fired co-generation plant (Tenaska) are located directly north of the Reservation boundary and are located in Lummi Wellhead Protection Area 2 (LWRD 1997). All five facilities have property buffers to reduce hazards to the public. These five facilities contain most of the hazardous materials at fixed facilities in the Reservation area. In addition, the petroleum products and other hazardous materials that are transported to and from these facilities via ship, barge, pipeline, and truck probably represent a greater threat to the Reservation and tribal resources than the materials stored at the facilities.

The Washington Department of Ecology annually collects EPCRA Tier II information on facilities that store hazardous materials in Washington State. This Tier II information is entered in a database that is available from Ecology. The latest report available shows that in 2002, Whatcom County had 96 reporting facilities with a total of 516 chemicals (Ecology 2004). The County's Local Emergency Planning Committee (LEPC) ranked 9<sup>th</sup> in both the top ten list of LEPCs with the largest number of reporting facilities and the top ten list of LEPCs with the largest number of chemicals reported (Ecology 2004).

This section describes the primary off-Reservation sources of potential hazardous material spills that could impact the Reservation.

### 3.2.1 Industrial Facilities

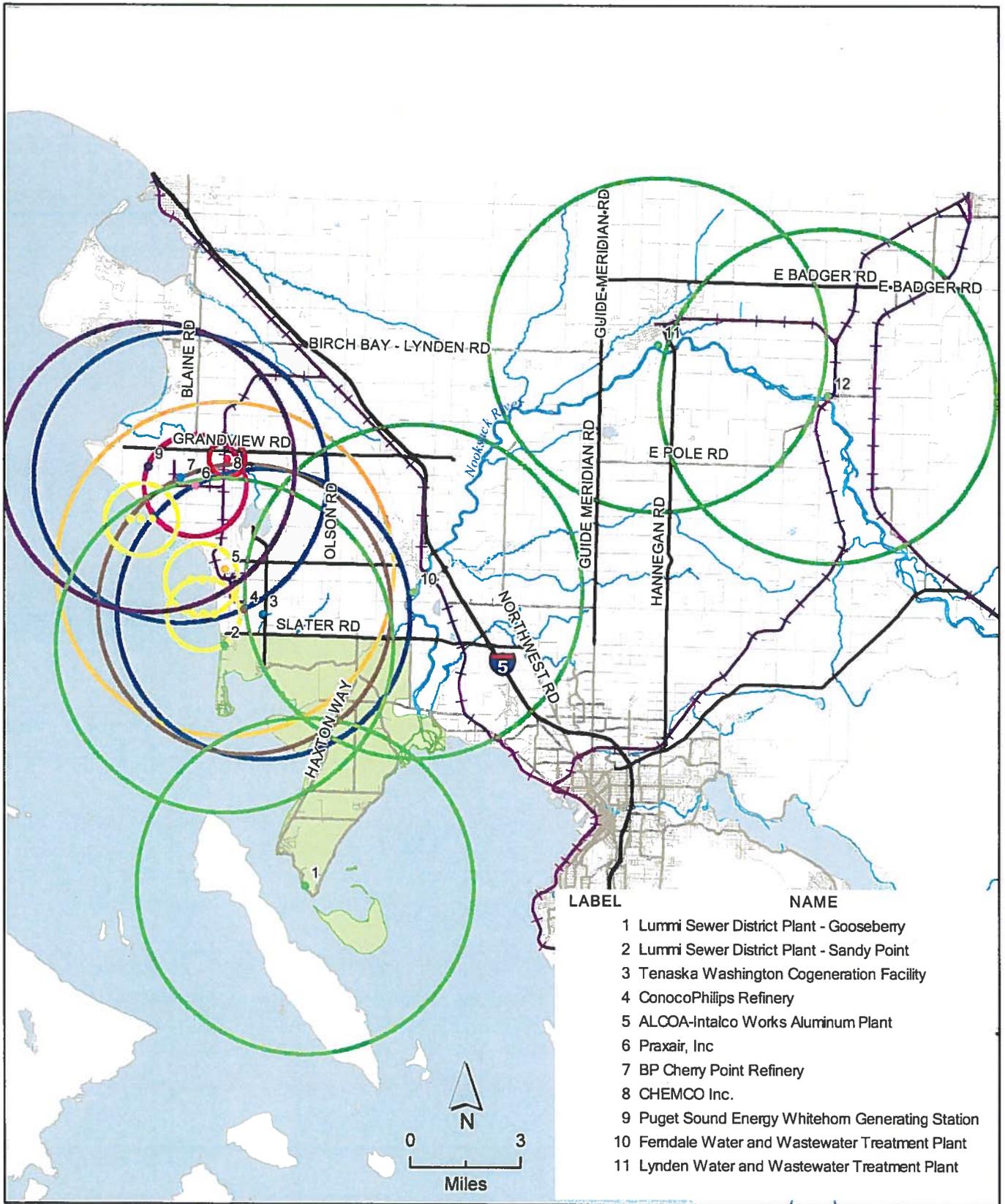
The industrial facilities on or near the Reservation that present a potential inhalation hazard are listed in Table 3.1 and mapped in Figure 3.1. The hazard zones depicted in Figure 3.1 are derived from the "Table of Initial Isolation and Protective Action Distances" in the 2004 North American Emergency Response Guidebook (USDOT 2004). They are based on the "Large Spill, Night" downwind protective distances. A "large spill" is defined as a spill from a large package or multiple spills from many small packages (USDOT 2004). According to the North American Emergency Response Guidebook (NAERG), the protective zones suggest "distances useful to protect people from vapor resulting from spills involving dangerous goods which are considered toxic by inhalation (TIH). The Table provides first responders with initial guidance until technically qualified emergency response personnel are available. Distances show areas likely to be affected during the first 30 minutes after materials are spilled and could increase with time." These hazard zone maps are designed as a tool for first responders and are not intended to suggest maximum potential vulnerability zones for any facility.

Table 3.1 Inhalation Hazard Zones for Facilities in the Reservation Area \*

Location	Facility	Chemical	Isolation Zone (feet)	Protective Distance (miles)	Facility 24-hour Phone
Lummi Reservation	LTSWD Gooseberry Treatment Plant	Chlorine	800	4.6	360-815-6095
	LTSWD Sandy Point Treatment Plant	Chlorine	800	4.6	360-815-6095
Cherry Point Heavy Industrial Area or Ferndale Area	Tenaska Washington Cogeneration facility	Ammonia	200	1.4	360-380-2119
		Sulfuric acid	1000	4.0	
	ConocoPhillips Refinery	Hydrofluoric acid	700	2.7	360-384-8351
		Sulfuric acid	1000	4.0	
	ALCOA-Intalco Works Aluminum Plant	Chlorine	800	4.6	360-384-7301
		Sulfuric acid	1000	4.0	
	Praxair, Inc.	Ammonia	200	1.4	800-772-9247
	BP Cherry Point Refinery	Ammonia	200	1.4	360-371-1301
		Sulfuric acid	1000	4.0	
		Multiple	500**	1.0**	
	CHEMCO, Inc., wood plant	Multiple (diesel, formaldehyde)	160**	0.5**	360-354-4807
	Puget Sound Energy Whitehorn Generating Station	Sulfuric acid	1000	4.0	888-225-5773
	Ferndale Water and Wastewater Plant	Chlorine	800	4.6	360-384-4006 or 911
Lynden Water and Wastewater Treatment Plant	Chlorine	800	4.6	360-354-3446	
Everson Wastewater Treatment Plant	Chlorine	800	4.6	360-966-0282	

\*(USDOT 2004).

\*\* (Whatcom County 2001) These values are based on USDOT 1996.



**Figure 3.1 Inhalation Hazard Zones for Facilities in the Reservation Area**

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation.

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**Legend**

- Hazard Piers
  - Major Arteries
  - Interstate 5
  - Major Roads
  - Other Roads
  - Railroads
  - Lummi Reservation
  - Streams
- Chemical Type**
- Ammonia
  - Sulfuric Acid
  - Chlorine
  - Ammonia and Sulfuric Acid
  - Chlorine and Sulfuric Acid
  - Diesel and Formaldehyde
  - Hydrofluoric Acid and Sulfuric Acid
  - Multiple

These hazard zones for facilities are designed as a tool for first responders to be used in concert with the NAERG and are not intended to suggest maximum potential vulnerability zones for any facility. For facilities with multiple chemicals, the zone is for the substance with the largest protective distance (Whatcom County 2001).

### **Tenaska Washington Cogeneration Facility**

The Tenaska Washington Cogeneration Facility (Tenaska) is located off of Lake Terrell Road, less than 0.5 miles north of the Reservation (see Figure 3.1), and began operating in 1994. It is a 270-megawatt cogeneration plant that provides power to Puget Sound Energy and steam to the ConocoPhillips refinery. It is powered by General Electric Frame 7EA gas turbines with supplementary-fired, heat-recovery steam generators and an extraction/condensing steam turbine system. In addition to the 50,000 cubic feet of natural gas used daily when the plant is operating, Tenaska also uses anhydrous ammonia and sulfuric acid in the generation process.

The Tenaska facility can store up to 6,000 gallons of sulfuric acid, which is used to purify water for steam generation, and up to 12,000 gallons (52,000 pounds) of anhydrous ammonia, which is used to clean nitrous oxide from emission vapors before release to the atmosphere (Ecology 2000a). Both substances are federally regulated, and as shown in Figure 3.1 if a large spill occurs, both could create an inhalation hazard as far as Lummi Bay and injure people on the Reservation (Whatcom County 2001). The Tenaska facility can also store up to 2.1 million gallons of diesel fuel oil and up to 6,000 gallons of caustic sodium hydroxide (Ecology 2000a). In 2002, Tenaska stored an average of between 10 and 50 million pounds of diesel as a back-up fuel and an average of between 10,000 and 100,000 pounds of sulfuric acid, ammonia, and sodium hydroxide (Ecology 2003b). All of these hazardous materials are transported to the facility via tanker trucks, most likely along Slater Road since the materials come from the south and Slater Road is the most direct access road from Interstate 5 (I-5). Tenaska has a Risk Management Plan, last revised in 1999, that is scheduled to be updated in 2004. The facility also has an SPCC spill response plan last updated in March 2003 and reviewed with no changes in 2004 (Alexander 2004).

All storage tanks on the Tenaska site are within concrete catch basins that have six inches of freeboard to provide 110 percent containment of potential accidental releases. To date, there have been no employee-caused accidents at the Tenaska facility (Alexander 2004). However, two spills of diesel fuel oil have occurred. On July 21, 1994, approximately 400 gallons of No. 2 diesel fuel was spilled when a gasket ruptured on a valve in a fuel transfer line at the fuel oil unloading skid. About half of the fuel sprayed inside the skid unloading catch basin, and the other half spilled onto the adjacent ground. After clean up and a period of monitoring, Ecology allowed Tenaska to discontinue monitoring on May 22, 2000. In November 1998, a pipe leak was discovered at the fuel loading station and the soil around the leak was excavated to repair the break. Test results of the remaining soils showed an acceptable level of risk and no further action was required (Ecology 2000a).

The Tenaska facility lies in a watershed that discharges to the Reservation, and some storm water from the facility drains to an unnamed stream that flows to Lummi Bay on the Reservation. Tenaska has taken steps to ensure that storm water runoff, which could pollute ground or surface water if untreated, is caught and treated before leaving

the facility. Water from asphalt surfaces is channeled to a holding pond with an under surface discharge. The water is tested for contamination before it is discharged to a grass channel that exits to the south. Wastewater and runoff from containment areas around storage tanks and equipment are processed first through one oil/water separator, then through the Tenaska wastewater treatment system, before discharge to the ConocoPhillips outfall in Georgia Strait. Runoff water is continuously composite-tested mechanically and samples are laboratory-tested monthly.

The fuel tank containment area at the Tenaska facility has an isolation drain valve that discharges to the storm water system. This area is not drained unless it is first checked for spilled material. The catch basins for the chemical storage tanks can be drained to the chemical waste collection and treatment sump if a spill occurs (Ecology 2000a). Although unlikely, a failure of these containment systems could result in damage to Reservation resources. A more likely potential threat is presented by transport of the hazardous materials along Slater Road to the Tenaska facility.

### **ConocoPhillips Ferndale Refinery**

The ConocoPhillips Ferndale oil refinery was built in 1954 on the Strait of Georgia shoreline, directly north of Lummi Bay and half a mile from the Reservation (see Figure 3.1). The refinery was originally constructed by British Petroleum (BP) and has had numerous owners, including Mobil, Tesoro, and Tosco. Crude oil is transported to the refinery by tanker ships via a deepwater dock and pumped through pipelines from the dock up to the refinery, and by pipeline via the Terasen (formerly Trans Mountain) pipeline. Most, if not all, of the oil is currently received by ship from Alaska rather than by pipeline from Canada. Other hazardous materials are received by ship, rail, and truck (Whittaker 2004). The refinery produces gasoline, jet fuel, low and ultra-low sulfur diesel, home-heating oil, propane, butane, and several specialty products. It can process about four million gallons (95,000 barrels) of crude oil per day and produce about two million gallons (48,000 barrels) of gasoline per day (ConocoPhillips 2004).

ConocoPhillips primarily uses the BP Olympic pipeline to transport its fuel products, with about 85 percent of the total product shipped by pipeline, 12 percent by ship or barge, and three to four percent by truck. During the 18 months that the pipeline was closed after the spill of 237,000 gallons of gasoline into Whatcom Creek in 1999, the refinery shipped most of its products from its own dock. In an average month, 10 tankers and 50 barges are handled by dock crews at the refinery. In addition, some chemicals and products are transported to and from the refinery by rail or by truck via Slater Road and Interstate-5. Railcars are transferred at the refinery gate and all movement of railcars at the refinery is conducted by refinery staff (Paris 2004; Whittaker 2004). Potential spills from the ConocoPhillips refinery and its associated ship and truck traffic present a significant environmental threat to the marine waters, shoreline, and uplands of the Reservation as well as to surrounding areas that are important resources for the Lummi people.

In their refining process, ConocoPhillips uses sodium hypochlorite, hydrofluoric acid, sulfuric acid, and other caustic agents. The refinery stores an average of over 10,000 pounds of sodium hypochlorite and sulfuric acid and over 100,000 pounds of hydrofluoric acid (Ecology 2003b). The two acids are transported by truck to ConocoPhillips approximately every one to three months (Whittaker 2004). Both acids are federally

regulated and, if spilled, could contaminate the air and injure people on the Reservation in a large spill scenario (Figure 3.1). The refinery also stores an average of over 10,000,000 pounds each of crude oil, diesel, gasoline, various naphtha products, and residual fuel oil (Ecology 2003b). Although the storage tanks at the refinery have asphalt-lined earthen dikes (the sulfuric acid tank has concrete containment) with 110 percent of tank capacity as secondary containment features, these substances could potentially contaminate surface and ground water on the Reservation.

In 2003, the ConocoPhillips refinery submitted an updated spill response/emergency plan to the EPA. This plan followed the Integrated Contingency Plan, or "One Plan," format that is designed to meet all regulatory requirements with one document. Spill prevention measures include specified and regulated oil transfer procedures, catch basins for pipeline junctions/manifolds, on-site booms and other spill response equipment, and quarterly response deployment drills. The refinery has incident response teams on staff, with roughly 50 staff having the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training required by 29 CFR 1910 (Whittaker 2004).

The wastewater outfall from the refinery extends 2,100 feet west from the shore into the Strait of Georgia. The 1.4 million gallons per day of wastewater from the refinery goes through an oil/water separator and receives primary and secondary treatment before discharge. The refinery is located within two watersheds that drain to the Reservation, and some storm water from the facility discharges to an unnamed stream that flows to Lummi Bay on the Reservation.

### **ALCOA-Intalco Works Aluminum Plant**

The ALCOA-Intalco Works (Intalco) aluminum smelter was built in 1965 along the Strait of Georgia, about 1.5 miles north of the Reservation boundary (see Figure 3.1). The Intalco smelter began operations in 1966. The facility produces primary aluminum metal by the Hall-Herouit reduction process. When in full operation, the smelter is capable of producing 307,000 tons of aluminum per year. Intalco operated continuously until the electrical shortages along the West Coast in 2001 forced the suspension of production from May 18, 2001 to April 30, 2002. The plant was in partial operation for a period before the suspension of production and has operated at less than capacity since resuming production. Current production is limited to about one-third of capacity, and future production is uncertain because of proposed rate increases for electricity.

The smelter receives alumina ore by ship at the Intalco dock along the Strait of Georgia. The ore could pose a dust and silt danger if it escaped during transport, although the compound itself is an inert material. The finished ingots of different shape and combination of metals are transported by truck and ship. Hazardous bi-products are shipped to Oregon for disposal, although Intalco maintains a federally approved RCRA hazardous waste site that contains smelter pot lining, with cyanide and other compounds in the lining. Currently, only wastewater sludge is placed in the waste site (Ringwald 2004). In addition, Intalco has three historic unlined landfills that were used for waste disposal from the 1960s until 1984. Two of these landfills (Beach 1 and Beach 2) occupy ravines that open onto the Strait of Georgia shoreline and the third is located on the bluff above the shoreline. Water seeping from the hillsides below these landfills contains elevated levels of fluoride, cyanide, polychlorinated biphenyls (PCBs), and total

suspended solids. Polycyclic aromatic hydrocarbons (PAHs) have also been found in soil samples taken from the Beach 1 and 2 landfills. Intalco is implementing a monitoring plan for the landfills, has developed a plan to clean up the contamination, and has applied to Whatcom County Planning and Development Services to perform engineered land clearing and grading in 2005 to mitigate the impacts of the landfills (Ecology 2001a; Ringwald 2004). Intalco uses a large amount of aluminum fluoride in the smelting process. While not a hazardous material, aluminum fluoride is the source of hydrofluoric acid released as an air pollutant (at nonhazardous concentrations) and of fluorides that are discharged from the process and storm water outfalls (Ringwald 2004).

Intalco uses several hazardous chemicals in their process, including chlorine and sulfuric acid, that pose potential threats to the environment and the surrounding community if released in sufficient quantity. Since the implementation of the Emergency Planning and Community Right-to-Know Act (EPCRA), Intalco has reduced the storage capacity of all regulated substances. For example, chlorine had been stored in a 2,000-gallon tank, but is now used only in 150-pound cylinders. However, both chlorine and sulfuric acid could create an inhalation hazard and injure people on the Reservation if a large spill occurs (Figure 3.1). In 2002, Intalco stored an average of over 1,000 pounds of chlorine; over 10,000 pounds of sulfuric acid, diesel, and gasoline (delivered by tank truck); over 100,000 pounds of sodium hydroxide (primarily delivered by rail); and over one million pounds of insulating oil (Ecology 2003b). Since 2002, Intalco has switched to ultraviolet treatment of its wastewater and has further reduced chlorine storage to below 1,000 pounds (Ringwald 2004). Intalco also stores significant quantities of coke ash and cold tar pitch, which are used to control the production process. These hazardous materials, some of which are trucked to and from the plant via Slater Road, are a potential hazard on the Reservation and could affect marine resources if a spill reached tidelands.

Gasoline, diesel, and hydraulic fluid are stored in above-ground tanks for use by vehicles and machinery on site. For all chemicals and fuels, Intalco has secondary containment in the form of either double-walled tanks or concrete basins/control dams around the tanks. Concrete containment is 110 percent of tank capacity. Intalco completed a major update of its Release Prevention, Control, and Countermeasure (RPCC) plan in August 2003 in compliance with the CWA. The RPCC includes procedures for all hazardous sources at the plant and addresses all potential releases. A Spill Prevention Control and Countermeasure (SPCC) plan that addresses liquid materials is a part of the RPCC. Intalco is permitted to discharge treated wastewater into the Strait of Georgia (under NPDES water permit WA0000295-0) and has been issued a renewed air-operating permit that is effective May 1, 2004 (Ringwald 2004).

### **Praxair, Inc.**

The Praxair plant, located on Aldergrove Road, just east of the BP Cherry Point refinery (see Figure 3.1), produces carbon dioxide for distribution to various commercial destinations. In 2002, this facility stored an average of between 10,000 and 100,000 pounds of ammonia, which is toxic and flammable (Ecology 2003b). The ammonia, which is used as a refrigerant, is stored in multiple steel tanks that are inspected but do not have secondary containment. However, the nature of ammonia (its boiling point is minus 29 degrees F) and other safety features of the facility make it unlikely that spilled liquid ammonia would escape the facility and reach marine waters before it evaporates. Ammonia is delivered to Praxair by tank trucks, most likely via Grandview Road from

Interstate 5. Praxair has developed an Emergency Response Plan for the facility, which includes spill response procedures, evacuation routes, and emergency notification for the community (Laplante 2004). The inhalation hazard zone for the Praxair facility (Figure 3.1) is approximately four miles from the Reservation boundary and, since winds from the northwest are very uncommon, the facility is not a probable threat to the Reservation. A worst-case spill could potentially, but is unlikely to, affect off-Reservation tidelands and marine waters that are important to tribal fisheries.

### **BP Cherry Point Refinery**

The British Petroleum Corporation Cherry Point (BP, formerly ARCO) refinery was built in 1971 along the Strait of Georgia, six miles northwest of the Lummi Reservation (see Figure 3.1). The BP refinery processes Alaskan North Slope crude oil, which is transported to the deepwater BP dock by tanker. The refinery formerly received (and could again receive) crude oil from Canada through a BP pipeline that connects to the Terasen pipeline (Rust 2004). About 8.4 million gallons (200,000 barrels) of crude oil is processed per day to produce a variety of products, including gasoline, jet fuel, diesel, and other residual fuels. Approximately 75 percent of these refined products are transported through the BP Olympic pipeline to terminals along the West Coast. The remaining products, including butane, sulfur, and coke, and other materials are exported or received by tanker, barge, rail, or truck, via Grandview Road and Interstate-5. A BP pipeline carries butanes to the BP Ferndale Terminal (formerly the Texaco Producing Terminal), which is south of the Alcoa-Intalco aluminum plant, from which they are transported by ship or barge (ARCO 2000). The BP Ferndale Terminal also receives and ships liquid propane by rail and truck. The BP refinery, BP pipelines, and associated ship, rail, and truck traffic pose a significant environmental threat to the Reservation and the marine waters and coastline between Point Roberts, Birch Point, Eliza Island, and Orcas Island, which the Lummi Nation depends on for its subsistence, ceremonial, and commercial fishing needs.

In their refining process, BP uses sodium hypochlorite, sulfuric acid, anhydrous ammonia, and other caustic agents. Ammonia and sulfuric acid, the most hazardous of these chemicals, are transported by truck to the refinery. The BP refinery can store up to 40,000 pounds of anhydrous ammonia and 6,000,000 pounds of butane. In 2002, the refinery stored an average of over 10,000 pounds of ammonia, sodium hypochlorite, and other chemicals, and over 100,000 pounds of sulfuric acid (Ecology 2003b). The ammonia storage tank is elevated over an asphalt-covered area that drains to a waste tank, which can hold all potentially spilled ammonia. The sulfuric acid storage tank is on a concrete pad, with concrete containment walls that provide the capacity of the tank plus the volume of a 100-year rainfall (at least 110 percent tank capacity). This containment area can also be drained to a waste tank (Seltzer 2004). A large spill scenario for these substances does not indicate an acute inhalation hazard to the Lummi Reservation (Figure 3.1). However, a large spill under certain wind conditions could contaminate the air on the Reservation.

The BP refinery also stores an average of over 10,000,000 pounds each of diesel, various naphtha products, and residual fuel oil and over 100,000,000 pounds of crude oil and gasoline (Ecology 2003b). The refinery has a maximum oil storage capacity of 315,651,540 gallons (7,198,912 barrels of crude oil and refined products), with the largest of 52 aboveground tanks holding 21,000,000 gallons (about 149 million pounds).

The petroleum storage tanks are surrounded by large earthen dikes, with the entire containment area lined by asphalt designed to retain petroleum products. These containment areas also provide the capacity of the tank plus the volume of a 100-year rainfall (Seltzer 2004). There are several incident response teams on the refinery staff, with at least 170 employees and contract employees that have the 40-hour HAZWOPER training required by 29 CFR 1910 (ARCO 2000). A spill response plan for the refinery was most recently revised in March 2003 to update names and other minor details, but the basic elements of the plan have been in place for several years (Rust 2004).

### **CHEMCO, Inc.**

CHEMCO chemically impregnates wood products under pressure with a proprietary treatment to provide fire-retardant protection. On its 40-acre site at the intersection of Grandview and Kickerville roads (just east of the BP Cherry Point refinery; see Figure 3.1), CHEMCO has a chemical manufacturing plant and stores multiple chemicals, including between 10,000 and 100,000 pounds of diesel fuel and formaldehyde, a toxic preservative (Ecology 2003b). The inhalation hazard zone for the CHEMCO facility is approximately three miles from the Reservation boundary and is therefore not a significant threat to the Reservation. CHEMCO is located in the Terrell Creek watershed, which drains to the Strait of Georgia. A worst-case spill could potentially affect off-Reservation tidelands that are important to tribal fisheries.

### **Puget Sound Energy Whitehorn Generating Station**

The Puget Sound Energy (PSE) Whitehorn Generating Station is located on Brown Road, just west of the BP Cherry Point refinery, and above Point Whitehorn along the Strait of Georgia. The Whitehorn Generating Station became operational in January 1975 and has been expanded since that time. This facility currently consists of two combustion turbine generators, three distillate fuel storage tanks, a water treatment system, and an electric substation. Two fuel storage tanks hold 1,008,000 gallons and a third holds 4,200,000 gallons. The distillate fuel oil in these tanks is the alternate fuel for the combustion turbine generators. The primary fuel for the turbines is natural gas supplied through the Williams pipeline by Northwest Pipeline Company (NWAPA 2003).

The turbine generators have no set operating schedule and operate only when additional electrical power capacity is needed. The turbines may go months or years without any significant operation except for testing, but may operate continuously for weeks when the power situation warrants. The turbine with the most use has operated for 17,000 hours since installation in 1980, with 6,000 of those hours occurring during the 2000-2001 period. During 2002, the generating station operated at very low capacity (only about one percent) because of low demand for power (NWAPA 2003; Lind 2004).

In addition to fuel storage, the Whitehorn Generating Station can store up to 3,500 gallons of sodium hydroxide (caustic) and 1,000 gallons of sulfuric acid. These compounds are transported to the station by tanker truck and are used to treat ion exchange resins in the water treatment system. The storage tanks for the sodium hydroxide and sulfuric acid are inside a building, with concrete containment and drains to a sump system (Lind 2004). In 2002, the generating station stored a daily average of between 1,000 and 10,000 pounds of sulfuric acid and between 10 million and 50 million pounds of diesel fuel (Ecology 2003b). The generating station currently stores

approximately three million gallons of No. 2 diesel fuel, which is generally transported to the station via a pipeline from the BP refinery (tanker truck is a secondary option). The aboveground fuel storage tanks have approximately 150 percent containment by earthen berms with clay (not concrete or asphalt) linings. All storage tanks at the facility have a monitoring and alarm system that is connected to a main PSE office in Redmond, WA. The generating station has a SPCC spill response plan that was recently updated during the 2002 – 2003 period (Lind 2004).

The sulfuric acid at the station has an inhalation hazard range of up to 4.0 miles based on the “large spill, night” classification of the 2004 NAERG, but this hazard zone does not reach the Reservation. Although unlikely, given the volume and distance from the Reservation, a large spill of acid could potentially contaminate air on the Reservation and could affect off-Reservation tidelands and marine waters that are important to tribal fisheries. The large volume of diesel fuel stored at this facility presents a greater potential threat to the environment.

#### **Other nearby facilities:**

The BP Ferndale Terminal (formerly the Texaco Producing Terminal) is along the Strait of Georgia, just north of the ConocoPhillips refinery and south of the Alcoa-Intalco Works aluminum plant. A BP pipeline carries butanes from the BP refinery to the BP Ferndale Terminal, from which they are transported by ship or barge (ARCO 2000). The BP Ferndale Terminal also receives and ships butane and liquid propane by rail and truck.

Facilities that store hazardous chemicals in the City of Bellingham area include Bellingham Cold Storage (ammonia), Bornstein Seafoods Inc. (ammonia), Encogen Northwest Cogeneration Plant (ammonia, sulfuric acid), Georgia-Pacific West Inc. (ammonia, acids), the Post Point Wastewater Treatment Plant (chlorine), and the Bellingham water treatment plant (chlorine). Additional details for these and other facilities located in Whatcom County are listed in the annual summary of the Washington Tier Two Hazardous Chemical Inventory.

### **3.2.2 Municipal Facilities**

The municipal water and wastewater plants listed below all discharge their effluent to the Nooksack River. Sewage spills from these plants can harm the Nooksack River and contaminate tribal shellfish beds on the Reservation, especially in the Portage Bay area. Each facility is in the Nooksack River floodplain and close to the river, and each stores enough chlorine to present a potential inhalation hazard to its surrounding area (Figure 3.1).

**Ferndale Water and Wastewater Treatment Plant:** The City of Ferndale operates a water and wastewater treatment facility just over a mile from the northern boundary of the Reservation, with an outfall to the Nooksack River that is approximately three miles upstream from where the river enters the Reservation. This facility stores a total of approximately twelve 150-pound chlorine cylinders that are divided between two buildings. The facility also has a 2,000-gallon tank for storage of diesel fuel; this tank has appropriate spill containment features (Leuenberger 2004).

**Lynden Water and Wastewater Treatment Plant:** The City of Lynden operates a water and wastewater treatment facility with an outfall to the Nooksack River that is approximately 11 river miles upstream from the northern boundary of the Reservation. The water plant has a 2,000-pound chlorine cylinder and two 150-pound back-up cylinders to treat water. Wastewater, formerly treated with chlorine, is now treated with ultraviolet (UV) light before discharge. The facility stores sodium metabisulfite to remove chlorine from the wastewater in case the UV system is not operating. The facility also has an approximately 100-gallon diesel tank and a back-up diesel generator with a tank of perhaps 400 gallons (Adams 2004).

**Everson Wastewater Treatment Plant:** The City of Everson operates a wastewater treatment facility with an outfall to the Nooksack River that is approximately 20 river miles upstream from the northern boundary of the Reservation. This wastewater facility stores a total of approximately four to six, 150-pound chlorine cylinders in one building. The facility also stores sodium metabisulfite to remove chlorine from the wastewater and has a diesel generator (Shaw 2004).

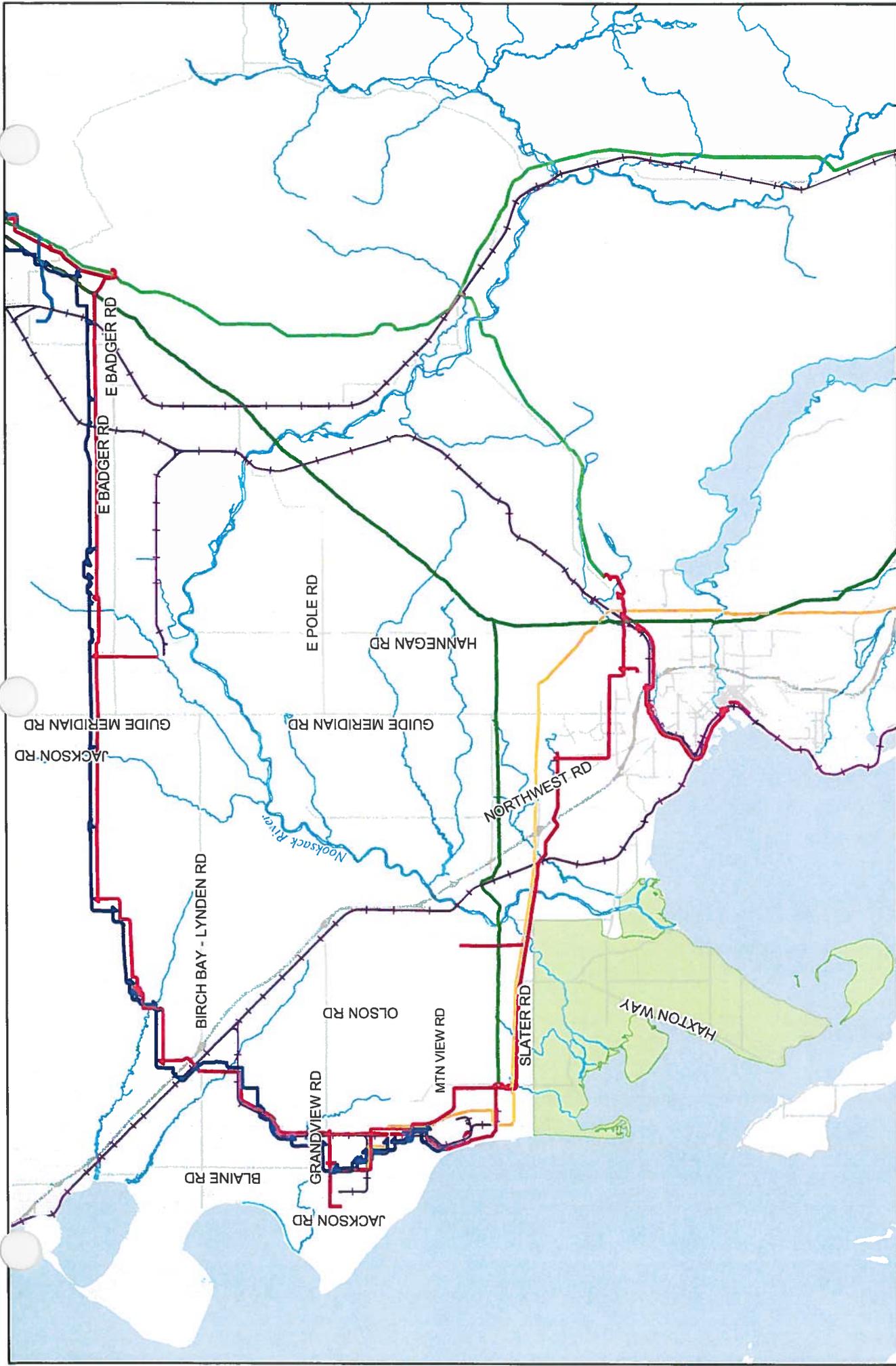
### **3.2.3 Transportation of Hazardous Materials**

A spill resulting from an accident in the transportation network of marine shipping and upland pipelines, roads, and railways may pose the greatest hazardous materials risk in the area. This risk is due to the probability of accidents associated with moving containers of hazardous materials and to the length of pipelines and the large volumes of products that flow through pipelines. Longer response times than those for fixed facilities also contribute to the increased risks associated with the transportation of hazardous materials.

In the Reservation vicinity, large oil tankers serve the two oil refineries and could create a spill on the scale of the Exxon Valdez spill in Prince William Sound. Three pipelines carrying oil, gasoline, jet fuel, and natural gas cross the Nooksack River and run parallel to Slater Road, less than one mile from the Reservation boundary. Hazardous materials may be transported along many roads in the area. Slater Road is one of the main routes to the Cherry Point Heavy Impact Industrial Zone and it is used to transport various hazardous materials between the facilities and the Interstate 5 highway. The main railway through the area passes 1.5 miles from the east boundary of the Reservation and crosses the Nooksack River in Ferndale, approximately two miles north of the Reservation. A secondary rail line serves the facilities in the Cherry Point Industrial Zone. Figures 3.2, 3.3, and 3.4 show the pipeline, main road, and railroad routes in the area and highlight the potentially vulnerable zones along the road and railroad routes.

#### **Shipping**

Large barges and oil tankers load and unload oil and petroleum products at the ConocoPhillips and BP docks in the Strait of Georgia just north of the Reservation. The locations of these docks are shown in Figure 3.1. Large vessels also visit the Intalco dock, which lies between the two refinery docks. Potential spills can occur as a result of vessel groundings, collisions, allisions, or during the transfer of products at the dock. A large oil spill in this area could have huge environmental and economic effects on the region because it could severely damage marine resources and shut down all shipping



**Figure 3.2 Pipelines in the Reservation Area**

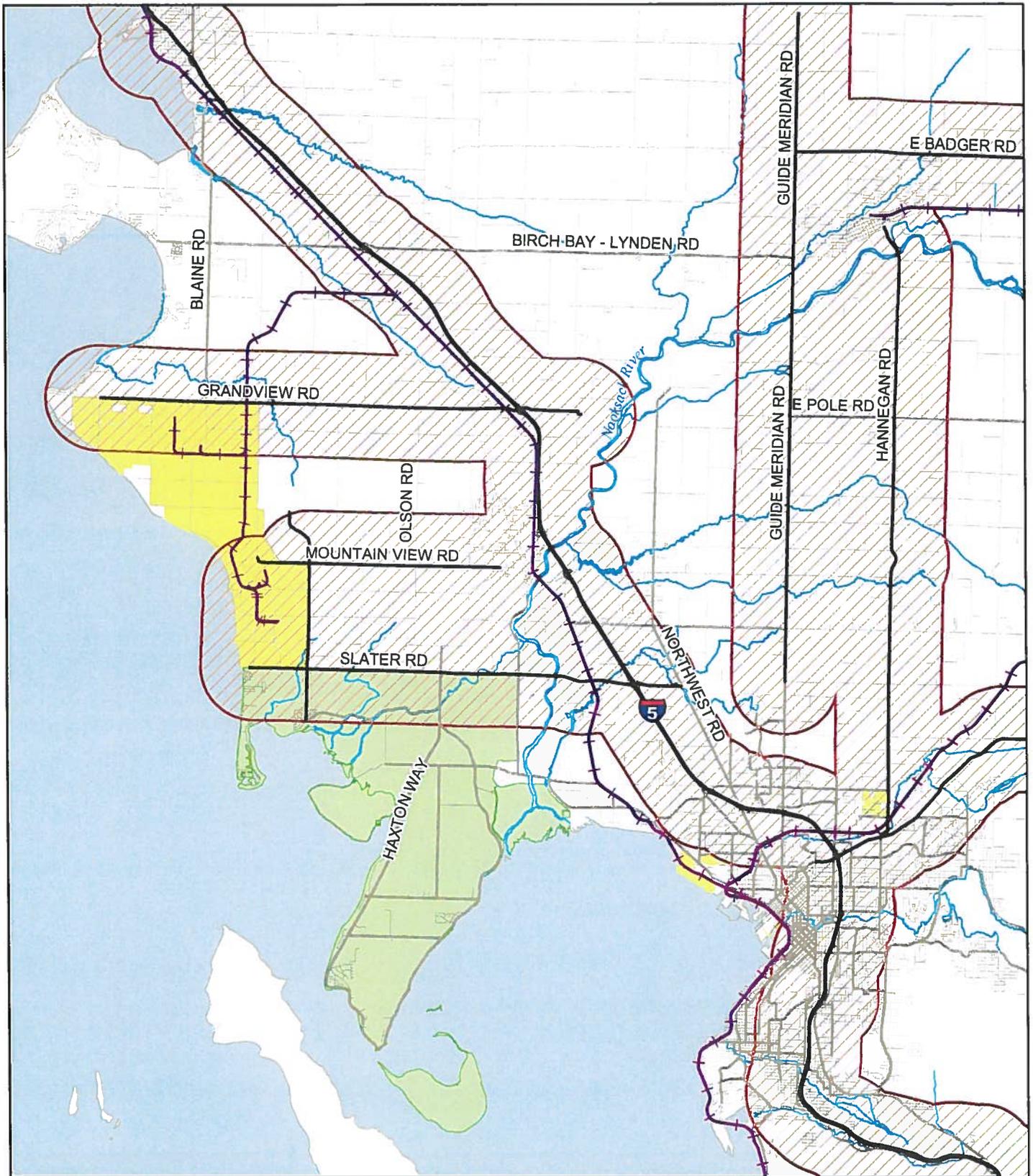
Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation.



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Lummi Nation Individual Tract

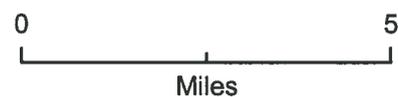


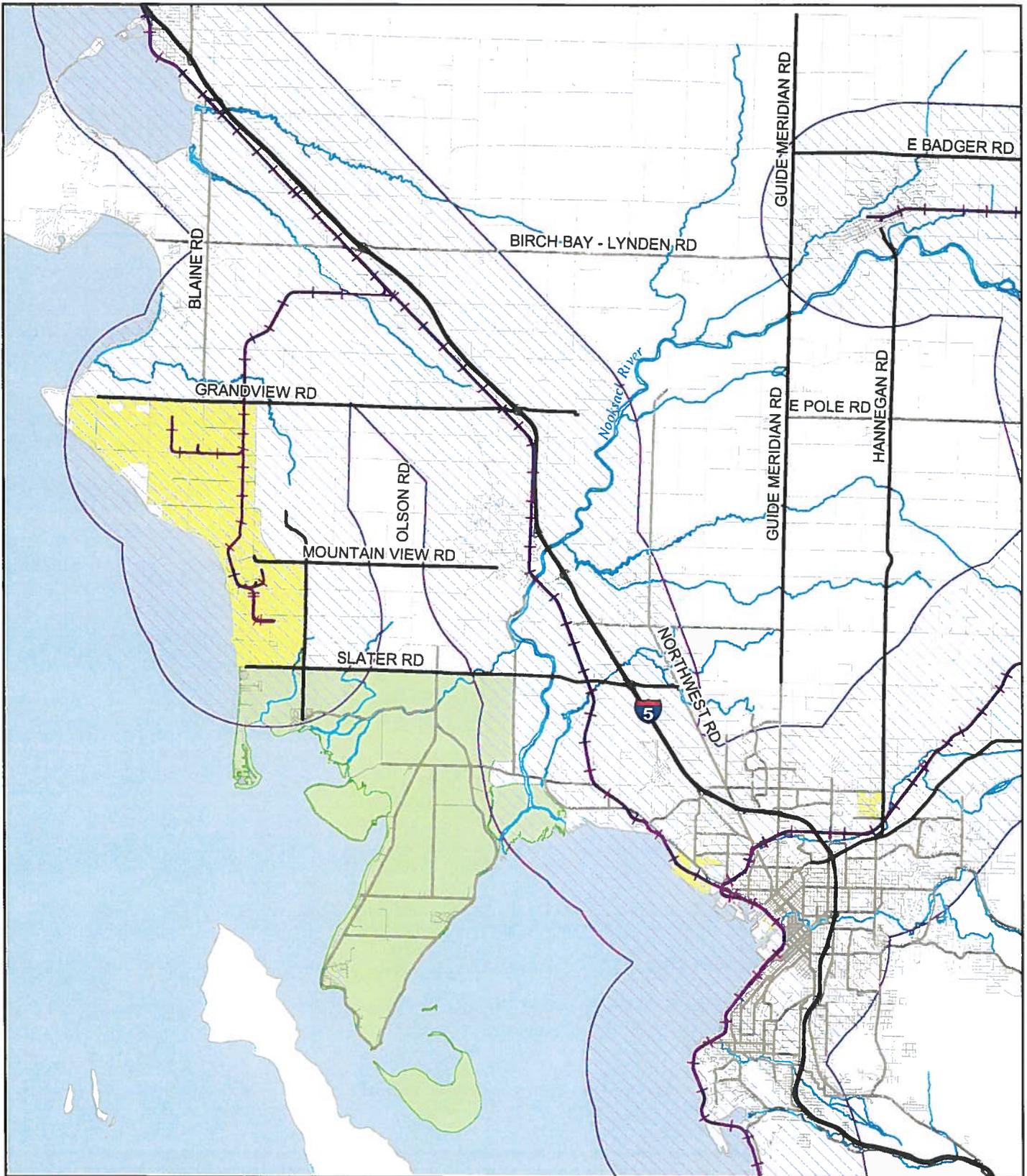
**Figure 3.3 Hazardous Materials Corridors for Major Roads in the Reservation Area**

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**Legend**

- Major Arteries
- Interstate 5
- Major Roads
- Other Roads
- Railroads
- Streams
- ▨ 1-Mile Corridor
- Lummi Reservation
- Heavy Impact Industrial Zoning





**Figure 3.4 Hazardous Materials Corridors for Railroads in the Reservation Area**

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**Legend**

- Major Arteries
- Interstate 5
- Major Roads
- Other Roads
- Railroads
- Streams
- ▨ 2-Mile Corridor
- Lummi Reservation
- Heavy Impact Industrial Zoning



for an extended period, including the delivery of oil from other tankers that the region relies on for much of its fuel needs.

Recent significant shipping accidents in the Reservation area include:

- On December 14, 2001, the T/V Overseas Washington was discharging cargo at the south wing of the Cherry Point refinery dock when a combination of wind and wave action parted the two after-spring lines, damaging three loading arms. The vessel crew and the terminal operator recognized the deterioration of the weather and had drained the loading arms, so no significant amount of oil was spilled (Ecology 2003c).
- On June 13, 2001, the Overseas Boston was unloading Alaska North Slope crude oil at the Tosco (now ConocoPhillips) dock when a coupling that connected a marine loading arm to the ship's manifold blew off. Oil, discharged from the ship's manifold, blew across the Tosco dock and was deflected back to the ship by a shroud located at the rear of the marine loading arms. The ship's operator immediately stopped transfer but 2,620 gallons (62.4 barrels) of oil were released with approximately 2,436 gallons (58 barrels) spilled to the water. The refinery response team was activated, the agencies were notified and clean-up contractors were called in. No wildlife was injured by the spill and no lasting environmental damage was incurred (Whittaker 2004).
- On June 27, 1999, the T/V Arco Texas was discharging crude oil through two loading arms to the Tosco (now ConocoPhillips) refinery when a combination of tidal current and wind overcame the holding capacity of its winches and the ship drifted away from the terminal dock, causing both loading arms to fall into the water. Approximately 1,050 gallons (25 barrels) of crude oil were released as a result of the damaged loading arms. The probable cause of the breakaway and subsequent spill was the inadequate capacity of the aft mooring winches on the ship under the current and wind load at the time. The observed flood current of between one and three knots was not reflected in the tidal current predictions for the nearest prediction points, which indicated a slack current turning to a weak flood at the time of the incident (Ecology 2001b).
- On August 6, 1997, a failure or human error involving the pumping system at the Tosco (now ConocoPhillips) dock caused a spill of about 1,050 gallons (25 barrels) of a mixture of heavy oil and jet fuel into the Strait of Georgia. The spill occurred as Tosco used bunker oil to clear test water from a pipeline on its dock. A significant spill response effort was made, including skimmers, absorbent materials, and placing booms along the shorelines of the Sandy Point Peninsula and the north end of Lummi Island. Workers were prepared to lay a 10,000-foot boom across Lummi Bay, but the oil did not approach the bay. Minor shoreline effects of the spill were recorded on Vendovi Island, south of Lummi Island.
- On December 30, 1994, an estimated 26,936 gallons (641 barrels) of diesel oil spilled when Barge 101 grounded while being towed by the tug Mercury to Jack Island (near Anacortes) from Vancouver, British Columbia. The grounding most likely occurred on Clements Reef, just northwest of Matia Island and approximately eight miles west of the Reservation. At the time of the grounding, Barge 101 was

carrying 2,620,968 gallons (62,404 barrels) of No. 2 diesel oil, and had a draft of 16-foot 5 inches forward and 19-foot 5 inches aft. Damage to the barge was not detected until the tug Mercury tied up to the barge, at which time the crew observed diesel oil in the water around the barge. The grounding punctured the number four and six starboard cargo tanks. A spill response effort by Crowley Marine Services followed. The Office of Marine Safety determined that the probable cause of the grounding was the Master's failure to accurately navigate the tug Mercury and the barge near charted navigational hazards. This occurred as a result of a failure to follow the established navigation procedures of the company and to use the instruments available on-board to determine the position of the vessel (Ecology 2000b).

- On May 1, 1987, about 1,000 gallons (24 barrels) of heavy fuel oil spilled from an overfilled barge tank at the Mobil Oil Company (then Tosco, now ConocoPhillips) dock (Bellingham Herald 1997).
- On June 4, 1972, approximately 21,000 gallons (500 barrels) of crude oil were spilled into the Strait of Georgia at the ARCO (now BP) Cherry Point Refinery dock from the T/V World Bond. The tanker ship was in the process of offloading Alaska North Slope crude oil when a flange on the tanker failed. A significant response effort was implemented to contain and recover the oil and clean the shoreline, but few details were recorded. Following this incident, ARCO implemented new policies stipulating that all vessels calling on the dock must be in good condition, including the piping, manifolds, flanges, and other oil transfer equipment. These policies also required that all new vessels be inspected before docking at the Cherry Point Refinery and that any vessel not meeting the established criteria will be prohibited from docking or transferring oil (ARCO 2000).

The BP Cherry Point refinery also reported jet fuel spills of 210 gallons in 1991 and 100 gallons in 1997 from vessels at their dock. Eight other spills of various petroleum products ranging from 10 to 100 gallons and 24 smaller petroleum spills (many of which were less than one gallon, or were sheens) were recorded from 1990 through 1999 at the BP dock. From the start of operation in 1971 through 1989, there were nine petroleum or oily water spills of 80 to 420 gallons and twelve spills of less than ten gallons (three of which were sheens) at the Cherry Point dock (ARCO 2000). The ConocoPhillips refinery has also had minor spills at its dock (Whittaker 2004). From 1995 to 2004 there were 6 spills of crude oil, jet fuel, gasoline, or heavy fuel oil that ranged in size from a sheen to 126 gallons (3 barrels) (Whittaker 2004). A small spill (2-3 barrels) of diesel fuel occurred at the dock on January 18, 2005 and 50 gallons (less than 1.5 barrels) of intermediate fuel oil was spilled from a barge on February 14, 2005.

Because human error is responsible for many spills, the safety planning and training of ship crews and dock personnel are important factors in preventing spills. When a spill occurs, the ConocoPhillips and BP refineries have response plans that are practiced at least three times annually with two required deployment exercises and one required tabletop exercise. In addition, the Northern Puget Sound Geographic Response Plan (GRP) for oil spills guides the actions of all available response entities to protect environmental resources.

## Pipelines

As detailed in Table 3.2 and illustrated on Figure 3.2, there are eight pipelines that transport petrochemicals in northwestern Whatcom County near the Reservation, six of which service the facilities in the Cherry Point Heavy Impact Industrial Area. Three of these, the BP Olympic pipeline carrying refined fuel, the Terasen crude oil pipeline, and the Cascade natural gas pipeline, run east-to-west just north of the Reservation boundary. All three pipelines cross the Nooksack River just east of the northeast boundary of the Reservation.

Two natural gas pipelines, the Cascade pipeline and the BP pipeline, originate (or cross) the Canadian border near Sumas, travel west across Whatcom County and enter the industrial zone from the north. These natural gas pipelines cross several creeks that are tributaries to the Nooksack River. A third natural gas pipeline, the Williams Northwest Pipeline, crosses the United States border at Sumas and travels south to east of Bellingham making two crossings of the Nooksack River. A fourth natural gas pipeline is the Sumas pipeline which connects the Sumas Cogeneration plant to the Canadian pipeline facilities of Westcoast Energy Inc. (DOE 1992).

There are two pipelines which run within the industrial area. The BP pipeline transfers crude oil from the Terasen pipeline to the BP Cherry Point refinery. This line is not currently in use but could become the primary route if oil tanker shipping is shut down. Finally, BP operates a butane pipeline that runs from the refinery to the BP Ferndale Terminal to the north of the ConocoPhillips refinery.

The greatest public safety and environmental risk to the Reservation is posed by the BP Olympic pipeline (formerly the Olympic Pipeline Co.), which was the source of the large gasoline spill and explosion in 1999 in the City of Bellingham that killed three people and caused significant environmental damage along Whatcom Creek. The BP Olympic pipeline runs almost parallel to the northern Reservation boundary, ranging from approximately one-eighth to one-half mile to the north, and crosses the Nooksack River just north of Slater Road. The two crude oil pipelines, Terasen and BP, also pose a risk because they are close the Reservation, the Terasen lines crosses the Nooksack River, and the product they carry could cause significant environmental damage, especially to aquatic habitats. The natural gas lines pose less risk because natural gas is lighter than air, dissipates quickly, and does not pose a large inhalation or environmental hazard.

Recent significant pipeline accidents in the Reservation area include:

- In January of 2000, the Trans Mountain (now Terasen) pipeline spilled 21,000 gallons (500 barrels) of crude oil at the Laurel station facility when a valve was left open during a restart. Including this spill, the Terasen pipeline has had three spills of light crude at the Laurel station totaling 28,800 gallons from the 10-year period between 1993 and 2003 (Chin 2003).
- On June 10, 1999, a 16-inch-diameter steel pipeline owned by Olympic Pipe Line Company (now BP Olympic) ruptured and released about 237,000 gallons of gasoline into Whatcom Creek in Bellingham, Washington. About 1 1/2 hours after the rupture, the gasoline ignited and burned approximately 1 1/2 miles along the creek. Two 10-year-old boys and an 18-year-old were killed and eight additional

Table 3.2 Petrochemical Pipelines near the Lummi Reservation

Pipeline	Product	Route	Risk to Reservation
BP Olympic	Refined fuels	<ul style="list-style-type: none"> <li>Runs north-south to connect the BP and ConocoPhillips refineries, then runs east-west just north of the Reservation</li> <li>Crosses the Nooksack River just east of the northeast corner of the Reservation</li> </ul>	High
Terasen	Crude oil	<ul style="list-style-type: none"> <li>Runs east-west from Cherry Point to the I-5 corridor (approximately) then north-south.</li> <li>Crosses the Nooksack River approximately 1 mile north of the northern boundary of the reservation.</li> </ul>	High
Cascade	Natural gas	<ul style="list-style-type: none"> <li>Runs east-west from Cherry Point to the I-5 corridor (approximately).</li> <li>Crosses the Nooksack River just east of the northeast corner of the Reservation</li> <li>Includes a segment that runs between BP and ConocoPhillips</li> </ul>	Medium-High
Williams	Natural gas	<ul style="list-style-type: none"> <li>Begins or crosses the Canadian border near Sumas and runs directly south to the east of Bellingham with a branch into Bellingham.</li> <li>Crosses the Nooksack River twice.</li> </ul>	Low
BP Natural Gas	Natural gas	<ul style="list-style-type: none"> <li>Begins or crosses Canadian border near Sumas, travels west across northern Whatcom County, and then southwest to the industrial zone.</li> </ul>	Low
Sumas Pipeline	Natural gas	<ul style="list-style-type: none"> <li>Runs east-west between the Canadian border near Sumas and the Sumas Cogeneration plant.</li> </ul>	Low
BP Cherry Point	Crude oil	<ul style="list-style-type: none"> <li>Connects the Terasen crude oil pipeline to the BP Cherry Point refinery.</li> <li>Runs north-south within the Cherry Point Heavy Impact Industrial area</li> </ul>	High (when in use)
BP Cherry Point	Butane	<ul style="list-style-type: none"> <li>Runs from BP Cherry Point refinery to the BP Ferndale Terminal</li> </ul>	Medium

injuries were documented. A single-family residence and the City of Bellingham water treatment plant were severely damaged. In addition, substantial environmental damage occurred along the creek and its banks. As of January 2002, Olympic estimated that total property damages were at least \$45 million.

- On March 1-2, 1997, a leak from the ARCO (BP) pipeline spilled 420 gallons of crude oil on ALCOA-Intalco farmland (Bellingham Herald 1997).
- On January 1, 1997, a weather-related pipe break spilled 31,500 gallons of oil onto the Tosco (now ConocoPhillips) refinery grounds (Bellingham Herald 1997).
- In 1997, the Williams Northwest natural gas pipeline ruptured in Whatcom County sending shooting flames into the air just north of Nugent's Corner, east of Goodwin Road near Everson, WA. The cause of the rupture was thought to be an area of shifting ground. Structural damage was caused to homes in the area but no one was injured (AP 2003).
- In 1992 the Trans Mountain (now Terasen) pipeline was fined for a 92,000 gallon spill that reached a nearby wetland (Chin 2003)
- On February 23, 1987, about 16,800 gallons of diesel fuel spilled from a pipeline on the Mobil Oil Company (then Tosco, now ConocoPhillips) property (Bellingham Herald 1997).

## **Roadways**

Accidents along roadways present a significant spill potential on and near the Reservation. The largest hazards for the Reservation are posed by trucks and trailers delivering hazardous materials to the Cherry Point Heavy Impact Industrial Zone and fuel to the Lummi Shell station, the Fisherman's Cove gas station, and the Whatcom County ferry to Lummi Island. The route for all of these destinations follows Slater Road, a county road that lies along the northern boundary of the Reservation. The trucks also travel along Haxton Way to reach the gas stations on the Reservation and the Lummi Island ferry.

Other roadways of concern to the Lummi Nation include the many roads that cross the Nooksack River or its tributaries. The highways that cross the Nooksack River are most likely to have an accident that causes a spill. These highways are Interstate 5 and State Highways 539, 542, and 544. Hazard zones along the major roads in the area were identified to be one mile wide on either side of the roadways by Whatcom County (Whatcom County 2001) and are shown in Figure 3.3.

## **Railroads**

The Burlington Northern railway passes 1.5 miles from the east boundary of the Reservation and crosses the Nooksack River in Ferndale, approximately two miles north of the Reservation. Since this rail line carries materials between Seattle, Washington, and Vancouver, British Columbia, it may carry hazardous materials on a daily basis. A

secondary rail line travels north from the facilities in the Cherry Point Heavy Impact Industrial Zone to the main rail line. Figure 3.4 shows the railroad routes in the area and the potentially vulnerable zones in a large spill scenario along these routes (Whatcom County 2001). The two-mile wide vulnerable zone identified by Whatcom County reaches onto the eastern portion of the Reservation, indicating the potential for an event involving a chemical with a large inhalation hazard that could be released into winds from the east moving onto the Reservation.

## 4. LUMMI SPILL PREVENTION AND RESPONSE

Although the Lummi Natural Resources Department (LNR) has previously developed Spill Response Plans for marine waters and for upland areas, these plans have not been integrated. This SPRP builds on the past plans to develop a more comprehensive and integrated plan for spill response.

The LNR 1996 Oil Spill Response Plan was a short document comprised of a phone list of LNR employees to be contacted in case of a spill; a phone list of pertinent federal and state agencies, tribal and local governments, and non-governmental organizations; a letter to Whatcom County Division of Emergency Management (DEM) requesting notification of incidents and providing coordination details; guidance on initial response actions for tribal staff that are on-site or notified of a spill incident; and a list of LNR staff designated to be the Tribal On-Scene Coordinator (Tribal OSC). (The Tribal OSC is the Lummi representative on a federal/tribal/state/local Unified Command structure that is responsible for organizing the spill response. The federal OSC generally has the greatest authority.) The LNR Spill Response Plan was updated in 1998 with new contact information, revised initial response guidance, and an environmental complaint form used to record information describing spills.

The Lummi Nation Wellhead Protection Program Phase II report (LWRD 1998a) contains a section titled Spill Response Plan that addresses the threats to water quality in the two wellhead protection areas on the Reservation. This plan briefly describes the nature of hazardous materials incidents and possible steps to reduce the effects of such incidents. It also identifies the primary legislative requirements pertaining to spill response, the primary potential sources of hazardous materials on and near the Reservation, the responsibilities or capabilities of off-Reservation organizations (i.e., government agencies and industries) that may respond to a spill that affects the Reservation or tribal resources, and contact information for those organizations and for LNR staff. In addition, the plan describes the response capabilities and limitations of Lummi Law and Order and LNR personnel and the order of notification for response organizations.

In addition, the Lummi Natural Resources Department (LNR) provided the Whatcom County DEM with emergency notification procedures in 1997, 2000, 2003, and 2004 (Appendix F). These procedures request that DEM notify LNR as soon as possible of any environmental emergencies that affect Reservation residents or tribal resources. The procedures include a prioritized list of LNR staff with contact information for the staff and for other important emergency contacts. These notification procedures are also attached to the emergency procedure sheet used by the Lummi Tribal Sewer and Water District (LTSWD) for sewage spills (Appendix F). This sheet includes immediate actions to be taken and instructions for required notification of the EPA, LNR, and the Washington Department of Health for discharges that may affect shellfish growing waters.

### 4.1 RESPONSIBILITY AND AUTHORITY

Pursuant to the Lummi Nation Constitution, complete leadership authority and responsibility rests with the Lummi Indian Business Council (LIBC). As a result, the

LIBC and its officers are responsible for the health and safety of the Lummi Reservation community and for emergency direction and control within the boundaries of the Lummi Indian Reservation. The LIBC consists of eleven elected members, who serve three-year terms. The terms of the council members are offset so that four members are up for election in consecutive years followed by three members standing for election. Once an annual election is completed and the members are seated, they elect officers among themselves. The Chairman, Vice-Chairman, Treasurer, and Secretary each have constitutionally required responsibilities and authority and each is assigned specific and general responsibilities by the LIBC.

Although it retains the political responsibility for the community, the LIBC has traditionally split the administrative responsibility and authority for emergency response between the Administrator for the Law and Order Department and the Executive Director of the Lummi Natural Resources Department. The Law and Order Administrator is responsible for the protection of life, property, and the rights of the Nation and its members. In accordance with CFR 300.610, the Natural Resources Executive Director is responsible for the protection of the natural resources of the Nation, including all resources on the Reservation and those off-Reservation resources used by Lummi members while exercising their treaty rights. The Draft Lummi Nation Comprehensive Emergency Management Plan (Appendix C), developed by the LIBC Safety Officer, identifies proposed roles and responsibilities of LIBC Officers, Department Directors, and staff.

Other LIBC departments involved in spill prevention and response include Cultural Resources, Education, Economic Development, Planning, and the Lummi Indian Family Enrichment (LIFE) Center. The LIBC department directors are responsible for assuring the safety of their employees, facility, and services as well as contributing department resources to the response and recovery efforts. While it is likely that outside assistance would be available in the event of an emergency, a large-scale disaster may require that the LIBC and individual departments be prepared to carry out disaster response and short-term recovery efforts on an independent basis.

In the event that an emergency response incident exhausts the capabilities and resources of the Lummi Nation, the LIBC Chairman or his/her designee will contact the appropriate local, state, or federal agency to request necessary assistance to protect the political integrity, safety, health, and welfare of the Lummi Nation and its members. The LIBC may assign all or part of this authority and responsibility to an officer, individual, or employee at their discretion. A general chain of command and policy for designating duties is proposed in the Draft Lummi Nation Comprehensive Emergency Management Plan (Appendix C).

## **4.2 SPILL PREVENTION**

The federal and state regulatory requirements summarized in Section 2 and detailed in Appendix A and B of this plan unfortunately do not, by themselves, guarantee safety from chemical accidents. Some of the regulatory requirements, particularly the EPCRA and the CAA Risk Management Program, encourage communication between facilities and the surrounding communities about chemical safety and chemical risk. Many of the larger potential spill sources that could affect the Reservation are outside the Reservation boundaries and are not under the direct regulatory jurisdiction of the Lummi

Nation. Because the Lummi Nation is not responsible for regulating these sources, there is relatively little that the LIBC can do to prevent spills from these sources beyond reviewing and commenting on risk management and emergency response plans for facilities and transportation. Communication with off-Reservation facilities and jurisdictions is therefore an important aspect of spill prevention and response efforts by the Lummi Nation.

To reduce the risk from potential spill sources on the Reservation, the LNR Comprehensive Water Resources Management Program, which is being developed and implemented by the LNR Water Resources Division, includes elements that address spill prevention. These elements include the Wellhead Protection Program (LWRD 1997, 1998a), Storm Water Management Program (LWRD 1998b), Flood Damage Reduction Plan (LWRD 2001a), and Nonpoint-Source Management Program (LWRD 2001b, 2002). These programs and plans identify vulnerable areas and potential pollution sources on the Reservation and list recommended prevention measures to reduce pollution and the potential for contaminating spills. As discussed in Section 2.1, the Lummi Nation Water Resources Protection Code (Title 17), Land Use, Zoning, and Development Code (Title 15), Flood Damage Reduction Code (Title 15A), and Solid Waste Control and Disposal Code (Title 18) also help prevent spills of hazardous materials.

Although spill prevention measures have been taken at the specific facilities on the Reservation (Section 3.1), the LIBC has also undertaken general spill prevention measures Reservation-wide. In 1995, underground fuel storage tanks (USTs) were removed or brought into compliance at Fisherman's Cove. In 1996, the LIBC removed four USTs from the tribal center in order to comply with federal UST regulations. Small remaining volumes of hazardous materials were removed from the old maintenance building to the Whatcom County Disposal of Toxics facility when the LIBC Maintenance Department moved to a new location in 2003. The Maintenance Department currently stores only small volumes of paints, paint thinners, and other maintenance chemicals (Emley 2004). The LIBC Safety Office is currently conducting an inventory of chemicals stored at tribal facilities so that required Material Safety Data Sheets (MSDSs) can be placed at storage locations. This step should improve the safe handling of chemicals (Russell 2004).

#### **4.3 INCIDENT COMMAND**

The LIBC recognizes that the industry standard for response to disasters that threaten the community and environment is the Joint Incident Command System/ Unified Command format (ICS/UC). The LIBC will seek to ensure that a Tribal On-Scene Coordinator (OSC) is present in the Unified Command and at the Whatcom County Emergency Operations Center to represent the concerns of the Lummi Nation. Currently the LIBC Safety Officer is designated to coordinate efforts with the Whatcom County DEM. As required by Homeland Security Presidential Directive (HSPD) – 5, the Department of Homeland Security has recently developed the National Incident Management System (NIMS), which incorporates the Incident Command System, to provide a consistent cross-agency approach to emergency response. The resources of the LIBC may be available, as appropriate, to assist in response, assessment, and recovery efforts in the Reservation area. The Lummi Nation Comprehensive Emergency Management Plan (CEMP) proposes that the Lummi Nation will engage in such

cooperative emergency planning, response, mitigation, and restoration with other jurisdictions and industry as it may be deemed necessary, beneficial, and appropriate. A Mutual Aid Agreement would be one way to formally establish a cooperative arrangement with facilities and other jurisdictions and may be desirable for the Lummi Nation.

The purpose of the Unified Command is to ensure that the On-Scene Coordinators of each appropriate government and the responsible party agree on a course of action before the initiation of a response or recovery effort. Listed below in Table 4.1 are the typical members of a Unified Command team that would address a pollution release or other disaster that may threaten the community and the environment in the Reservation area. For spills on the Reservation, the federal OSC from the EPA or the Coast Guard (depending on the spill location) will act as the Incident Commander. For off-Reservation spills in Whatcom County, state regulations designate the Washington State Patrol as the Hazardous Materials Incident Commander for all jurisdictions, with the exception of jurisdictions that affirmatively retain such responsibility. Along state and interstate highway corridors, the Washington State Patrol is the designated incident command agency. For marine spills that affect Whatcom County, the Director of the Division of Emergency Management or the Director's designee assumes the position of Local On-Scene Coordinator within the Unified Command organization.

Table 4.1 Unified Command On-Scene Coordinators

<b>Jurisdiction</b>	<b>Representative<sup>2</sup></b>
Federal	Environmental Protection Agency and Coast Guard
Washington State	Dept. of Ecology and Washington State Patrol
Tribal	Chief of Police, LNR Director, and LIBC Chairman
Whatcom County	Director, Division of Emergency Management
Fire Department	Fire Chief, Fire District #8 (Marietta) or #7 (Ferndale)
Responsible Party	Company Representative

As mentioned in Section 2.2, the five functions performed under the Unified Command through the ICS are command, operations, planning, logistics, and finance and administration. Further Unified Command and ICS information is attached in Appendices A and D. The Lummi Incident Command structure for LIBC employees, which is based on the Draft Lummi Nation Comprehensive Emergency Management Plan (CEMP) (Appendix C), is illustrated in Figure 4.1. Table 4.2 outlines the responsibilities of LIBC officers and key LIBC staff after activation of the CEMP (LIBC 2004). The Draft Nation CEMP is currently under revision and some changes in Figure 4.1 and Table 4.2 may result from this revision.

<sup>2</sup> Phone numbers listed in Appendix F

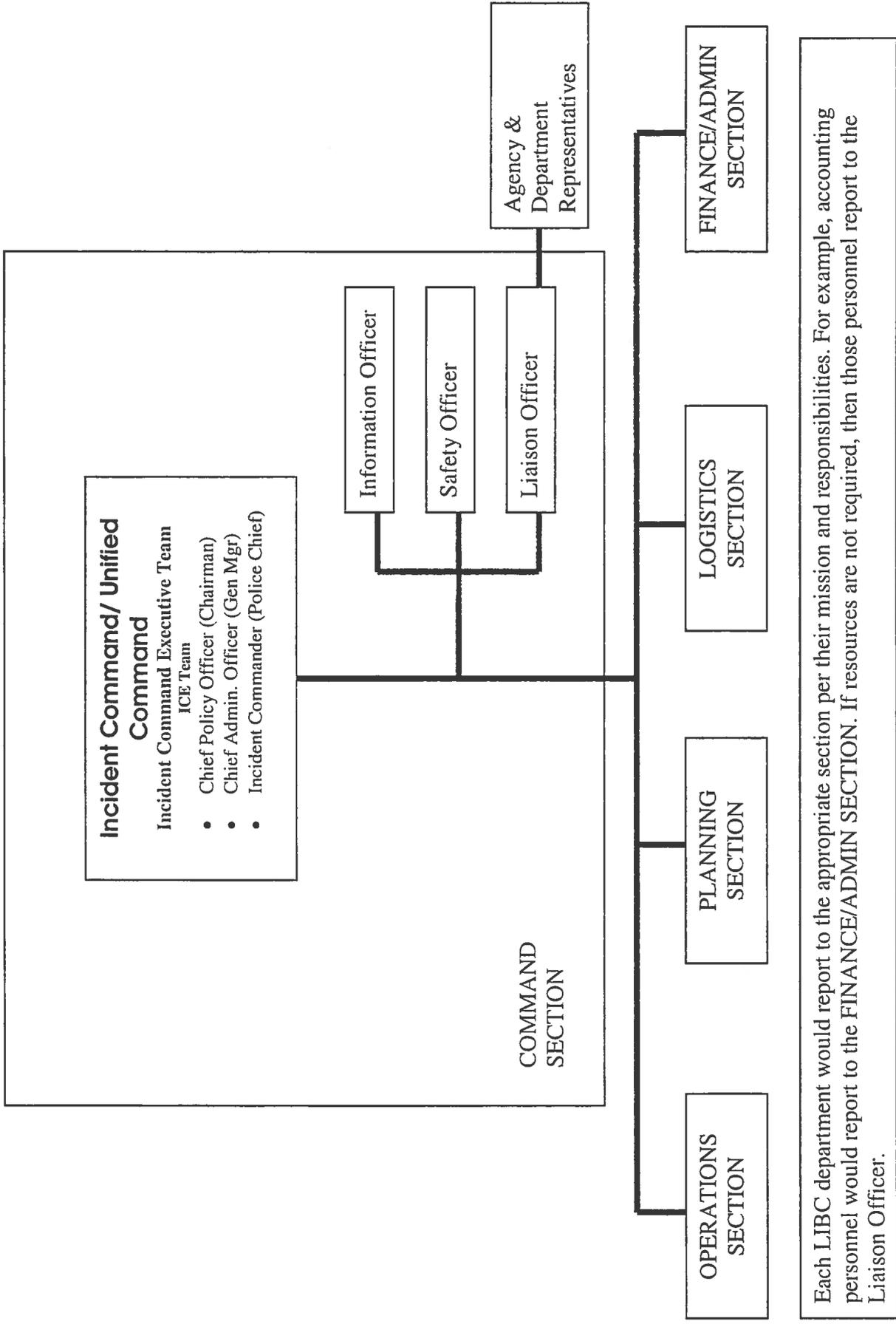


Figure 4.1 Lummi Nation Comprehensive Emergency Response Command Structure

Table 4.2 Roles and Responsibilities under the Lummi Nation Comprehensive Emergency Response Plan (CEMP)

CEMP Component	Position	Responsibilities
Incident Command Executive Team (ICE Team)	Chief Policy Officer	<ul style="list-style-type: none"> <li>• Held by LIBC Chairman</li> <li>• Oversees decision making of ICE Team</li> <li>• Has authority to activate CEMP via notification of Lummi Police.</li> </ul>
	Chief Administrative Officer	<ul style="list-style-type: none"> <li>• Held by the LIBC General Manager</li> <li>• Ensures compliance, availability, and support of all LIBC personnel during response.</li> </ul>
	Incident Commander	<ul style="list-style-type: none"> <li>• Held by the Chief of Police</li> <li>• Implements the Incident Command System (ICS)</li> <li>• Has the authority to activate the Emergency Operations Center</li> </ul>
Emergency Operations Center (EOC)	Information Officer	<ul style="list-style-type: none"> <li>• Responsible for developing and releasing information about the incident to the news media, to incident personnel, and to other appropriate agencies and organization</li> </ul>
	Safety Officer	<ul style="list-style-type: none"> <li>• Develops and recommends measures to the IC/UC for assuring personnel health and safety and to assess hazardous and unsafe situations.</li> </ul>
	Liaison Officer	<ul style="list-style-type: none"> <li>• Serves as the point of contact for assisting and coordinating activities between the IC/UC and various agencies and groups.</li> </ul>
	Operations Coordinator	<ul style="list-style-type: none"> <li>• Responsible for all operations directly applicable to the primary mission of the response.</li> </ul>
	Planning Coordinator	<ul style="list-style-type: none"> <li>• Responsible for collecting, evaluating, and disseminating the tactical information related to the incident, and for preparing and documenting Incident Action Plans (IAPs).</li> </ul>
	Logistics Coordinator	<ul style="list-style-type: none"> <li>• Responsible for providing facilities, services, and materials for the response</li> </ul>
	Administration and Finance Coordinator	<ul style="list-style-type: none"> <li>• Responsible for all financial, administrative, and cost analysis aspects of the response</li> </ul>
Operations and Support	Emergency Operations Officer (EOO)	<ul style="list-style-type: none"> <li>• Designated by the Incident Commander</li> <li>• Responsible for operation of the EOC</li> </ul>
	Division Directors and Department Managers	<ul style="list-style-type: none"> <li>• Specified Department Managers are to make themselves available to the ICE Team and the EOC</li> </ul>

#### 4.4 INITIAL RESPONSE AND NOTIFICATION

Because of geographic proximity, mission, and staffing levels, Lummi Law and Order personnel will often be the first responder to the scene of an accident on the Reservation. Their responsibilities include securing the area, controlling traffic, and notifying appropriate response personnel. The first responder from Law and Order will initially contact 911 emergency dispatch to mobilize other local response vehicles as necessary. If 911 is notified before Lummi Law and Order, 911 personnel should contact Lummi Law and Order to initiate the local tribal response.

The National Response Center (NRC) and/or the Hazardous Spill office of the EPA Region 10 office in Seattle should be notified after 911. Since the EPA and Ecology spill response sections generally work closely together on accidental releases in Washington State, the EPA hazardous waste section suggests that a call to Ecology after EPA is notified may speed response efforts. Table 4.3 lists the order in which agencies should be notified and the emergency phone numbers for the agencies. (*Note: Whatcom County 911 emergency dispatch guidelines call for activating the local emergency response personnel first and then notifying Whatcom County DEM, and then DEM will notify the NRC, Washington State Patrol, and the WA EMD.*) In the case of a spill, it will also be important to notify the LIBC cultural resources staff and the LNR so that cultural and environmental resources receive consideration during the spill response. Contact numbers for hazardous materials facilities and other potential responders and a notification protocol are included in the Spill Response Binder (Appendix F).

Table 4.3 Order of Notification for Hazardous Spill Incidents

Order of Call	Response Agency	24-Hour Phone
1	Lummi Law and Order	911
2	Local Emergency Dispatch	911
3	National Response Center	1-800-424-8802
4	EPA Region 10	1-206-553-1263
5	Whatcom Co. DEM	360-676-6681
6	WA Department of Ecology, NW Region and/or WA Emergency Management Division	1-206-649-7000  1-800-258-5990 or 1-800-OILS-911

The Comprehensive Emergency Management Plan being developed by the LIBC Safety Office will be designed to address any disaster or emergency situation (not just spills) that may occur on-Reservation. The Comprehensive Emergency Management Plan will describe the mechanisms and structures by which the Lummi Nation will mobilize resources and coordinate response with local, state, and federal agencies. The LIBC Safety Office is encouraging and coordinating the development of facility, departmental, and program emergency response plans. These plans will be referenced within the comprehensive plan. The procedures in this SPRP complement and are consistent with the Draft Lummi Nation Comprehensive Emergency Management Plan and will comprise an appendix of the CEMP.

#### 4.5 LUMMI NATURAL RESOURCES DEPARTMENT RESPONSE

Staff of the Lummi Natural Resources Department (LNR) must be notified and kept informed of any spill that could potentially affect natural resources of value to the Lummi Nation. A notification list of LNR staff has been provided to Lummi Law and Order, Lummi Tribal Sewer and Water District, pertinent LIBC departments, the Whatcom County DEM, and to the major industries near the Reservation. This notification list and transmittal letter with guidelines are included in the Spill Response Binder (Appendix F).

It is important that the expertise of the LNR staff be available to provide advice to emergency personnel on response options that may affect environmental resources. Although it would be best to have LNR technical staff that know the physical characteristics of the Reservation on-site to control resource damage, the OSHA regulations (29 CFR 1926.65(e)(7)) forbid untrained personnel from physically participating in recovery operations. Additionally, the NCP requires compliance with the OSHA provisions (OSHA 2001). The OSHA training requirements for spill response (29 CFR 1920.120(q)(6)) specify the different levels of training needed for the varying levels of involvement. Generally, 24 hours of training is required for emergency response and 40 hours of training is required for post-emergency response clean-up (OSHA 2001). Once the appropriate training course has been completed, an 8-hour refresher course must be successfully completed each subsequent year to retain certification. Further detail on OSHA training requirements is provided in Section 4.7.1 of this plan and in OSHA Bulletin 3172 (Appendix E). LIBC staff with OSHA training are listed in the Spill Response Binder (Appendix F). The LIBC or the responsible party for the spill needs to provide the necessary protective equipment to allow the trained staff to be on-site at a hazardous material spill.

The LNR department should be informed by Lummi Law and Order of all hazardous material spills as soon as possible. The LNR should then take the following steps:

1. The LNR staff member who receives a spill report should acquire as much information about the spill as possible and should record the information on an Incident Report form from the Spill Response Binder. The contents of the Spill Response Binder, which is a stand-alone document, are presented in Appendix F.
2. The LNR Director or his/her designee should then use the initial information to determine the initial response by the LNR. If the incident threatens natural resources, the initial response should include assigning appropriate staff to represent the LNR at the spill site, at a field operations location, and/or at the Unified Command.
3. A contact person should be designated at LNR to coordinate communication with assigned LNR staff, other LIBC departments, and with non-LIBC agencies.
4. To guide their actions, the LNR staff that are involved in a spill response should possess the LNR Spill Response Binder, which contains emergency spill response procedures and information. This binder includes first responder guidelines, communication information, and response equipment information.

5. At the end of the response effort, the involved LNR staff will write a memo to the Executive Director of the Natural Resources Department describing the spill and the response and clean-up efforts.

#### **4.6 AVAILABLE SPILL RESOURCES**

Lummi Law and Order personnel received 40-hour HAZWOPER training in 1998 (Appendix J) to qualify as first responders to determine the magnitude of a hazardous substance incident and to initiate the contact with appropriate emergency personnel. However, this training has expired and therefore does not allow the Lummi Law and Order personnel to be on-site at a hazardous material spill (29 CFR 1926.65). A 40-hour HAZWOPER class was offered at the LIBC in May 2004 to train appropriate staff. Staff from LNR, the Safety Office, Waste Management Operations/Project Clean-Up, the Fisherman's Cove mini-mart and pier, the Shell Mini-mart, and the Lummi Day Care Center completed this training (Appendix J). Because of limited money, equipment, and trained personnel, currently the Lummi Nation largely depends on off-Reservation services to provide response to hazardous spill accidents (although, as described in Section 7.2, the LNR Department acquired containment boom, spill kits, and sorbent materials in September 2004). As funds become available, the LIBC will acquire additional resources and training necessary to more actively participate in the response and recovery steps of hazardous material emergencies (LWRD 1998a).

An important resource for response to marine spills is effective boat access to shoreline areas. There are 12 Boat Access Points (BAPs) on the Reservation or on trust land near the Reservation. The locations, directions, and details for these BAPs are listed in Table 4.4, and the locations are shown in Figure 4.2. As described in Table 4.4, many of these access points are only usable at higher tides. Figure 4.3 is a nautical chart that shows marine water depths in fathoms in the Reservation vicinity when the tide level is 0.0 feet (mean lower low water). As indicated by the large area of shallow water, an oil spill hitting the Reservation shorelines during a low tide could impact a large area of valuable tidelands. Other nearby boat access points are listed in Table 4.5 and illustrated in Figure 4.4. These include access points at each refinery and along Gulf Road in the Cherry Point Heavy Impact Industrial Zone. The ALCOA-Intalco pier has a platform on the south side to tie-up and load boats, but there is no launching area at the Intalco facility.

Table 4.4 Beach/Boat Access Points On the Reservation

ID Code	Location	Directions	Notes <sup>3</sup>
BAP 1	Neptune Beach	I-5 Exit 260, Slater Road west to end of Beach Way S.	Narrow access, soft substrate; only skiff or boom on trailer during higher tides, access affected by W winds, access at any tide with four-wheel drive vehicle.
BAP 2	Joe Finkbonner's vacant lot	Slater Road to Beach Way to Sucia Drive, south to lot just south of 4517 Sucia Drive	Beach access, up to ~30-foot boats at higher tides, smaller boats (and harder to take boats out) at lower tides, access at any tide with four-wheel drive vehicle. Often blocked by logs/debris, access affected by W winds.
BAP 3	Sandy Point Marina, north end	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	Private boat ramp, usable for most trailers; entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.
BAP 4	Sandy Point, South Cape	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	End of road on private property, entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.
BAP 5	Lummi Bay Hatchery facility	Slater Road to Haxton Way to west on Sea Pond Access South	Steep and narrow ramp, skiffs and small trailers only; accessible at tides $\geq$ 6-feet, access at any tide with four-wheel drive vehicle.
BAP 6	Lummi Peninsula	Slater Road to Haxton Way to west at Cagey Road.	Beach access only, no boat access because of shallow depth.
BAP 7	Lummi Peninsula	Slater Road to Haxton Way. Between 2651 and 2637 Haxton	Beach access only, no boat access because of shallow depth.
BAP 8	Gooseberry Point	Slater Road to Haxton Way, on west side of Haxton Way across from Emma Road	Beach access only, no boat access because of shallow depth
BAP 9	Fisherman's Cove at Gooseberry Point	Slater Road to Haxton Way, south to Lummi View Drive	Public boat ramp, up to ~28-foot boats at $\geq$ 4 foot (soft substrate at $<$ 4 foot high tides). Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.

<sup>3</sup> All tide elevations are given in feet above Mean Lower Low Water (MLLW)

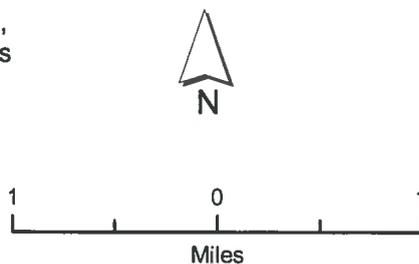
Table 4.4 Beach/Boat Access Points On the Reservation

ID Code	Location	Directions	Notes <sup>3</sup>
			Beach access, up to ~28-foot (possibly larger) boats at any tide. Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.
			Crane on Lummi dock, boats up to 10,000 pounds at any tide
BAP 10	Stommish Ground	Slater Road to Haxton Way to Lummi View Drive, east and south to Stommish Ground	Public boat ramp, up to ~28-foot boats; no access at tides < 5 feet.
BAP 11	The Portage (spit connecting to Portage Island)	Slater Road to Haxton Way, south to Lummi View Drive and southern end of peninsula	Beach access, up to ~28-foot boats at tides ≥ 5 feet, smaller boats at tides < 5 feet. Access affected by SE and SW winds.
BAP 12	Hermosa Beach	Slater Road to Haxton Way to Lummi Shore Road, south to Hermosa Beach area	Beach access, limited to smaller boats at tides ≥ 6 feet; limited by debris on beach.
BAP 13	Fish Point area	Slater Road to Haxton Way to Lummi Shore Road, south to Native American Shellfish Co.	Skiffs only, with access limited by shallow river channel, periodic debris, and low tides. Accessible at tides ≥ 6 feet.
BAP 14	Marine Drive Bridge over the Nooksack River	Slater Road, south on Ferndale Road, east on Marine Drive to east bank of river	Skiffs only, limited by steep and narrow bank access, shallow river channel, and periodic debris. Accessible at tides ≥ 6 feet.
BAP 15	Marietta Slough	Slater Road, south on Ferndale Road, east on Marine Drive, south on Old Marine Drive	Skiffs only, limited by shallow river channel and periodic debris. Accessible at tides ≥ 6 feet.



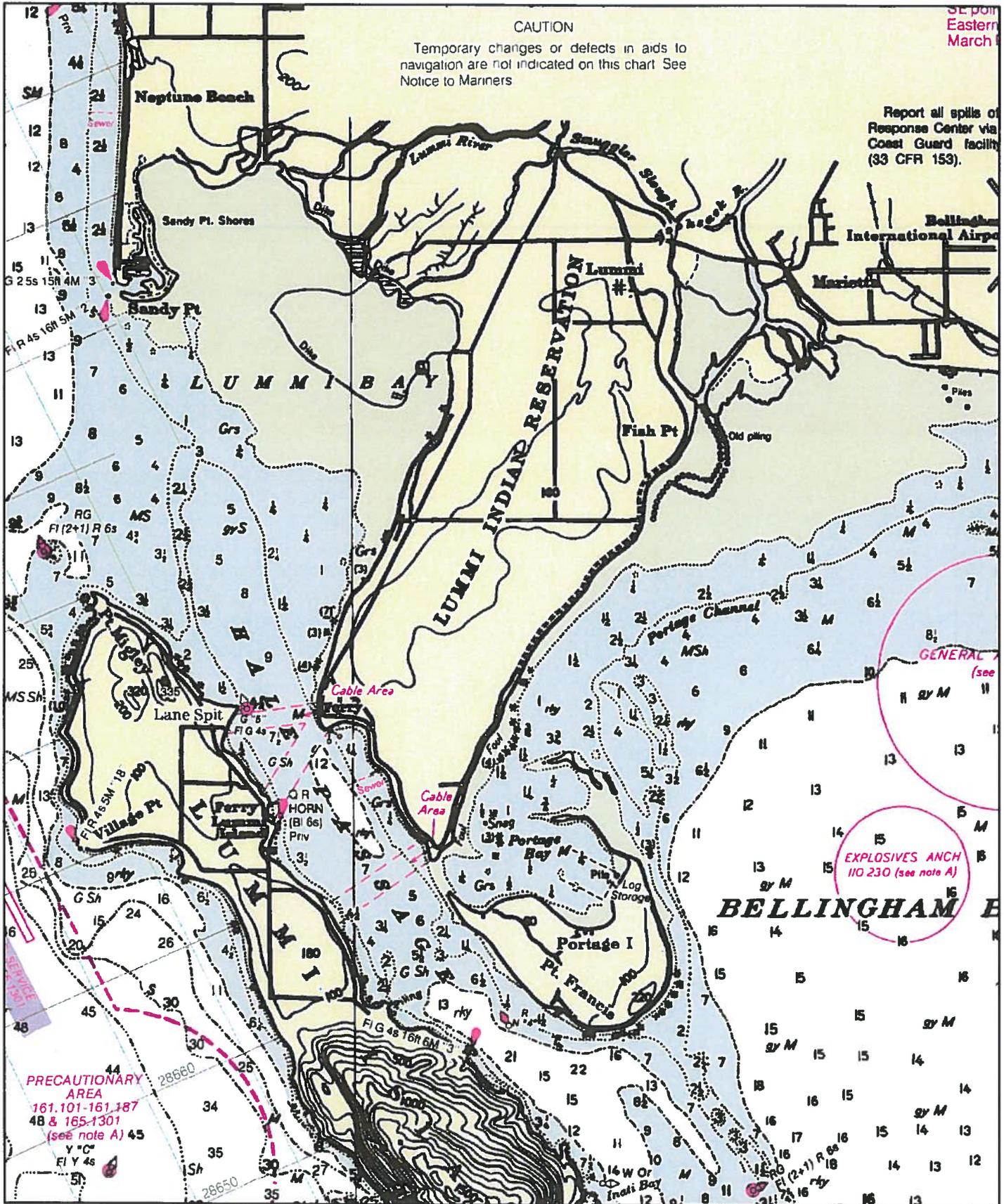
Figure 4.2 Beach/Boat Access Points, Topography, Surface Water Drainages, Place Names, and Roads of the Lummi Reservation

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from and against any damage loss of liability arising from any use of this data.



**Legend**

- Beach/Boat Access
- Beach Access Only
- ▲ Landmarks
- ~ Tidelands
- Roads (Major)
- Roads (Other)
- ~ Streams and Ditches



**Figure 4.3 Water Depths near Lummi Peninsula**

Background image is NOAA nautical Chart (#18421)  
 Depths are in fathoms. One fathom = 6 feet.

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation.

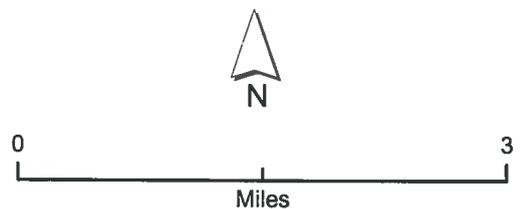


Table 4.5 Beach/Boat Access Points Off the Reservation

ID Code	Location	Directions	Notes
BAP 16	Birch Bay Village	I-5 Exit 270, Birch Bay-Lynden Road west to Birch Bay Drive, west on Birch Point Road to Birch Bay Village	Private boat ramp, usable for most trailers; BP has access for spill response. Access affected by W, SE, and SW winds.
BAP 17	BP Cherry Point Refinery dock	I-5 Exit 266, Grandview Road west to Jackson Road, south to security gate	Only small skiffs at high tide because of 4-ft drop-off; just north of pier; access affected by W, SE, and SW winds. BP also has boat launch on their pier.
BAP 18	Gulf Road	I-5 Exit 266, Grandview Road west to Kickerville Road, south to Alder, Lonseth, or Henry Road, west to Gulf Road, south to beach	Beach access, up to ~20-foot (possibly larger) boats; access limited by debris. Access affected by W, SE, and SW winds, access at any tide with four-wheel drive vehicle.
BAP 19	ConocoPhillips Refinery dock	I-5 Exit 260, Slater Road west to Lake Terrell Road, north to Unick Road, west to facility	Boat launch, no ramp; must access through refinery gate. Access affected by W, SE, and SW winds.
BAP 20	Ferndale/Hovander Park Public Boat Ramp (Nooksack River)	I-5 Exit 262, west on Main Street to just past railroad overpass, south on Hovander Road, follow signs west to river	Public boat ramp, usable for most trailers
BAP 21	Squalicum Harbor Marina	I-5 Exit 256, Meridian Street south to Squalicum Way and Roeder Avenue, southeast to marina just before T.J. Glenn Drive	Public boat ramps, usable for most trailers
BAP 22	Fairhaven Public Boat Ramp	I-5 Exit 250, Old Fairhaven Parkway west, north on 10 <sup>th</sup> Street, west on Harris Avenue to waterfront	Public boat ramp, usable for most trailers
BAP 23	Larrabee State Park, Teddy Bear or Wildcat Cove	I-5 Exit 250, Old Fairhaven Parkway west, south on Chuckanut Drive, west and then south on Cove Road	Public beach ramp/access, perhaps limited at low tides

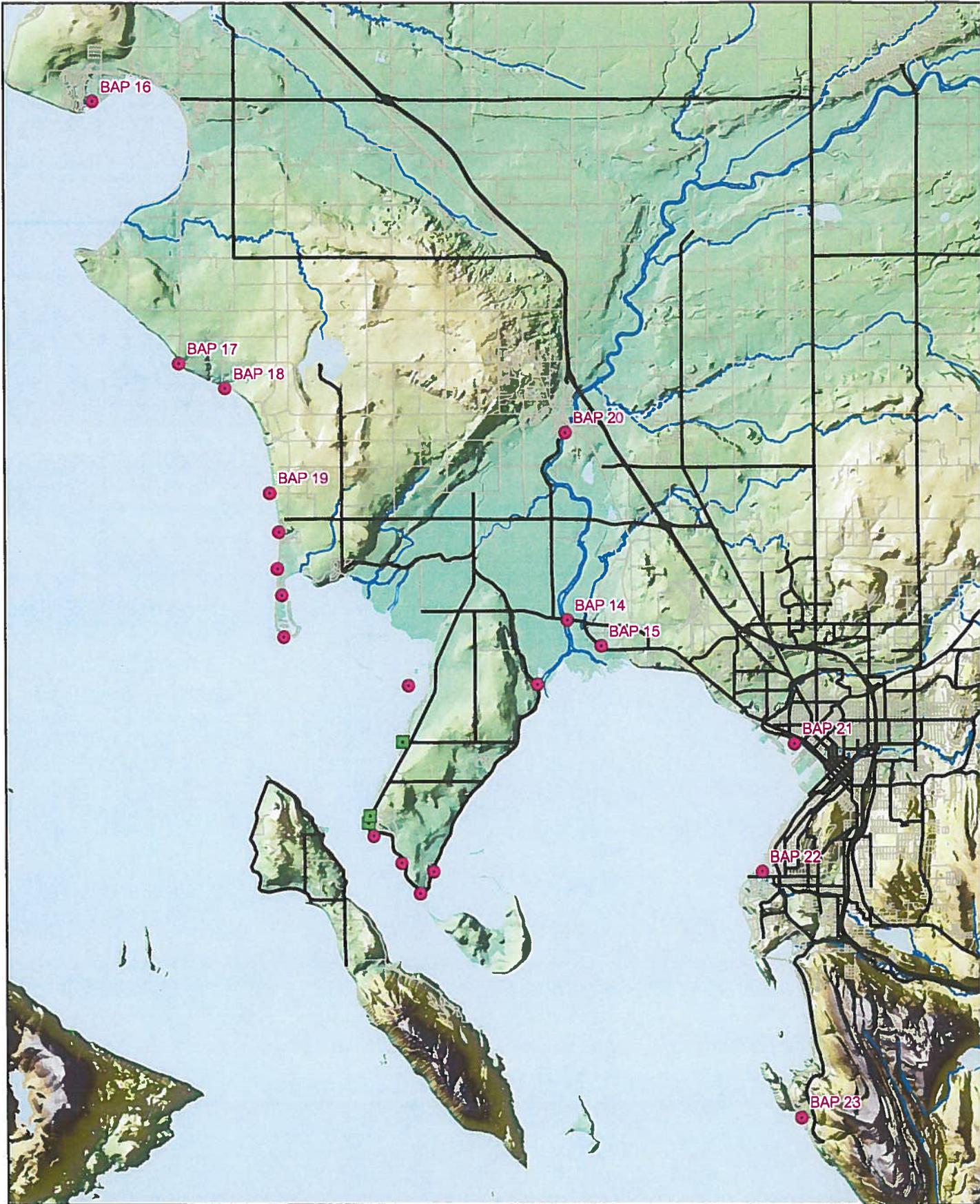
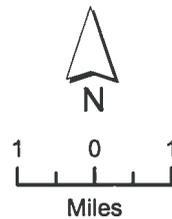


Figure 4.4 Beach/Boat Access Points, Topography, and Surface Water Drainages of Western Whatcom County

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from and against any damage loss of liability arising from any use of this data.



**Legend**

- Beach/Boat Acces
- Beach Access Onl
- Roads (Major)
- Roads (Others)
- Rivers

Off-Reservation resources that could respond to hazardous material emergencies on or near the Reservation include (LWRD 1998a):

- **U.S. Environmental Protection Agency (EPA):** The EPA is responsible for the management of hazardous waste spills that occur on tribal lands. The magnitude of the spill will influence the type of response and resources that would be needed.
- **U.S. Coast Guard (USCG):** The Coast Guard deals with hazardous spills that occur in marine waters. While not directly related to possible spills affecting upland and ground water resources on or near the Reservation, they may be called upon for such spills depending on the severity and location of a spill.
- **Washington State Department of Ecology (Ecology):** The EPA and Ecology spill response teams work together on many hazardous waste accidents within Washington State.
- **Washington State Patrol (WSP):** The WSP personnel are trained as incident commanders and in hazardous materials response.
- **Washington State Emergency Management Division (WEMD):** The WEMD coordinates the state response to an emergency, including operation of the state Emergency Operations Center and the activation of specialized personnel and equipment.
- **Whatcom County Division of Emergency Management (DEM):** The DEM operates a hazardous spill response vehicle that can aide in the clean-up and transport of minor spills. The DEM also has the capability through their command center to quickly access information that will help mobilize appropriate equipment and personnel efficiently.
- **Whatcom County Specialized Emergency Response Program (SERP):** The SERP administers a Hazardous Materials Unit and the Major Incident Support Team (MIST). The SERP volunteers are trained in hazardous material response, especially as it pertains to situations involving fire and explosive conditions. The SERP also runs the Community Alert Network (CAN) program, which simultaneously calls residents in a specified area within minutes to deliver emergency instructions (e.g., shelter in place or quickly evacuate).
- **Industrial Facilities:** All facilities that handle or store hazardous materials in quantities over certain thresholds, as defined by law, are required to have an active spill response plan in place and the equipment to effectively contain a spill. Because chemical industry representatives can be especially knowledgeable during the planning process, and because many chemical plant officials are willing and able to share equipment and personnel during a response operation, they may be called upon for assistance.

For oil spills, the Northwest Area Contingency Plan (NWACP) and the Geographic Response Plan (GRP) are important resources that provide guidance for spill response efforts. During a spill event, LIBC staff should ensure that the GRP actions intended to

protect Reservation resources are implemented. The North Puget Sound GRPs are provided in the Spill Response Binder which is attached as Appendix F of this plan. The effectiveness and adequacy of some of the measures described in the GRP for the Reservation have been questioned recently by spill response professional. As part of implementing this plan, the GRPs will be re-evaluated, any needed changes identified, and the GRPs will be revised as needed.

#### **4.7 RECOMMENDATIONS FOR TRAINING AND EQUIPMENT**

This section describes potential training and equipment that could help the LIBC provide a more effective response to hazardous material spills.

##### **4.7.1 Training Recommendations**

To assure that persons responding to an incident are prepared to assess potentially dangerous situations and take appropriate actions to protect themselves and others, several training courses are recommended. Federal law mandates that certain training courses and the associated certifications be obtained prior to employees conducting work in hazardous situations. Pursuant to 29 CFR 1910, employees should not be dispatched to investigate the release of hazardous materials without having first completed at least the four-hour First Responder Awareness Level training. The next level of training is First Responder Operations Level, which covers the appropriate emergency response. Federal law prohibits employees from being allowed to control the source of the spill and assist in assessment or recovery efforts without first having attained and maintained a hazardous waste worker certification through the Technician Level of training. To increase management experience, Tribal On-Scene Coordinators will be best prepared by attending the Incident Commander hazardous materials training (required), Unified Command Training, and Emergency Management Training and by participating in spill drills at facilities near the Reservation. Administrative and accounting personnel who will help in recovering the costs incurred by LIBC during assessment and recovery efforts should attend a documentation and billing class offered by the Federal Emergency Management Agency. Table 4.6 lists both required and suggested training courses and makes recommendations for which LIBC staff members should receive each course.

In addition to the courses listed in Table 4.6, LIBC officers and/or management staff should conduct periodic tabletop drills to familiarize each other with procedures outlined in the Comprehensive Emergency Management Plan (CEMP) being developed by the LIBC Safety Officer. Staff who will monitor the actions of outside organizations during a spill event should attend spill drills at facilities in the area to familiarize themselves with procedures and potential scenarios. Once formed, the Lummi Spill Response Team should also practice deploying the spill containment booms at the Seaponds dike, at the Fisherman's Cove pier, and at the hatchery water supply intake along the Nooksack River. Such practice should result in personnel who know their responsibilities and how to quickly implement those responsibilities when an incident occurs.

Table 4.6 Required and Recommended Spill Response Training

Training Level	29 CFR 1910.120	Course hours	Authorized Response Activities	LIBC personnel <sup>4</sup>
OSHA Training				
First Responder Awareness Level	(q)(6)(i)	4	<ul style="list-style-type: none"> <li>Individuals likely to witness or discover a hazardous substance release</li> <li>Individuals trained to initiate emergency response by notifying proper authorities</li> <li>Will not take further action</li> </ul>	<ul style="list-style-type: none"> <li>Fishermen</li> <li>General public</li> </ul>
First Responder Operations Level	(q)(6)(ii)	8	<ul style="list-style-type: none"> <li>Individuals who respond to releases as part of the initial response to protect people, property, and the environment.</li> <li>Trained to act <u>defensively without trying to stop the release.</u></li> <li>Function is to contain the release from a safe distance, keep it from spreading, and prevent exposures.</li> <li>Must be able to demonstrate competency in Awareness Level activities.</li> </ul>	<ul style="list-style-type: none"> <li>LIBC Chairman</li> <li>Incident Commander (Chief of Police)</li> <li>LNR Executive Director</li> <li>LNR Environmental Program Director</li> <li>Fishermen's Cove and Shell Mini-mart staff</li> <li>Fishermen</li> </ul>
Hazardous Materials Technician	(q)(6)(iii)	24	<ul style="list-style-type: none"> <li>Individuals who respond for the purpose of stopping the release.</li> <li>Can approach the point of release.</li> </ul>	<ul style="list-style-type: none"> <li>Spill Response Team</li> <li>LNR Water Resources staff</li> <li>Boat launch operators</li> <li>Fisherman's Cove and Shell Mini-mart managers</li> <li>Fishermen</li> <li>Law and Order- Natural Resources officers</li> <li>Hatchery staff</li> <li>Waste Management Team members</li> <li>LTSWD staff</li> </ul>

<sup>4</sup> Because the OSHA hazardous materials courses are hierarchical, groups are only listed in they highest category that they are recommended to take (i.e. those recommended for the Hazardous Materials Technician course are not also listed under First Responder Awareness level class).

Table 4.6 Required and Recommended Spill Response Training

Training Level	29 CFR 1910.120 (q)(6)(v)	Course hours	Authorized Response Activities	LIBC personnel <sup>4</sup>
Hazardous Materials Specialist	(q)(6)(v)	24	<ul style="list-style-type: none"> <li>Individuals who respond and provide support to Technicians.</li> <li>Duties require a more specific knowledge of substances they may be likely to be called upon to contain than Technician Level</li> <li>Acts as a site liaison with other government authorities.</li> </ul>	<ul style="list-style-type: none"> <li>Spill Response Team</li> <li>LNR Water Resources Staff</li> <li>Safety Officer</li> </ul>
General Site Worker	(e)(3)(i)	40	<ul style="list-style-type: none"> <li>Individuals who will be in contact with hazardous substances at levels above the Permissible Exposure Limit (PEL) established by OSHA.</li> <li>This certification is required for persons who work in a position related to hazardous materials response or recovery.</li> </ul>	Lummi Nation Safety Officer will not allow LIBC personnel to be on-scene in these conditions.
Incident Commander	(q)(6)(iv)	8	<ul style="list-style-type: none"> <li>Will assume control of the incident beyond the first responder awareness level.</li> <li>Shall have at least 24 hours of training equivalent to First Responder Operations Level plus competency in additional areas.</li> </ul>	<ul style="list-style-type: none"> <li>Chief of Police</li> <li>LNR Executive Director</li> <li>Environmental Program Director</li> </ul>
NIMS training IS-700		3	<ul style="list-style-type: none"> <li>Explains the purpose, principles, key components, and benefits of the National Incident Management System (NIMS).</li> </ul>	<ul style="list-style-type: none"> <li>Tribal leaders</li> <li>All LNR and LIBC staff involved in emergency response</li> </ul>
ICS Operations level			<ul style="list-style-type: none"> <li>Introduces principles, structure, terminology, and common responsibilities of ICS</li> <li>Students will be able to perform an ICS support role</li> </ul>	All LIBC personnel
ICS Commander level			<ul style="list-style-type: none"> <li>Familiarizes executives of response agencies with their responsibility and authority in the UC format.</li> <li>Training offered through USCG</li> </ul>	<ul style="list-style-type: none"> <li>Chief of Police</li> <li>LNR Director</li> <li>Other Department Directors</li> <li>CEO</li> <li>Chairman</li> </ul>

Table 4.6 Required and Recommended Spill Response Training

Training Level	29 CFR 1910.120	Course hours	Authorized Response Activities	LIBC personnel <sup>4</sup>
Other	Emergency Management Training		<ul style="list-style-type: none"> <li>• Offered by FEMA and WEMD</li> <li>• Covers response to many natural and man-made emergencies</li> </ul>	<ul style="list-style-type: none"> <li>• Law and Order</li> <li>• Safety Officer</li> <li>• LNR staff</li> </ul>
	Spill Drills		<ul style="list-style-type: none"> <li>• Required at facilities by federal and state law.</li> <li>• Offers familiarization with and practice of the UC/ICS structure</li> </ul>	<ul style="list-style-type: none"> <li>• Chief of Police</li> <li>• Department Directors</li> <li>• Safety Officer</li> <li>• Spill Response Team</li> <li>• LNR staff</li> </ul>
	Recovery Documentation and Preparation	8	<ul style="list-style-type: none"> <li>• Offered by FEMA</li> <li>• Gives familiarization with FEMA forms and policies for recovering costs associated with emergency response.</li> </ul>	<ul style="list-style-type: none"> <li>• CEMP Admin. and Finance Coordinator</li> <li>• LNR staff</li> </ul>

#### 4.7.2 Equipment Recommendations

The following equipment is recommended to improve the capability of the Lummi Nation to respond to a spill event:

Spill Response Binder: Binders containing spill response procedures and guidance should be available for each employee involved in a spill response. These binders should contain notification protocols, phone numbers, equipment inventories and locations, and response procedures. Each binder should be brightly colored and well-marked so that it can be quickly located and used. The contents of this binder are included as Appendix F of this plan.

Communication: Key LIBC personnel that are involved in a spill response effort must be able to communicate with each other. The appropriate equipment must provide communication in the field and in the event that phone lines are not functioning. The Nextel phones provide this communication if the signal is available, but reception is currently not available everywhere on the Reservation. The second option is two-way portable VHF radios, which the LIBC Maintenance Department and Lummi Law and Order currently possess. If the Nextel phones are inadequate, LNR staff should either use the several radios available in Maintenance or acquire additional radios.

Containment Boom: The LNR Department has purchased 1,400 feet of American Marine standard containment boom with 8-inch diameter, 6-foot long logs and a 12-inch long containment skirt. The boom is made of closed-cell polyethylene foam covered with 22 ounce PVC fabric and has universal connectors and heavy duty anchor points. The boom was purchased in thirteen, 100-foot sections and two, 50-foot sections. It is stored in an 8 foot wide, 8 foot tall, 20 foot long shipping container located behind the Lummi Oyster Hatchery at 3801 Haxton Way. The container is secured with a padlock which is keyed to the LT2 key made by Accurate Lock Service, Inc. in Bellingham.

This boom was purchased primarily for use at Gooseberry Point and the Seaponds tidegates in Lummi Bay. Deployment at Gooseberry Point should be performed according to deployment scenario NPS 18 in the North Puget Sound GRPs (Appendix F) for spills from the facilities to the north of the Reservation and as needed for local spills. This boom will not be particularly effective under high current or wave conditions (oil generally starts to be entrained under the boom at 0.7 knots, regardless of skirt depth), but larger boom is not recommended because the relatively small percentage of containment gained is not worth the greater cost, storage space, and deployment difficulty. It should be noted that the only fuel currently supplied at the Fisherman's Cove pier, gasoline, should not be contained with boom since such containment will increase the ignition and vapor hazard. However, it could be desirable to use the boom to protect the shoreline or other boats from gasoline. When spilled on water, gasoline should otherwise be allowed to spread and evaporate. Boom will be useful at Fisherman's Cove if a boat sinks or is disabled and is leaking hydraulic fluid, diesel fuel, or oil or if an accident causes such a spill. The Whatcom County ferry that serves Gooseberry Point uses diesel fuel and is a potential spill source.

Boom deployments to protect the Seaponds tidegates should be performed according to the schematics and GRPs included in the Spill Response Binder (Appendix F). In the

event of a spill associated with the activities of the salmon or oyster hatcheries, a small amount of boom can be used to contain the spill, and absorbent materials can be used to clean up the spill if it is not too large. To best protect the Seaponds from spills, it is recommended that the tidegates be repaired so that they can be closed. Table 4.7 lists the spill equipment purchased and stored in the container and describes the use of each item. All of the equipment is stored in the container at the hatchery to simplify management and inventory.

It is noted that personnel deploying the containment boom and spill kit equipment in the presence of hazardous materials must be certified with the appropriate hazardous materials training as required by OSHA. Refer to the OSHA regulations and Bulletin 3172 (Appendix E) for the required training for specific response activities.

Spill Kits: Nine spill kits of various types and sizes have been purchased and are listed in Table 4.7. Oil-only spill kits absorb petroleum products, but not water, and are therefore good for wet conditions. The universal kits absorb most if not all hazardous materials (including acids), but also absorb water and are therefore less effective when water is present. The two mini-marts currently each have one 30-gallon oil-only kit and the Fisherman's Cove pier has a similar 20-gallon kit. The Lummi Shell Mini-Mart recently used everything in its kit to cleanup an approximately 15-gallon spill of gasoline. They immediately replaced the kit and purchased an additional supply of pads. A large 55-gallon, oil-only kit is appropriate for the Fisherman's Cove pier to ensure the ability to cleanup a larger spill from a boat or other source. Only small volumes of chemicals are stored at the Seapond Aquaculture facilities, and no fuel tanks are located at the Seaponds. An oil-only and a universal 20-gallon kit have been purchased for this site and are both stored in the container. Both oil-only and universal 30-gallon kits have been purchased for construction sites on the Reservation. An oil-only 30-gallon kit has been provided to each sewer treatment plant as an extra precaution and to provide sewer district employees with the ability to respond to oil or fuel spills in the vicinities of the two treatment plants. A mechanism and a funding source will need to be identified to maintain this supply of kits.

Self-Contained Breathing Apparatus (SCBA): The Lummi Tribal Sewer and Water District has three units for use during chlorine tank transfers and should ideally have one more so that a back-up unit is available at each wastewater treatment plant. These units could possibly be used in a hazardous material response to a spill elsewhere on the Reservation as long as the users have the proper OSHA training.

Additional Supplies: Although the majority of the spill equipment has been purchased, additional support items are still needed including a portable air quality monitor to determine PELs, high power flashlights for nighttime response, more personal protective equipment such as Tyvek suits and boots, and fence posts and drivers to secure oil snare along the shorelines.

#### **4.8 POTENTIAL FUNDING SOURCES**

In addition to limited LIBC funding to implement spill prevention and response activities, other funding sources, such as the EPA General Assistance Program grant to the LNR

Table 4.7 Inventory of Lummi Nation Spill Response Equipment

Item	Unit	Quantity	Use
Containment Boom	100 feet	13	For the exclusion, containment, deflection, or collection of hazardous substances.
Containment Boom	50 feet	2	
Tow bridle with bullet float	Each	6	Two to pull each end of one length of boom at Fisherman's Cove. Four for Lummi Bay: one each for the two large tidegates and two extra for other potential boom deployments.
Boom repair kit	Each	1	To repair holes in boom fabric
Anchor system – 22 lb Danforth	Each	4	To form a square deployment at Fisherman's Cove.
Anchor system – 40 lb Danforth	Each	5	For Lummi Bay: three for the two large tidegates and two extra for other potential boom deployments.
Spill kit, oil-only, 20 gallon	Each	1	To cleanup small spills at the aquaculture facility
Spill kit, oil-only, 30 gallon	Each	2	To cleanup small spills at construction sites
Spill kit, oil-only, 30 gallon	Each	2	To cleanup small spills at the two sewer treatment plants
Spill kit, oil-only, 55 gallon	Each	1	To cleanup small spills at the Fisherman's Cove warehouse
Spill kit, universal, 20 gallon	Each	1	To cleanup small spills at the aquaculture facility
Spill kit, universal, 30 gallon	Each	2	To cleanup small spills at construction sites
Oil-sweep, 19"x100 feet	Each	10	A 100 foot long string of sorbent pads to absorb small spills or residual oil from the water surface. Sweep is more efficient and easier to retrieve than individual pads.
Oil snare, 30 on 50 foot rope	Each	10	Pom-poms of oleophilic fibers strung on a rope that adsorb heavier oil. To be used along the shoreline and inside the tidegate runways.
Sorbent boom, 5"x10'	4/bale	5	A five inch diameter boom of absorbent material. Use to absorb small spills, residual oil, or oil that escapes containment boom and to provide an extra line of defense in the tidegate runways or Seapond.
Sorbent pads, 16"x20"	200/bale	5	Square pads of absorbent material to absorb small spills or residual oil from water or ground surface.
Screened pitchforks	Each	4	Tools to collect soiled pads.
Disposal bags	50/box	4	Six millimeter thick clear, plastic bags for disposal of soiled response equipment.
Raingear	20/case	1	For the protection of responders
Rubber gloves	72/case	1	For the protection of responders

for oil booms and spill kits, can be used to significantly improve LIBC response capabilities. The formation and funding of the Department of Homeland Security and an increased focus on tribal support by the FEMA, has made more funds available to tribes for general disaster planning, training, and response. The FEMA programs include funds for training and equipping first responders. In addition, funding and training opportunities may be available through the industries that represent the greatest threat to the Reservation. This section describes some specific potential funding sources.

The Hazardous Materials Training Program (SARA Title III Training Program, Catalog of Federal Domestic Assistance [CFDA] Number 97.020) makes funding available to federally recognized tribal governments to provide training in support of emergency planning, preparedness, mitigation, response, and recovery capabilities. (States and U.S. territories must apply for Emergency Management Performance Grants.) These programs must provide special emphasis on emergencies associated with hazardous chemicals. Funding can be used to pay for training and education from Federal training activities and conferences, state training programs, private sector training, university training centers, and other training sources. Funding may also be used to pay for contractual services acquired for the specific purpose of training and educating the tribes (GSA 2004). To apply, tribes must submit the following to the FEMA Regional Office: (1) a work plan, (2) a narrative describing the relative priorities of the training activities and how they address Title III objectives for that Tribe, (3) documentation as to how the tribe will satisfy the 20 percent nonfederal matching fund requirement of Title III, and (4) a proposed schedule of training activities by title, location, and date (GSA 2004). Further application information is available from the FEMA Regional Training Officer and the online CFDA: <http://12.46.245.173/CFDA/pdf/catalog.pdf>.

The Hazardous Materials Assistance Program (CERCLA Implementation, CFDA Number 97.021) provides technical and financial assistance through the states to support state, tribal, and local governments in oil and hazardous materials emergency planning and exercising (GSA 2004). The objective is to enhance state, tribal, and local government capabilities to participate in the National Response System (NRS). The funds are available to states, tribes, local governments, U.S. territories, State Emergency Response Committees (SERCs), and Local Emergency Planning Commissions (LEPCs). Applications must include a work plan describing program objectives, the method for meeting the objectives, a list of activities, the length of each activity, and the planned accomplishments (GSA 2004). Additional application information is available from the FEMA Regional Training Officer and the online CFDA.

The Chemical Emergency Preparedness and Prevention (CEPP) Technical Assistance Grants provided by the EPA offer funding to tribes in establishing TERCs, in developing emergency plans, and in preparing to integrate accident prevention information into their plans. These activities are related to EPCRA and Section 112(r) of the CAA. Further information on the CEPP grants can be obtained on the EPA website ([www.epa.gov/ceppo](http://www.epa.gov/ceppo)).

The Hazardous Materials Emergency Preparedness (HMEP) grant program, offered by the U.S. Department of Transportation under the Hazardous Material Transportation Act, is designed to support the framework established within the NRS and EPCRA by providing states, tribes, and local jurisdictions with financial and technical support,

national direction, and guidance to enhance hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazardous materials (Hazmat) training and to LEPCs for hazardous materials planning. More information is available at [hazmat.dot.gov/hmep.htm](http://hazmat.dot.gov/hmep.htm) or by calling 202-366-0001. The HMEP funds may be used for (NRT 1998):

- Developing and improving emergency plans under EPCRA;
- Conducting commodity flow studies;
- Determining the need for regional hazardous material response;
- Annual training for local responders, including volunteers, to respond safely and efficiently to accidents and incidents involving hazardous materials.

The Oil Spill Liability Trust Fund is a source of funding for oil removal costs, including the cost of monitoring removal actions. It is administered by the Coast Guard National Pollution Funds Center. An Emergency Fund is used to fund removal actions by On-Site Coordinators, to initiate Natural Resource Damage Assessments, and to fund immediate removal actions by states. A Principal Fund is used to pay claims against the Trust Fund and to carry out other Oil Pollution Act requirements. The Trust Fund is available to pay uncompensated removal costs determined to be consistent with the NCP or uncompensated damages. For hazardous substance releases, the CERCLA Superfund serves a similar role (NRT 1998).

The Local Government Reimbursement (LGR) program of the EPA is designed to cover costs associated with some necessary emergency actions, including measures necessary to prevent or mitigate injury to human health or the environment associated with the release or threatened release of any hazardous substance (or pollutant). The amount of reimbursement for any single emergency response may not exceed \$25,000 (NRT 1998). On February 18, 1998, the EPA published a new LGR regulation that simplifies and streamlines the process for applicants. Local governments obtain and complete a simple LGR application form which requires a local government to provide basic information about the incident, document its response costs by attaching copies of receipts, and certify that certain program requirements have been met. Information on eligibility to participate in the LGR program is available via the LGR HelpLine at 800-431-9209 or on the EPA website (<http://www.epa.gov/superfund/programs/er/lgr/index.htm>).

A comprehensive source of financial assistance information is the *Tribal Environmental and Natural Resource Assistance Handbook* produced by the Domestic Policy Council Working Group on American Indians and Alaska Natives. This handbook provides a central location for federal sources of technical and financial assistance available to Tribes for environmental management. The handbook is available online at [www.epa.gov/indian/index.htm](http://www.epa.gov/indian/index.htm).

#### **4.9 ACTION PLAN**

The following actions are recommended to implement this SPRP, reduce the probability of hazardous material spills, and to improve the Lummi Nation's response to spills:

- Implement the Emergency Planning and Community Right to Know Act (EPCRA) on the Reservation through the formation of a Tribal Emergency Response Commission (TERC). A Lummi Nation TERC would coordinate and implement emergency response activities according to EPCRA including acquisition of Federal grant funds, develop and review LEPC plans, and establish procedures for public information.
- The TERC should coordinate with the other area spill response organizations such as the Region 10 Regional Response Team, the Northwest Area Committee, the Washington State SERC, and the Whatcom County LEPC.
- Establish a Lummi Nation Spill Response Team. This team should consist of tribal members who are familiar with the Lummi Nation Waters, shorelines, and tidelands and who can commit to participating in training and to incident response. By establishing a designated team, training resources can be focused on a set group of people who will have the time, capability, and interest to provide effective response.
- Assess and acquire appropriate training for the TERC, the Spill Response Team, LIBC personnel, and community members.
- Maintain inventory of communication and response equipment and upgrade as needed.
- Establish a schedule and conduct appropriate spill response drills.
- Develop or review Pollution Prevention Plans (P3s) for Reservation facilities as necessary.
- Establish and/or maintain appropriate coordination with Whatcom County DEM and other agencies.
- Establish Mutual Aid Agreements with Whatcom County DEM and facilities near the Reservation.
- Offer public education opportunities specific to hazardous materials spills such as the four-hour First Responder Awareness Level hazardous materials training.
- Develop a plan for providing spill information to Reservation residents through coordination of the LIBC Safety Office and the LIBC Communication office with established Whatcom County DEM and radio public information procedures and public meetings.
- Continue to review and provide comments to the Northwest Area Committee and the Region 10 Regional Response Team on the Geographic Response Plans for adequate protection of tribal resources.
- Participate on the Washington State Department of Ecology Spills Program Resource Damage Assessment (RDA) committee (RDA) or other appropriate groups for spills that impact the Reservation and the Lummi Usual and Accustomed hunting,

fishing, and gathering grounds and stations to ensure consideration and best possible protection of tribal resources.

- Identify and pursue potential federal, state, and local funding for training, purchase of additional equipment, maintenance of existing equipment, and tidegate repair.

These actions should be pursued in coordination with the LIBC Safety Office and the Lummi Nation Comprehensive Emergency Management Plan that is being developed by the Safety Office.

## 5. SUMMARY

Large amounts of crude oil, petroleum products (e.g., gasoline, jet fuel), and other hazardous materials are transported by ships, pipelines, trucks, and railroad and are stored on or near the Reservation. Accidents, equipment failure, and human error have the potential to cause large spills and disastrous human and environmental consequences. Some of these hazardous materials pose a toxic inhalation hazard to people. Oil and chemical spills or releases in waters on or adjacent to the Reservation could destroy the highly productive and valuable ecosystems, and a spill on land would threaten public safety and health and the environment. To date, the Lummi Nation has not suffered a large hazardous material spill on the Reservation. However, future residential, municipal, commercial, and industrial growth on the Reservation, in the Cherry Point Heavy Impact Industrial Zone, and in the area north of the Reservation will increase the risk of a hazardous material emergency on the Reservation. Because of the potential consequences, it is important for Lummi Nation to develop and practice a plan and to coordinate with other jurisdictions for an effective response to a hazardous material spill or release.

Preventing spills and minimizing damage from spills are important elements of spill plans. In addition to tribal and federal regulations, implementation of development regulations and review of projects by the LIBC Technical Review Committee will continue to help reduce the potential for hazardous material spills, particularly smaller scale spills. The potential for large-scale spills exists primarily off-Reservation and is addressed by federal and state regulations. The Lummi Nation can help protect its people and resources by reviewing spill prevention and response plans for facilities in the Reservation area and by ensuring that pollution prevention plans are developed for facilities on the Reservation.

Maximizing spill prevention and response will require an additional investment of resources by the Lummi Nation. Measures necessary to maximize spill prevention efforts and spill response preparedness include devoting additional staff time to review, develop, and implement pollution prevention plans; training and equipping staff for response to and recovery from hazardous material spills; and design and construction costs associated with future storage facilities. Although substantial investments to meet these challenges have occurred, continued and/or increased investments are needed. In addition to prevention and response, recovery from spills will also present a financial challenge to both the LIBC and individuals. Given the relatively low median income for tribal members, the damages and economic disruption caused by a hazardous material spill will be difficult to recover from without assistance.

## REFERENCES

- Adams, T. 2004. Lynden Water and Wastewater Treatment Facility. Personal communication. March 2, 2004.
- Alexander, B. 2004. Tenaska Washington Cogeneration Facility. Personal communication. April 9, 2004.
- ARCO Cherry Point Refinery. 2000. Oil Spill Emergency Response Plan. Originally approved in March, 1994. Revised November, 2000.
- Associated Press (AP). 2003. No one hurt in pipeline blast. The Bellingham Herald. May 2, 2003.
- Bellingham Herald. 1997. Cause of oil spill remains clouded. Page A3. August 8.
- Brionez, L. 2004. Lummi Tribal Sewer and Water District. Personal communication. February 26 and March 2, 2004.
- Chin, C. 2003. Pipeline firm trying to do it right. The Bellingham Herald. April 27, 2003.
- City of Bellingham. 2003. County emergency response agencies form Major Incident Response Team (MIST). Press release. Available from [http://www.cob.org/press/releases/2003\\_12\\_23\\_mist.htm](http://www.cob.org/press/releases/2003_12_23_mist.htm)
- ConocoPhillips. 2004. Company webpage: <http://www.conocophillips.com/global/na/ferndale.asp>
- Crawford, G. 2004. Chief, Whatcom County Fire District 8. Personal communication. July 22, 2004.
- Emley, D. 2004. LIBC Facilities Manager. Personal communication. February 26, 2004.
- Laplante, R. 2004. Praxair Inc., Ferndale Plant. Personal communication. March 5, 2004.
- Leuenberger, J. 2004. Ferndale Wastewater Treatment Facility. Personal communication. March 1, 2004.
- Lind, B. 2004. PSE Whitehorn Generating Station. Personal communication. April 15, 2004.
- Lummi Indian Business Council (LIBC). 1996. Lummi Biosolids Land Application Site Operation Plan. LIBC, Lummi Reservation.
- Lummi Indian Business Council (LIBC). 2004. Draft Lummi Nation Comprehensive Emergency Management Plan. LIBC, Lummi Reservation.

Lummi Water Resources Division (LWRD). 1997. Lummi Nation Wellhead Protection Program, Phase 1. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. November.

Lummi Water Resources Division (LWRD). 1998a. Lummi Nation Wellhead Protection Program, Phase II. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. May.

Lummi Water Resources Division (LWRD). 1998b. Lummi Reservation Storm Water Management Program Technical Background Document. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. December.

Lummi Water Resources Division (LWRD). 2000. Lummi Indian Reservation Wetland Management Program Technical Background Document. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. March.

Lummi Water Resources Division (LWRD). 2001a. Lummi Nation Flood Damage Reduction Plan. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. November.

Lummi Water Resources Division (LWRD). 2001b. Lummi Nation Nonpoint-Source Assessment Report. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. December.

Lummi Water Resources Division (LWRD). 2002. Lummi Nation Nonpoint-Source Management Program. Prepared for the Lummi Indian Business Council. LIBC, Lummi Reservation. January.

McCourt, W. 2005. Lummi Tribal Sewer and Water District Manager. Personal communication. March 25, 2005.

Nationmaster. 2003. Encyclopedia: Bhopal Disaster. Website: <http://www.nationmaster.com/encyclopedia/Bhopal-Disaster>.

National Oceanic and Atmospheric Administration (NOAA), Office of Response and Restoration. 2004. <http://response.restoration.noaa.gov/spotlight/spotlight.html>.

National Response Team (NRT). Date unknown. Incident Command System/ Unified Command (ICS/UC) Technical Assistance Document. Available from [www.nrt.org](http://www.nrt.org).

National Response Team (NRT). 1987. Hazardous Materials Emergency Planning Guide. Publication No. NRT-1. Washington, D.C.

National Response Team (NRT). 1998. NRT-RRT Factsheet. Prepared by the NRT Preparedness Committee. August.

National Response Team (NRT). 1999. National Response System: An Overview Prepared by the NRT. October.

- National Response Team (NRT). 2001. Hazardous Materials Emergency Planning Guide, 2001 Update. Publication No. NRT-1. Available from [http://www.nrt.org/production/nrt/home.nsf/resources/Publications/\\$File/NRT-1\\_Planning\\_Guide.pdf](http://www.nrt.org/production/nrt/home.nsf/resources/Publications/$File/NRT-1_Planning_Guide.pdf). Accessed 2004 September 10.
- Northwest Air Pollution Authority (NWAPA). 2003. Puget Sound Energy Whitehorn Generating Station: Draft Air Operating Permit Statement of Basis. Mt. Vernon, WA. August 25.
- Occupational Safety and Health Administration (OSHA). Date unknown. Hazardous Waste Operations and Emergency Response, Fact Sheet OSHA 89-31. Available from <http://www.pp.okstate.edu/ehs/training/oshahzwp.htm>
- Occupational Safety and Health Administration (OSHA). 2001. Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard, OSHA Bulletin 3172. Available from [www.osha.gov/publications/osha3172.pdf](http://www.osha.gov/publications/osha3172.pdf).
- Paris, R. 2004. ConocoPhillips Refinery. Personal communication. March 3, 2004.
- Regional Response Team 10 (RRT). 2002. Oil Spill Prevention, Planning, and Response Measures. Factsheet prepared by the RRT/Northwest Area Committee.
- Regional Response Team 10 (RRT). 2003. Northwest Area Contingency Plan. Prepared by the RRT/Northwest Area Committee.
- Ringwald, D. 2004. ALCOA-Intalco Works Aluminum Plant. Personal communication. March 5, 2004.
- Roberts, D. 2004. Lummi Commercial Company Operations Manager. Personal communication. July, 2004.
- Russell, C. 2004. LIBC Safety Officer. Personal communication. July, 2004.
- Rust, G. 2004. BP Cherry Point Refinery. Personal communication. March 3, 2004.
- Seltzer, J. 2004. BP Cherry Point Refinery. Personal communication. July 8, 2004.
- Shaw, D. 2004. Everson Wastewater Treatment Facility. Personal communication. March 2, 2004.
- Slade, L.H. and W.E. Stern. Environmental Regulations on Indian Lands – A Question of Jurisdiction. <http://www.lectlaw.com/files/env21.htm>. Accessed 2004 October 26.
- Solomon, V. 2005. Lummi Tribal Sewer and Water District. Personal communication. March 25, 2005.

- U. S. Department of Energy, Office of Fossil Energy (DOE). 1992. Sumas Cogeneration Company L.P. FE Docket No. 90-92-NG Final Order Granting Long Term Authorization to Import Natural Gas from Canada. Available from <http://www.fe.doe.gov/programs/gasregulation/authorizations/orders/ord494b.pdf>. Accessed 2004 November 3.
- U.S. Department of Transportation (USDOT). 1996. 1996 North American Emergency Response Guidebook. Developed jointly by Transport Canada, the Secretariat of Transport and Communications of Mexico, and the USDOT for first responders during the initial phase of a hazardous materials incident. Office of Hazardous Materials Safety. Available from <http://hazmat.dot.gov/gvdebook.htm>.
- U.S. Department of Transportation (USDOT). 2004. 2004 North American Emergency Response Guidebook. Developed jointly by Transport Canada, the Secretariat of Transport and Communications of Mexico, and the USDOT for first responders during the initial phase of a hazardous materials incident. Office of Hazardous Materials Safety. Available from <http://hazmat.dot.gov/erg2004/erg2004.pdf>.
- U.S. Environmental Protection Agency (EPA). 1993. The Plain English Guide to the Clean Air Act. Publication No. EPA-400-K-93-001. Office of Air and Radiation, USEPA, Washington D.C. April.
- U.S. Environmental Protection Agency (EPA). 1996. Fact Sheets in the Nonpoint Pointers Series. Publication No. EPA-841-F-96-004.
- U.S. Environmental Protection Agency (EPA). 2000. The Emergency Planning and Community Right-to-Know Act. Factsheet, Publication No. EPA 550-F-00-004. Office of Solid Waste and Emergency Response, USEPA, Washington D.C. Available from <http://www.epa.gov/ceppo>. March.
- U.S. Environmental Protection Agency (EPA). 2002. Chemical Emergency Preparedness and Prevention in Indian Country. Factsheet, Publication No. EPA 550-F-01-012. Office of Solid Waste and Emergency Response, USEPA, Washington D.C. Available from <http://www.epa.gov/ceppo>. August.
- U.S. Environmental Protection Agency (EPA). 2003a. EPA Oil Program website: Oil Pollution Act Overview; Spill Prevention, Control, and Countermeasure; National Contingency Plan Overview. Oil Program, Office of Solid Waste and Emergency Response, USEPA, Washington D.C. Website pages: <http://www.epa.gov/oilspill/opaover.htm>, <http://www.epa.gov/oilspill/spcc.htm>, <http://www.epa.gov/oilspill/ncpover.htm>.
- U.S. Environmental Protection Agency (EPA). 2003b. EPA Emergency Response Program website: National Response System. Emergency Response Program, Office of Solid Waste and Emergency Response, USEPA, Washington D.C. Website page: <http://www.epa.gov/superfund/programs/er/nrs/index.htm>.

- U.S. Environmental Protection Agency (EPA). 2004a. Clean Water Act Overview. Oil Program, Office of Solid Waste and Emergency Response, USEPA, Washington D.C. Website: <http://www.epa.gov/oilspill/cwaover.htm>. January 7.
- U.S. Environmental Protection Agency (EPA). 2004b. Pollution Prevention. The Office of Prevention, Pesticides and Toxic Substances, USEPA, Washington D.C. Website: <http://www.epa.gov/opptintr/p2home/index.htm>.
- U.S. Fish and Wildlife Service (USFWS). 2003. Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service: Federal Water Pollution Control Act (Clean Water Act). Division of Congressional and Legislative Affairs, USFWS, Washington D.C. Website: <http://laws.fws.gov/lawsdigest/fwatrpo.html>.
- U.S. General Services Administration (GSA). 2004. Catalog of Federal Domestic Assistance. Office of Management and Budget. Washington, D.C. Available from <http://12.46.245.173/CFDA/pdf/catalog.pdf>.
- Washington State Department of Ecology (Ecology). 2000a. Fact Sheet for NPDES Permit WA-003129-1: Tenaska Washington Partners, L.P. Prepared by Nancy Kmet, Industrial Section, Olympia, WA. June 27.
- Washington State Department of Ecology (Ecology). 2000b. The Barge 101: Prevention Bulletin 00-08-008. Spill Prevention, Preparedness, and Response Program, Washington Department of Ecology, Olympia.
- Washington State Department of Ecology (Ecology). 2001a. Alcoa – Intalco Aluminum Corporation: Beach I, Beach II, and Construction Debris Landfills Site. Public Comment Period Notice. Washington Department of Ecology, Olympia. April 2001.
- Washington State Department of Ecology (Ecology). 2001b. The Arco Texas: Prevention Bulletin 01-08-006. Spill Prevention, Preparedness, and Response Program, Washington Department of Ecology, Olympia.
- Washington State Department of Ecology (Ecology). 2003a. San Juan Islands/ North Puget Sound Geographic Response Plan. Spill Prevention, Preparedness, and Response Program, Washington Department of Ecology, Olympia. Available at: [http://www.ecy.wa.gov/programs/spills/preparedness/GRP/wa\\_marine\\_grps.htm](http://www.ecy.wa.gov/programs/spills/preparedness/GRP/wa_marine_grps.htm).
- Washington State Department of Ecology (Ecology). 2003b. Washington Tier II Hazardous Chemical Inventory for 2002. Spill Prevention, Preparedness, and Response Program, Washington Department of Ecology, Olympia. .
- Washington State Department of Ecology (Ecology). 2003c. The Overseas Washington: Prevention Bulletin 03-08-001. Spill Prevention, Preparedness, and Response Program, Washington Department of Ecology, Olympia. Available from <http://www.ecy.wa.gov/biblio/0308001.html>. Accessed 2004 November 3.
- Washington State Department of Ecology (Ecology). 2004. Chemicals in Washington State: Summary Report 2002: Toxic Release Inventory and Tier Two Emergency and

Hazardous Chemical Inventory. Hazardous Waste and Toxics Reduction Program,  
Washington Department of Ecology, Olympia.

Washington State Department of Ecology Prevention Bulletins 01-02, 96-02.

Whatcom County. 2001. Hazardous Materials Plan. Prepared by the Whatcom County  
Division of Emergency Management for the Whatcom County Local Emergency  
Planning Committee.

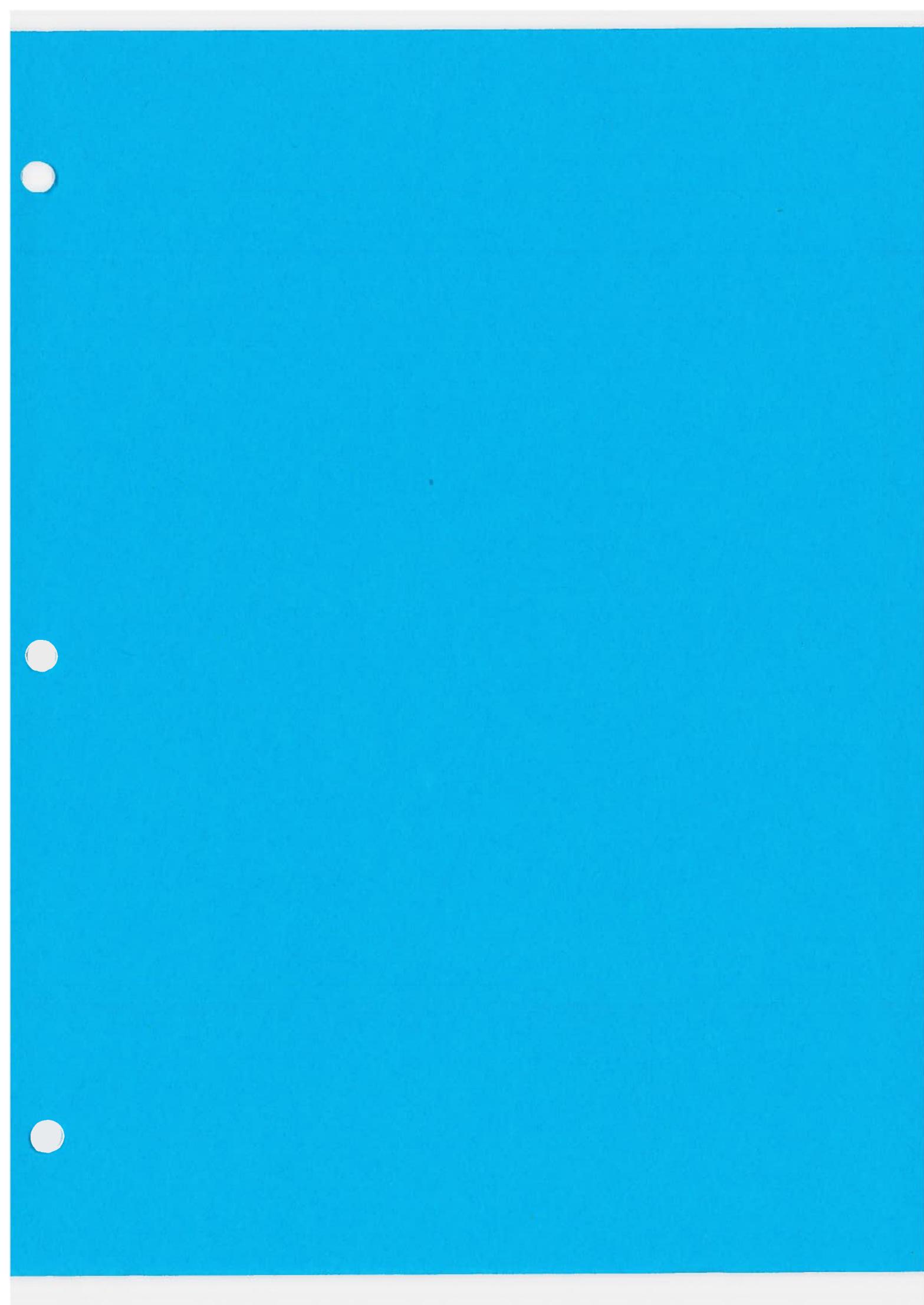
Whittaker, D. 2004. ConocoPhillips Refinery. Personal communication. July, 2004.

## LIST OF ACRONYMS AND ABBREVIATIONS

<b>Programs and Terms</b>	
<b>ACP</b>	Area Contingency Plan
<b>CAA</b>	Clean Air Act
<b>CEMP</b>	Comprehensive Emergency Management Plan
<b>CEPP</b>	Chemical Emergency Preparedness and Prevention
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CFDA</b>	Catalog of Federal Domestic Assistance
<b>CFR</b>	Code of Federal Regulations
<b>CWA</b>	Clean Water Act
<b>EPCRA</b>	Emergency Planning and Community Right-to-Know Act
<b>FEMA</b>	Federal Emergency Management Act
<b>GIS</b>	Geographic Information System
<b>GRP</b>	Geographic Response Plans
<b>HAP</b>	Hazardous Air Pollutant
<b>HAZWOPER</b>	Hazardous Waste Operations and Emergency Response
<b>HMEP</b>	Hazardous Materials Emergency Preparedness
<b>ICP</b>	Integrated Contingency Plan
<b>ICS</b>	Incident Command System
<b>LGRP</b>	Local Government Reimbursement Program
<b>LTSWD</b>	Lummi Tribal Sewer and Water District
<b>MIST</b>	Major Incident Support Team
<b>MOC</b>	Memorandum of Cooperation
<b>MSDS</b>	Material Safety Data Sheet
<b>NCP</b>	National Contingency Plan
<b>NIIMS</b>	National Interagency Incident Management System
<b>NIMS</b>	National Incident Management System
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>NRC</b>	National Response Center
<b>NRS</b>	National Response System
<b>NWACP</b>	Northwest Area Contingency Plan
<b>OCA</b>	Off-site Consequence Analysis
<b>OPA</b>	Oil Pollution Act
<b>OSC</b>	On-Scene Coordinator
<b>RCP</b>	Regional Contingency Plan
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>RMP</b>	Risk Management Plan
<b>SARA</b>	Superfund Amendments and Reauthorization Act
<b>SERP</b>	Specialized Emergency Response Program
<b>SPCC</b>	Spill Prevention, Control, and Countermeasure
<b>SPRP</b>	Spill Prevention and Response Plan
<b>TRC</b>	Technical Review Committee
<b>TRI</b>	Toxics Release Inventory

## LIST OF ACRONYMS AND ABBREVIATIONS

<b>UC</b>	Unified Command
<b>U.S.C.</b>	United States Code
<b>WCHMP</b>	Whatcom County Hazardous Materials Plan
<b>Agencies and Organizations (Parent Organization)</b>	
<b>BIA</b>	Bureau of Indian Affairs
<b>BP</b>	British Petroleum
<b>Ecology</b>	Department of Ecology, Washington State
<b>EPA</b>	Environmental Protection Agency
<b>DEM</b>	Division of Emergency Management
<b>FEMA</b>	Federal Emergency Management Agency
<b>LEPC</b>	Local Emergency Planning Committee
<b>LIBC</b>	Lummi Indian Business Council
<b>LNR</b>	Lummi Natural Resources Department
<b>LTSWD</b>	Lummi Tribal Sewer and Water District
<b>LWRD</b>	Lummi Water Resources Division
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NRT</b>	National Response Team
<b>OSHA</b>	Occupational Safety and Health Administration
<b>RRT</b>	Regional Response Team
<b>SERC</b>	State Emergency Response Commission
<b>TERC</b>	Tribal Emergency Response Commission
<b>USCG</b>	United States Coast Guard
<b>USDI</b>	U.S. Department of the Interior
<b>USDOT</b>	U.S. Department of Transportation
<b>USEPA/EPA</b>	U.S. Environmental Protection Agency
<b>USFWS</b>	U.S. Fish and Wildlife Service (USDI)
<b>WCDEM</b>	Whatcom County Division of Emergency Management
<b>WEMD</b>	Washington State Emergency Management Division



## **Appendix A: The Legal Context of Water and Air Pollution**

Federal laws such as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Resource Conservation and Recovery Act (RCRA); the Federal Emergency Management Act (FEMA); and Occupational Safety and Health Administration (OSHA) regulations require handlers or transporters of hazardous materials to report dangerous materials and to have an active spill response plan prepared. In the event of a spill, the cost of clean-up lies with the facility or transporter involved (NRT 1987). Having site-specific plans in place helps to contain hazardous materials during the critical initial moments following an unplanned release.

The United States Environmental Protection Agency (EPA) is the primary federal regulatory agency responsible for the development of policies to protect the population and environment of the United States from adverse effects of pollution. The EPA is required by law to implement the requirements of many congressional acts, including four that are particularly important to spill prevention and response: the Clean Water Act, the Emergency Planning and Community Right-to-Know Act, the Oil Pollution Act of 1990, and the Clean Air Act. Additionally, Title 17 of the Lummi Nation Code of Laws, the Water Resources Protection Code, includes provisions to protect Reservation water from hazardous substance spills. This section summarizes the key provisions of these rules as they relate to prevention and response of oil and hazardous substance spills and specifically to the development and implementation of the Lummi Nation Spill Prevention and Response Plan.

### **THE CLEAN WATER ACT**

The federal Water Pollution Control Act (33 U.S.C. 1251-1376; now commonly referred to as the Clean Water Act) was first enacted in 1948 and has been amended many times to add provisions that reduce the levels of water pollution. The 1970 amendments authorized the determination of quantities of oil that would be harmful if discharged and the development of a National Contingency Plan (NCP) to minimize damage from oil discharges. The NCP was developed by the EPA and the United States Coast Guard (USCG) under their Section 311 authority to establish a program to prevent, prepare for, and respond to spills that occur in navigable waters of the United States (EPA 2004a). The EPA also implements provisions of the CWA and the Oil Pollution Prevention regulation (40 CFR 112) through the Spill Prevention, Control, and Countermeasure Program (SPCC) which seeks to prevent oil spills from certain aboveground and underground storage tanks.

The Water Pollution Control Act Amendments of 1972 set the basic structure for regulating discharges of pollutants to waters of the United States<sup>5</sup>, including establishment of the National Pollutant Discharge Elimination System (NPDES). Through the NPDES, the CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters without a permit (EPA 2003a, 2004a).

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<sup>5</sup> Waters of the United States include all waters currently or historically used for interstate or foreign commerce, including waters subject to the ebb and flow of tides and many lakes, rivers, streams and wetlands.

The State of Washington, through the Department of Ecology (Ecology), has been delegated the NPDES management and enforcement duties in the State, although the EPA still retains oversight responsibility and implements the CWA on all federal lands (i.e., military bases, national forests, and Indian reservations). The 1972 amendments also included provisions that further defined liability for discharges of oil and hazardous substances and clarified the federal role in clean-up operations.

The Clean Water Act (CWA) of 1977 and the Water Quality Act of 1987 provided further extensive amendments to the original statute (USFWS 2003). The 1987 amendments to Section 518 authorized the EPA to treat qualified Indian tribes as states by delegating regulatory authority for specified sections of the Act. Delegated activities include the authority to grant discharge permits under the NPDES, to grant dredge and fill permits under §404, and to set water quality standards under §303 (Slade and Stern 2004).

### **THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT**

The Emergency Planning and Community Right-to-Know Act (EPCRA; Title III of the Superfund Amendments and Reauthorization Act [SARA]) was enacted by Congress in 1986 in response to concerns about the environmental and safety hazards posed by the storage and handling of toxic chemicals. These concerns were triggered by the death or injury of over 50,000 people after the accidental release of 40 tons of methyl isocyanate from a chemical plant in Bhopal, India in 1984 (Nationmaster 2003). The EPCRA was designed to help local communities protect public health and safety and the environment from chemical hazards. It establishes requirements for federal, tribal, state, and local governments and for industries regarding emergency planning and reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase public knowledge and access to information on the amounts, uses, and releases of chemicals at individual facilities. Governments can use this information to improve chemical safety and protect public health and the environment through emergency planning (EPA 2000). Regulations implementing EPCRA are codified in Title 40 of the Code of Federal Regulations (CFR), parts 350 to 372. The chemicals covered by each of the sections vary, with some overlap, and the quantities that trigger reporting also vary (EPA 2000).

To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). The SERCs were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district. Similarly, tribes can appoint a Tribal Emergency Response Commission (TERC) to coordinate and implement emergency response activities. However, tribes can choose between several options for implementation of EPCRA programs. A tribe may enter into cooperative agreements with another tribe, a consortium of tribes, or the state within which its lands are located to develop a program that meets tribal needs. Examples of tribal EPCRA implementation include (EPA 2002):

- A tribe may directly implement the program on its lands;
- Through a cooperative agreement with the SERC, a tribe may choose to implement some, but not all, of the EPCRA requirements, while the state implements the remainder; or

- A tribe authorizes the SERC to perform the functions of the TERC within tribal lands, and the tribe establishes an LEPC or joins an off-reservation LEPC that works directly with the SERC through a cooperative agreement.

If a TERC is not established or a cooperative agreement is not developed, the tribal chief executive officer operates as the TERC (EPA 2002).

The EPCRA has four major provisions:

- Emergency response planning (Sections 301-303);
- Emergency notification of hazardous chemical releases (Section 304);
- Reporting requirements for hazardous chemical storage (Sections 311-312); and
- Toxic chemical release inventory (Section 313).

Information derived from these four requirements will help states, tribes, and communities develop a broad perspective on chemical hazards for the entire community as well as for individual facilities. Regulations implementing EPCRA are codified in Title 40 of the Code of Federal Regulations (CFR), parts 350 to 372. The chemicals covered by each of the sections vary, with some overlap, and the quantities that trigger reporting also vary (EPA 2000).

### **Emergency Response Planning**

Community emergency response plans for chemical accidents are developed under Section 303 of EPCRA. Emergency response plans contain information that community officials can use at the time of a chemical accident. The plans must (EPA 2000):

- Identify facilities and transportation routes of extremely hazardous substances;
- Describe emergency response procedures, both on- and off-site;
- Designate a community coordinator and facility coordinator(s) to implement the plan;
- Outline emergency notification procedures;
- Describe how to determine the probable area and population affected by releases;
- Describe local emergency equipment and facilities and the persons responsible for them;
- Outline evacuation plans;
- Provide a training program for emergency responders (including schedules); and
- Provide methods and schedules for exercising emergency response plans.

Under EPCRA, industries storing hazardous chemicals above minimal levels set by the EPA must file a Risk Management Plan for a worst case release of the most threatening

chemical stored on site. The EPA requires industries to plan for a 100 percent release in ten minutes and that the plans include areas that the release would reach in the first 30 minutes.

### **Emergency Notification**

Under Section 304 of EPCRA, facilities must immediately notify the LEPC and the SERC (or TERC) if there is a release into the environment of a hazardous substance that is equal to or exceeds the minimum reportable quantity set in the regulations. This requirement covers the 356 extremely hazardous substances listed under Section 302 of EPCRA as well as the more than 700 hazardous substances subject to the emergency notification requirements under Section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund, 40 CFR 302.4). Some chemicals are common to both lists. Initial notification can be made by telephone, radio, or in person. Emergency notification requirements involving transportation incidents can be met by dialing 911, or in the absence of a 911 emergency number, calling the operator. This emergency notification needs to include (EPA 2000):

- The chemical name;
- An indication of whether the substance is extremely hazardous;
- An estimate of the quantity released into the environment;
- The time and duration of the release;
- Whether the release occurred into air, water, and/or land;
- Any known or anticipated acute or chronic health risks associated with the emergency, and where necessary, advice regarding medical attention for exposed individuals;
- Proper precautions, such as evacuation or sheltering in place; and
- The name and telephone number of a contact person.

A written follow-up notice must be submitted to the SERC and LEPC as soon as practicable after the release. The follow-up notice must update information included in the initial notice and provide information on actual response actions taken and advice regarding medical attention necessary for citizens that were exposed (EPA 2000).

### **Reporting Requirements**

Under Occupational Safety and Health Administration (OSHA) regulations, employers must maintain a material safety data sheet (MSDS) for any hazardous chemicals stored or used in the work place. Approximately 500,000 products have MSDSs. Section 311 of EPCRA requires facilities that have MSDSs for chemicals held above certain quantities to submit either copies of their MSDSs or a list of MSDS chemicals to the SERC, LEPC, and local fire department. If the facility owner or operator chooses to submit a list of MSDS chemicals, the list must include the chemical or common name of each substance and must identify the type of hazard each substance presents (i.e., health, fire, explosive, or reactive hazard). If a list is submitted, the facility must submit a copy of the MSDS for any chemical on the list upon the request of the LEPC or SERC (EPA 2000).

Under Section 312 of EPCRA, facilities covered by Section 311 must submit annually a hazardous chemical inventory form to the LEPC, the SERC, and the local fire department. Facilities provide either a Tier I or Tier II form. Tier I forms include the following aggregate information for each hazard category:

- An estimate (in ranges) of the maximum amount of chemicals for each category present at the facility at any time during the preceding calendar year;
- An estimate (in ranges) of the average daily amount of chemicals in each category; and
- The general location of hazardous chemicals in each category.

The Tier II report contains basically the same information as the Tier I, but it must name the specific chemicals at a facility. Many states, including Washington, require Tier II information under state law. Tier II forms provide the following information for each substance:

- The chemical name or the common name as indicated on the MSDS;
- An estimate (in ranges) of the maximum amount of the chemical present at any time during the preceding calendar year and the average daily amount;
- A brief description of the manner of storage of the chemical;
- The location of the chemical at the facility; and
- An indication of whether the owner elects to withhold location information from disclosure to the public.

The information submitted under EPCRA Sections 311 and 312 is available to the public from LEPCs and SERCs. In 1999, the EPA excluded gasoline held at most retail gas stations from Section 311/312 reporting requirements. EPA estimates that about 550,000 facilities are now subject to these reporting requirements (EPA 2000).

### **Toxic Chemical Release Inventory**

Section 313 of EPCRA (commonly referred to as the Toxics Release Inventory or TRI) requires certain facilities to complete a Toxic Chemical Release Inventory Form annually for specified chemicals. The form must be submitted to the EPA and the State on July 1 and must cover releases and other waste management of toxic chemicals that occurred during the preceding calendar year. One purpose of this reporting requirement is to inform the public and government officials about releases and other waste management of toxic chemicals so that sources may be tracked and overall waste streams analyzed. The following information is required on the form:

- The name, location, and type of business;
- Whether the chemical is manufactured, processed, or otherwise used and the general categories of use of the chemical;
- An estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year;
- Quantity of the chemical entering the air, land, and water annually;
- Off-site locations to which the facility transfers toxic chemicals in waste for recycling, energy recovery, treatment, or disposal; and

- Waste treatment/disposal methods and efficiency of methods for each waste stream.

In addition, the Pollution Prevention Act of 1990 requires collection of information on source reduction, recycling, and treatment. The EPA maintains a national TRI database, which is available on the EPA and other websites (EPA 2000).

### **EPCRA Enforcement**

Section 325 of EPCRA allows civil and administrative penalties ranging up to \$75,000 per violation or per day per violation when facilities fail to comply with reporting requirements. Criminal penalties up to \$50,000 or five years in prison apply to any person who knowingly and willfully fails to provide emergency release notification. Penalties of not more than \$20,000 and/or up to one year in prison apply to any person who knowingly and willfully discloses any information entitled to protection as a trade secret.

Section 326 of EPCRA allows citizens to initiate civil actions against the EPA, the SERC, or the owner or operator of a facility for failure to meet EPCRA requirements. A SERC, LEPC, and state or local government may institute actions against facility owners/operators for failure to comply with EPCRA requirements (EPA 2000).

### **THE OIL POLLUTION ACT OF 1990**

The federal Oil Pollution Act (OPA) of 1990 was enacted largely in response to public concern following the spilling of nearly 11 million gallons of oil by the *Exxon Valdez* into Prince William Sound, Alaska, in 1989; the largest oil spill in United States history (NOAA 2004). The OPA provided national planning and preparedness provisions for oil spills that are similar to EPCRA provisions for extremely hazardous substances. These provisions include new requirements for contingency planning by both government and industry. As a result, the National Oil Spill and Hazardous Substances Pollution Contingency Plan (more commonly called the National Contingency Plan or NCP) was expanded in a three-tiered approach: (1) the federal government is required to direct all public and private response efforts for certain types of spill events; (2) Area Committees, composed of federal, state, and local government officials, must develop detailed, location-specific Area Contingency Plans (ACPs); and (3) owners or operators of vessels and certain facilities that pose a serious threat to the environment must prepare their own facility response plans. The NCP, first authorized in the 1970 amendment to the Clean Water Act, is designed primarily as a response to oil spill events. The EPA has published regulations for aboveground and underground storage tank (UST) facilities, while the U.S. Coast Guard has published regulations for oil tankers. The OPA plans offer an opportunity for LEPCs to coordinate their plans with area and facility oil spill plans covering the same geographical area (EPA 2003a).

The OPA also created the national Oil Spill Liability Trust Fund, which is available to provide up to one billion dollars per spill incident when the responsible party is incapable or unwilling to clean up the spill. In addition, the OPA increased penalties for regulatory noncompliance, broadened the response and enforcement authorities of the federal government, and preserved state authority to establish law governing oil spill prevention and response.

## THE CLEAN AIR ACT

The 1970 Clean Air Act (CAA) gave the EPA the authority to list air toxins for regulation and then to regulate the chemicals. The 1990 Clean Air Act amendments include a list of 189 hazardous air pollutants selected by Congress on the basis of potential health and/or environmental hazard. The EPA must regulate these listed air toxins. The 1990 amendments allow EPA to add new chemicals to the list as necessary. The EPA refers to chemicals that cause serious health and environmental hazards as hazardous air pollutants (HAPs) or air toxins and issues regulations for large and small sources of the chemicals that threaten human health and the environment (EPA 1993).

Large sources of hazardous air pollutants include oil refineries, electrical generation plants, chemical factories, and incinerators. The 1990 CAA requires large sources to use Maximum Available Control Technology (MACT) to reduce pollutant releases. While this very high level of pollution control has posed a heavy burden on some industries, many industry executives agree that it forced them to examine the level of chemicals they store and emit and whether less threatening chemicals could be used in their production processes (EPA 1993).

Although the 1990 CAA deals more strictly with large sources than small ones, the EPA also regulates small sources of hazardous air pollutants. Many small businesses, such as dry cleaners or auto body paint shops, are sources of air toxins. Under the 1990 CAA, the EPA is required to study whether and how to reduce hazardous air pollutants from small neighborhood polluters such as auto paint shops, print shops, and other similar activities. The EPA must also examine air pollution after the first round of regulations to see whether the remaining health hazards require further regulatory action (EPA 1993).

To improve spill prevention and response, the 1990 CAA amendments also require the EPA and OSHA to issue regulations for chemical accident prevention. Under CAA Section 112(r), all chemical facilities with processes that exceed a threshold quantity for one of 77 acutely toxic substances (such as chlorine and ammonia) or one of 63 highly volatile, flammable substances (when not used as a fuel) must develop a Risk Management Program to identify and evaluate hazards and manage those hazards safely. An example of a facility subject to the Risk Management Program requirements would be a drinking water treatment plant holding more than 2,500 pounds of chlorine. All facilities subject to these requirements must submit a summary of their program, known as a Risk Management Plan (RMP), to the EPA or to an agency delegated by the EPA to implement the CAA. The RMP for a facility includes (EPA 2002):

- Hazard assessments for the facility, including worst-case release and alternative release scenarios;
- Accident prevention activities for the facility, such as the use of special safety equipment, employee safety training programs, and analyses of process safety hazards conducted by the facility;
- Descriptions of past chemical accidents at the facility;

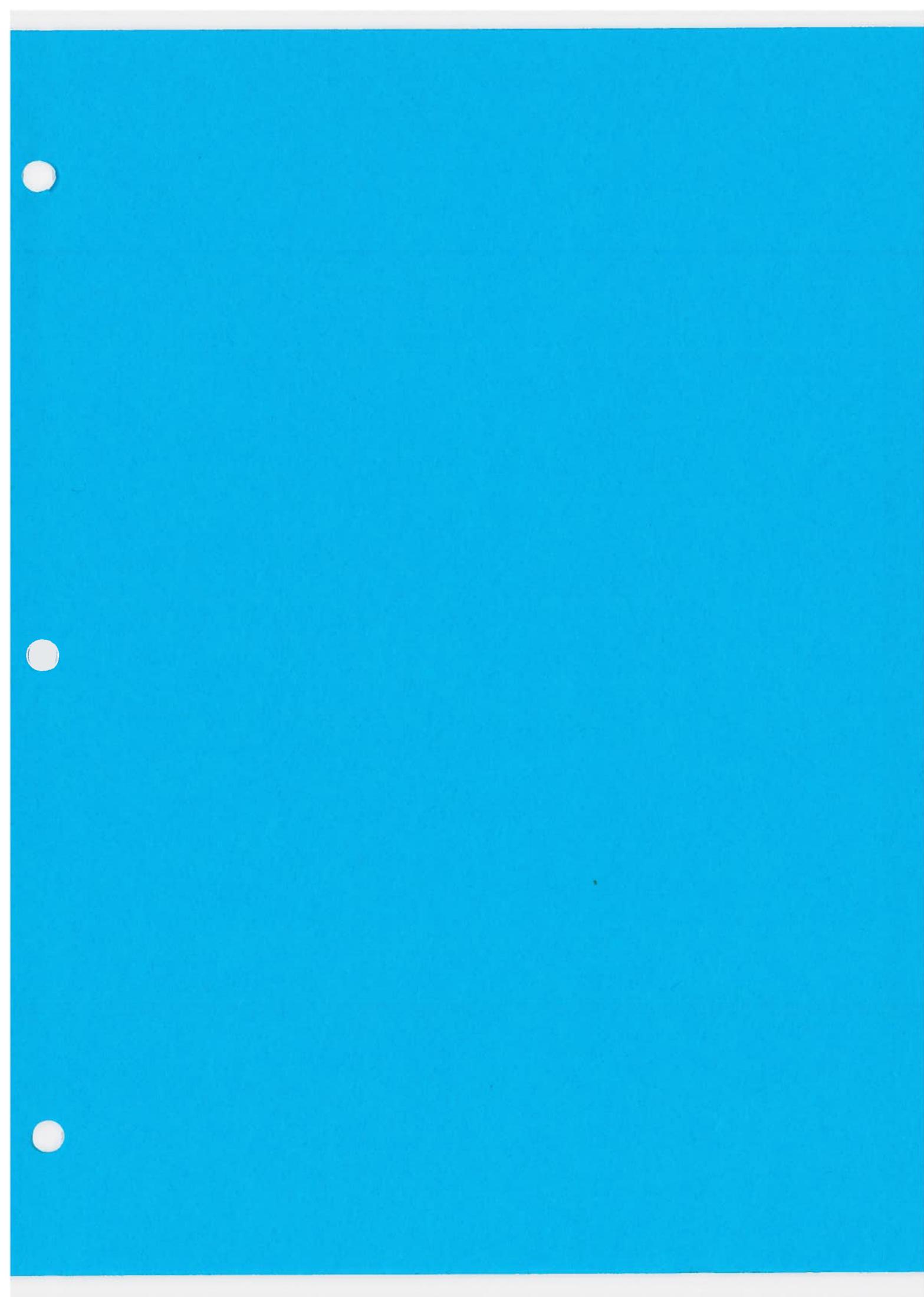
- The management system in place at the facility; and
- The emergency response program at the facility.

Before September 11, 2001, the information from RMPs that have been submitted could be reviewed in a public access database called RMP\*Info on the EPA Chemical Emergency Preparedness and Prevention Office website ([www.epa.gov/ceppo](http://www.epa.gov/ceppo)). In response to the terrorism threat, the EPA removed the database from its website. In addition to the RMP database information, SERCs, TERCs, and LEPCs can access off-site consequence analysis (OCA) information about facilities that have submitted an RMP. A TERC or tribal LEPC member can receive the information directly from the EPA for official use (e.g., to incorporate the information into emergency preparedness plans) (EPA 2002).

Tribes that the EPA finds eligible for treatment in the same manner as a state under the CAA Tribal Air Rule (40 CFR Part 49) can apply for authorization to administer the RMP program. If the tribe passes its own chemical safety legislation, it should ensure that its program is at least as stringent as the federal law in order to strengthen enforcement capabilities (EPA 2002).

#### **LUMMI NATION TITLE 17: WATER RESOURCES PROTECTION CODE**

The Lummi Natural Resources Department administers the Water Resources Protection Code, Title 17 of the Lummi Nation Code of Laws, as part of its Comprehensive Water Resources Management Program (CWRMP). The CWRMP includes wellhead protection, storm water management, wetland management, nonpoint source pollution management, and water quality standards programs. Provisions of Title 17 that work to protect the surface and ground water of the Reservation from the adverse effects of pollution include permit requirements for discharges, the establishment of sanitary control areas around wells and springs, prohibition of landfills in Wellhead Protection Areas, and a permit requirement for activities that would introduce pollutants to wetlands or result in a physical or chemical change of wetland water quantity and quality.



## **Appendix B: Federal, State, and Local Spill Response Resources**

As described in Appendix A, federal legislation has been the stimulus for the development of federal, state, regional, and local spill response plans and systems. Because it may not be feasible for any one agency or jurisdiction to respond effectively to every possible spill incident, coordination between various agencies and jurisdictions is essential to maximize the effectiveness of spill response. This section describes in general the plans and systems at the federal, state, and local levels that address the Reservation and surrounding area. Table 2.2 in the text of the SPRP summarizes the plans discussed.

### **FEDERAL PLANS AND RESOURCES**

As described above, the CWA required the development of the National Contingency Plan (NCP); Area Contingency Plans; response plans for tank vessels, offshore facilities, and certain onshore facilities; emergency response drills; inspection of response equipment; and the listing of hazardous substances other than oil. It also required establishment of the National Response System, the National Response Team, the National Response Center, the National Response Unit and Coast Guard Strike Teams, Regional Response Teams, Area Committees, Coast Guard District Response Groups, and federal On-Scene Coordinators (OSCs). These plans and resources, discussed below, are designed to provide an integrated system for spill response throughout the United States.

#### **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**

The National Contingency Plan (NCP) is the federal plan for responding to both oil spills and hazardous substance releases. It is the result of efforts to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans. When first developed in 1968, the NCP provided the first comprehensive system of accident reporting, spill containment, and cleanup, and established a national response headquarters, a national reaction team, and regional reaction teams. As required by the CWA of 1972, the NCP was revised to include a framework for responding to hazardous substance spills as well as oil discharges. Following the passage of Superfund legislation in 1980, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions. Other legislation has required additional revisions to the NCP. The latest revisions to the NCP were finalized in 1994 to reflect the oil spill provisions of the Oil Pollution Act of 1990 (EPA 2003a).

Federal On-Scene Coordinators (OSCs) are the federal officials predesignated by the EPA and the U.S. Coast Guard (USCG) to coordinate all federal containment, removal, and disposal efforts and resources during an incident under the NCP. The federal OSC is the point of contact for the coordination of federal efforts with those of the local response community. Under the NCP the OSC has the ultimate responsibility to assure protection of the public and the environment (NRT 1999). An OSC also coordinates, directs, and reviews the contingency planning work of various planners including Area Committees, responsible parties, and contractors.

The NCP describes the National Response System (NRS) and establishes the National Response Team and the 13 Regional Response Teams. The National Contingency Plan (NCP) and National Response System (NRS) were developed to ensure that the resources and expertise of the federal government are available immediately for oil or hazardous substance releases that are beyond the capabilities of local and state responders. The NCP provides the framework for the NRS and establishes how it works. The NRS responds to a wide range of oil and hazardous substance releases. It is a multi-layered system of individuals and teams from local, state, and federal agencies; industry; and other organizations that share expertise and resources to ensure that oil spill control and cleanup activities are timely and efficient and that they minimize threats to human health and the environment (EPA 2003b). The NRS includes four levels of contingency planning (federal, regional, area and local, and site-specific industry) that guide response efforts and provides a framework for coordination among these levels (NRT 1998).

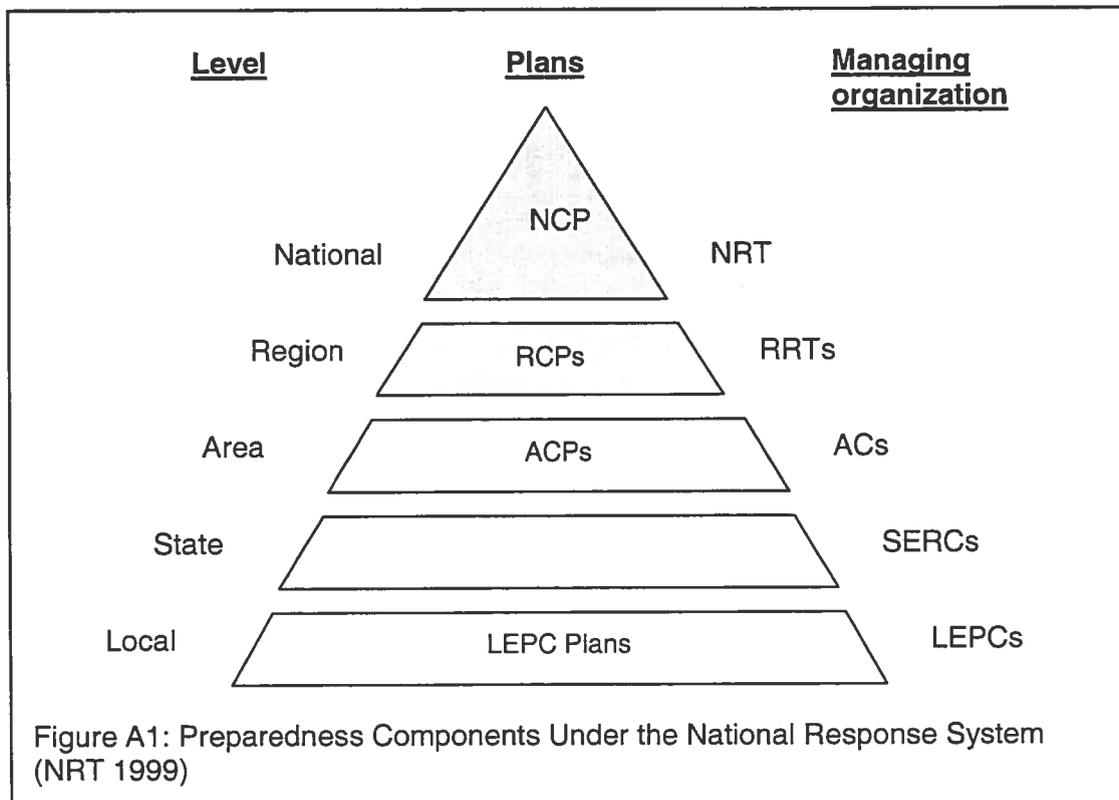
The federal team component of the National Response System is the National Response Team: a group of representatives from 16 federal agencies that is the primary planning, policy, and coordination organization for emergency response to spills. This interagency team is chaired and vice-chaired by the EPA and the U.S. Coast Guard, respectively. Rather than directly participating in a response, the NRT is responsible for three major response management activities: (1) distributing information; (2) planning for emergencies; and (3) training for emergencies, as well as managing the National Response System (NRS).

The NRT operates the National Response Center (NRC) which is the single point of contact for all pollution reporting (NRT 1999). The NRT also monitors the Regional Response Teams (RRTs) in their development and implementation of Regional Contingency Plans (RCPs) required by the NCP.

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|---|
| <p style="text-align: center;"><u>National Contingency Plan (NCP)</u></p> <ul style="list-style-type: none"> <li>• Required by CWA and expanded by CERCLA and OPA</li> <li>• Federal plan for response to oil and hazardous substance releases</li> <li>• Provides national response capability</li> <li>• Promotes coordination among responders and plans</li> <li>• Establishes the NRT and 13 RRTs</li> <li>• Describes the NRS</li> </ul> <p style="text-align: center;"><u>National Response System (NRS)</u></p> <ul style="list-style-type: none"> <li>• Coordinates agencies for a focused response</li> <li>• Includes four levels of contingency planning: federal, regional, area, and local</li> <li>• Requires development of Regional Contingency Plans by RRTs</li> <li>• Is 3-tiered: NRT, RRT, OSC</li> </ul> <p style="text-align: center;"><u>National Response Team (NRT)</u></p> <ul style="list-style-type: none"> <li>• Chaired by EPA, USCG serves as Vice-Chair</li> <li>• Membership of 16 federal agencies</li> <li>• Three major activities <ul style="list-style-type: none"> <li>1. information distribution</li> <li>2. emergency planning</li> <li>3. emergency training</li> </ul> </li> <li>• manages the NRS</li> <li>• operates the NRC</li> <li>• monitors Regional Response Teams</li> </ul> <p style="text-align: center;"><u>Regional Response Team (RRT)</u></p> <ul style="list-style-type: none"> <li>• Develops RCP to define roles of responders</li> <li>• Co-chaired by EPA and USCG</li> <li>• Provides assistance as requested by OSC</li> <li>• May request assistance from NRT</li> </ul> <p style="text-align: center;"><u>Area Committees</u></p> <ul style="list-style-type: none"> <li>• Develop Area Contingency Plans with detailed response information</li> <li>• ACP must be consistent with local LEPC response plan</li> </ul> |
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The Regional Response Teams (RRTs, which include the same federal agencies that form the NRT as well as a representative from each state in the region) develop the Regional Contingency Plan for each federal region. The Regional Contingency Plan defines the roles and responsibilities of federal, state, local, and other responders for incident response within the region. In the Pacific Northwest region, the Northwest Area Contingency Plan (NWACP), required by the Oil Pollution Act, serves as the Regional Contingency Plan as well as the Area Contingency Plan for the Washington, Oregon, and Idaho area (NRT 1998).

The OPA required the federal OSCs responsible for the coastal zone to chair Area Committees (ACs). Under the oversight of the OSC, the AC is responsible for developing an Area Contingency Plan (ACP) and working with federal, state, and local officials to enhance contingency planning and pre-plan joint response efforts (NRT 1999). The ACP must be produced in consultation with the appropriate SERCs and LEPCs and provide detailed information on response procedures, priorities, and appropriate countermeasures for spills in that area. A Local Emergency Planning Committee can request that Regional Response Team review of a local emergency plan.



The NRS operates beginning with identification of the spill at the local, area level. Local responders (i.e. the responsible parties, the local fire and police departments) are the first to respond but state responders can take over if the incident is beyond local capacity. The EPA operates the Local Governments Reimbursement program to reimburse local governments or Indian tribes up to \$25,000 per incident for un-budgeted response efforts (EPA 2003b). Anyone discovering a hazardous substance release or

oil spill is encouraged to contact the NRC using its toll-free number. By law, the NRC must be contacted if the spill exceeds chemical-specific reportable quantities established by the EPA. In this case, the NRC then notifies the OSC responsible for the area of the incident. The OSC determines the status of the local response and monitors the situation to determine whether, or how much, federal involvement is necessary and ensures that the cleanup, by any sector, is appropriate, timely, and minimizes human and environmental damage. The OSC may request assistance from a number of special response teams, the NRT, and the RRT. The NRC collects available information on the details of the incident and maintains reports of all incidents (EPA 2003b). The effectiveness of response to major incidents is assessed by the National Response Team. These "lessons learned" are used to make recommendations for improving the National Contingency Plan and the National Response System.

### **Incident Command System/ Unified Command (ICS/UC)**

The hierarchical, cross-jurisdictional, approach of the NRS is the result of application of the Incident Command System/ Unified Command (ICS/UC). ICS is a standardized on-scene incident management concept designed specifically to allow responders to adopt an integrated organizational structure equal to the complexity and demand of any single incident or multiple incidents w/o being hindered by jurisdictional boundaries (NRT date unknown). The National Contingency Plan states that the NRS will function as an ICS under the direction of the federal On-Scene Coordinators; its use is also endorsed by the NRT and the RRTs. In 1980, federal officials transitioned ICS into a national program called the National Interagency Incident Management System (NIIMS) and its use has since been endorsed or mandated by many federal agencies (NRT date unknown). ICS divides emergency response into five manageable functions: command, operations, planning, logistics, and finance and administration.

Unified Command (UC) is a structure that brings together the incident commanders established by ICS of all major organizations involved in the incident to coordinate and effective response to large, multi-jurisdictional incidents. The makeup of each UC depends on the details of the incident, existing response plans, and decisions made in the initial UC meeting. They must at least have jurisdictional authority and the resources to support participation in the response. The responsibilities of the UC include developing incident objectives and priorities, providing agency or company resources, and agreeing on logistical support procedures.

## **REGIONAL PLANS AND RESOURCES**

### **Northwest Area Contingency Plan**

As required by the Oil Pollution Act of 1990, the Northwest Area Contingency Plan (RRT 2003) is the response plan developed for the Washington, Oregon, and Idaho area by the Regional Response Team for Region 10. The Northwest Area Contingency Plan (NWACP) identifies resources at risk, response resources, and cleanup strategies within its area. The general goals of such a plan are to (RRT 2002a):

- Protect the safety of the public and the spill responders;
- Stabilize the source to stop the release of additional oil into the environment;

- Protect sensitive areas to limit the damage caused by the spilled oil;
- Collect and recycle or dispose of oil;
- Rehabilitate wildlife; and
- Implement an appropriate cleanup strategy for impacted areas.

The NWACP improves response efforts by proactively identifying resources at risk, protection priorities, available equipment, and response personnel in advance so that the first response is initiated while, rather than after, incident-specific priorities are determined. The response techniques employed in a spill are dependent upon the product spilled, quantity, location, response time, weather conditions, responder capability, and availability of response equipment. The NWACP identifies the appropriate conditions for the various spill response techniques such as mechanical containment and recovery, dispersants, in-situ burning, shoreline cleanup, and natural removal.

The NWACP also includes a manual and a series of matrices to be used as a tool for shoreline countermeasure response. Shoreline countermeasures are a critical element affecting the environmental impact and cost resulting from a spill. Local response organizations and agencies have developed mechanisms for identifying shorelines requiring treatment, establishing treatment priorities, monitoring the effectiveness and impacts of treatment, and for resolving problems as the treatment progresses. Each section of the manual has been adapted to the specific environments, priorities, and treatment methods appropriate to the planning area. These elements provide the information needed to select cleanup methods for specific combinations of shoreline and oil types (Ecology 2003a).

### **Geographic Response Plans**

Geographic Response Plans (GRPs) are oil spill response plans for public coastal and inland waters. They are considered part of the NWACP, but are distributed and revised separately. Each GRP has two priorities: (1) to identify sensitive natural and cultural resources in a specific geographic region and (2) to describe and prioritize response strategies to protect these resources during the initial phase of an oil spill. Currently, all coastal and selected inland water areas in Washington and Oregon are covered by the 24 regional GRPs (RRT 2002).

Each GRP contains a list of pre-planned response strategies that can be put into effect immediately by initial responders to protect critical public resources during the first few hours of an oil spill. This strategy list serves as the action plan for federal and state OSCs and others entities responding to a spill. Once a coordinated response has been established, the GRP protection strategies are refined and supplemented based on real-time assessments. Each regional GRP includes spill contact information, site descriptions, reference maps, prioritized response protection strategies, shoreline information, sensitive resource descriptions, and logistical information. The logistical support section includes information such as locations of local equipment and personnel, local facilities, site access, local experts, and potential wildlife rehabilitation centers. Oil spill response contractors frequently test specific GRP strategies at the actual site. Testing provides an opportunity for response contractors to verify feasibility, deploy

equipment, and train personnel to ensure that they are prepared for a real oil spill (RRT 2002).

The GRPs only address the protection of sensitive public (not private) resources, and not all sensitive resources can be protected. The protection strategies in the GRPs have been designed for use with persistent oils and may not be suitable for other petroleum or hazardous substances. In addition, environmental conditions (e.g., wind, currents, and tides), together with the physical limitations of existing spill response technology, may preclude the effective protection of some areas. The development of any protection strategies for private economic resources (including, but not limited to, commercial marinas, private water intakes, non-release aquaculture facilities) are the responsibility of the private resource owner or the responsible party (RRT 2002).

The Department of Ecology (Ecology) is responsible for maintaining, updating, and distributing GRPs for Washington and the Lower Columbia River. Response strategies are refined and updated as a result of field visits and tests, oil spill drills, and the lessons learned from actual oil spills. Current versions of the GRPs are posted on the Northwest Area Committee/Regional Response Team website at:

<http://www.uscg.mil/d13/m/nwac/nwac.html>. Using GRPs is a proven process that has become part of the standard pollution response of the Northwest Area (RRT 2002).

The waters adjacent to the Lummi Reservation are addressed in the San Juan Islands/North Puget Sound GRP (Ecology 2003a). This GRP identifies:

- Resources needing protection (including sensitivity of shoreline types and shoreline type maps);
- Response resources (e.g., boom, boat ramps, and vessels) needed;
- Site access and staging areas;
- Tribal and local response community contacts; and
- Local conditions (e.g., physical features, hydrology, currents and tides, winds, and climate) that may affect response strategies.

The response strategies in the GRP were developed based on the sensitive resources identified, hydrology, and climactic considerations. Individual strategies, which are specific to a location, identify the amount of boom necessary for implementation. The response strategies are then prioritized based on potential spill origins and trajectory modeling, taking into account factors such as resource sensitivity, feasibility, wind, and tidal conditions (Ecology 2003a). Maps of boom locations in the Reservation area are shown in Figures 3.1, 3.2, and 3.3.

### **Pacific States/British Columbia Oil Spill Task Force**

The Pacific States/British Columbia Oil Spill Task Force was formally created by a Memorandum of Cooperation (MOC) signed in 1989 by the Governors of Alaska, Washington, Oregon, and California and the Premier of British Columbia following the Nestucca and Exxon Valdez oil spills. These events highlighted the common concerns shared by the West Coast states and the Province of British Columbia, Canada, related to spill risks from coastal vessel traffic routes, the need for cooperation across shared

borders, and a shared commitment among West Coast citizens of both the U.S. and Canada to protect their unique marine resources.

In June 2001, a revised Memorandum of Cooperation was written to include the State of Hawaii and a focus on spill preparedness and prevention needs for the 21st century. The continuing focus of the Task Force is on fostering regulatory consistency, sharing information and resources, and coordinating development and implementation of new policies and programs to reduce the risk of marine oil spills.

The Oil Spill Task Force published a major report in October of 1990 that included 46 joint recommendations for spill prevention and response, as well as a number of recommendations specific to each member jurisdiction. Most of these recommendations have since been incorporated into state or provincial statutes, rules, or programs; they are also reflected in the U.S. Federal Oil Pollution Act of 1990 (OPA), as well as the Canadian Shipping Act Amendments adopted in 1993.

### **STATE PLANS AND RESOURCES**

The Ecology Spill Prevention, Preparedness, and Response (Spills) Program implements Washington laws pertaining to oil and hazardous substance spills, including:

- Chapter **90.56** RCW, Oil and Hazardous Substance Spill Prevention and Response
- Chapter **88.46** RCW, Vessel Oil Spill Prevention and Response
- Chapter **90.48** RCW, Water Pollution Control

The Spills Program carries out a number of prevention activities, including:

- Performing vessel screening, inspection, and oil transfers;
- Participating in the operation of the Neah Bay Rescue Tug;
- Conducting incident investigations;
- Reviewing oil spill prevention plans and operation manuals for oil-handling facilities; and
- Assessing and managing spill risk.

Since the first few hours of a spill are crucial to minimizing impacts, an effective response to a spill must begin immediately if damages are to be minimized. The state-approved spill contingency plans maintained by regulated vessels and facilities help assure that companies have a spill response contractor on retainer and have a plan to respond to spills immediately with the proper equipment and trained personnel. Ecology activities to improve preparedness include review and approval of oil spill contingency plans from facilities and vessels, participation and evaluation of spill drills, and participation in the development of Geographic Response Plans.

Ecology responds directly to both accidental and intentional releases of oil and hazardous materials. These activities include:

- 24-Hour Statewide Response: The agency provides round-the-clock response to oil and hazardous material spills that pose a risk to public health, safety, and the environment. Incidents may be co-managed with the responsible party and local, tribal, and federal emergency response personnel.

- Methamphetamine Drug Lab Cleanup: Ecology spill responders work with law enforcement personnel to dispose of drug lab chemicals from the sites of illicit methamphetamine drug labs and lab dumps
- Compliance and Enforcement: Ecology can take enforcement and compliance actions for violations related to oil and hazardous material spills, including imposing fines and requiring changes in operating practices to prevent future spills.
- Natural Resource Damage Assessment and Restoration: When an oil spill causes significant damage to publicly owned natural resources, Ecology coordinates assessment of the degree of damage and acquisition of fair compensation from the responsible party(ies) through the Natural Resources Damage Assessment Committee. Ecology works with other organizations to use the collected monies (the Coastal Protection Fund) for restoration of the lost resources.

Under a 2001 memorandum of agreement on oil spills, Ecology and the U.S. Coast Guard are developing a cooperative vessel inspection program, sharing information, and monitoring oil transfer operations. Other joint initiatives include implementing recommendations from the North Puget Sound Oil Spill Risk Management Panel, managing the risk of oil spills in Haro Strait and on the Columbia River, and working with the Pacific States/British Columbia Oil Spill Task Force to implement a coastal vessel risk management system from California to Alaska.

The state rules for facility and vessel oil spill contingency plans were adopted by Ecology in 1991 and 1992. Recent drills have identified gaps in the ability of industry contingency plan holders to respond to a probable worst-case oil spill. Ecology is updating its rule to strengthen spill response standards, establish salvage and other vessel emergency service standards, improve the drill program, and make other necessary changes.

#### **LOCAL PLANS AND RESOURCES**

Local emergency response plans are produced by Local Emergency Planning Committees (LEPCs). The LEPCs have membership from government agencies, including local fire, police, and emergency managers; industry; citizens; and other interested parties. These plans guide local efforts in responding to an oil or hazardous materials spill. The only LEPC in the Reservation area is the Whatcom County LEPC, which has produced a Hazardous Materials Plan (Whatcom County 2001) that meets the community planning requirements of Section 303 of EPCRA. A hazard analysis demonstrated that such a plan was necessary because of the transportation and storage of hazardous chemicals and oil in the area (Whatcom County 2001). The Lummi Nation has coordinated with the Whatcom County Division of Emergency Management (WCDEM) during past spill response efforts. Future coordination should benefit both jurisdictions.

In 1997, a public/private cooperative effort resulted in the establishment of the Whatcom County Specialized Emergency Response Program (SERP), a non-profit, 501(3)c corporation that was organized to support response needs of local public safety agencies. The SERP currently administers the Hazardous Materials Unit, the Major Incident Support Team (MIST), and the Community Alert Network (CAN). The SERP is managed and staffed by volunteers from local emergency response organizations and

funded through grants, local industries, and the WCDEM. The first initiative of the SERP was to develop a well-equipped, well-trained hazardous materials response team. The Hazmat Unit is available for 24 hour on-call response to nearly any Hazmat Level II or III incident, excluding cleanup of clandestine drug labs. Other hazmat teams in the area are at the larger fixed facilities, the Surrey Fire Department in British Columbia, and by request, through the state Emergency Management Division Duty Officer.

The Major Incident Support Team (MIST) was established under the Whatcom County SERP in 2003 (City of Bellingham 2003). It is funded by a combination of grants and donations, with start up funding provided by the ConocoPhillips and BP Cherry Point refineries. The MIST team was formed to assist local agencies in successfully managing major emergency incidents. Any city or agency in the Whatcom County area may request the assistance of MIST on a 24-hour, on-call basis through the WCDEM. Team members initially completed a 40-hour course on the National Interagency Incident Management System (NIIMS) and are trained in the five functions of the Incident Command System.

The Community Alert Network (CAN) is an emergency notification program that calls every home phone in a specified area within minutes to deliver emergency instructions (e.g., shelter in place or quickly evacuate). In case of an emergency, the CAN program allows emergency officials to record a message that provides specific instructions to residents on how they should respond to the emergency. The company that provides the service enters the location information for the hazard area into their computer system and the system delivers the message to all the homes in the area (Crawford 2004).

The larger fixed facilities in the area have in-house hazardous materials response teams that may be accessed for additional assistance or technical expertise. Another hazmat team is at the Surrey Fire Department, which maintains a fully equipped hazardous materials response team in Lower Mainland British Columbia that may be available for mutual aid responses. Other hazmat emergency response teams may be requested through the state Emergency Management Division Duty Officer. Also, the state Fire Mobilization Act may be invoked in the event of a major chemical incident requiring long-term operations by regional or state resources (Whatcom County 2001).

## **FACILITIES AND VESSELS**

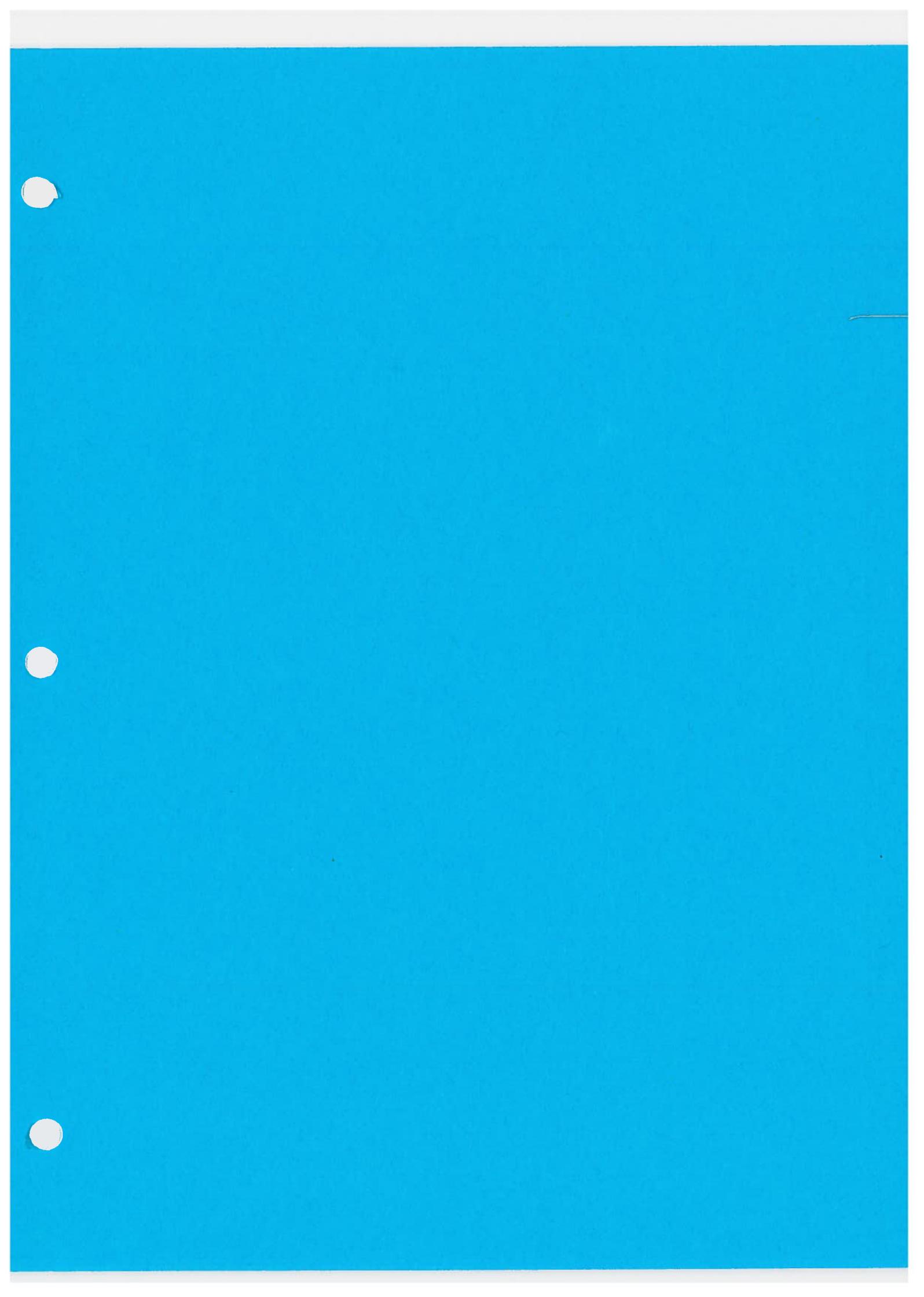
In the final tier of plans forming the National Response System are Facility Response Plans and Vessel Response Plans. These are required for oil cargo handling facilities or vessels. These plans detail pollution response action plans for the specific facility or vessel, and must be submitted for review and approval to the EPA or USCG, depending on the threat to the environment. Facilities that store large volumes of highly flammable or toxic chemicals are required to develop and implement Risk Management Plans that outline how the facility will prevent and respond to a release. These response plans represent the first line of defense against the impacts of a hazardous materials spill.

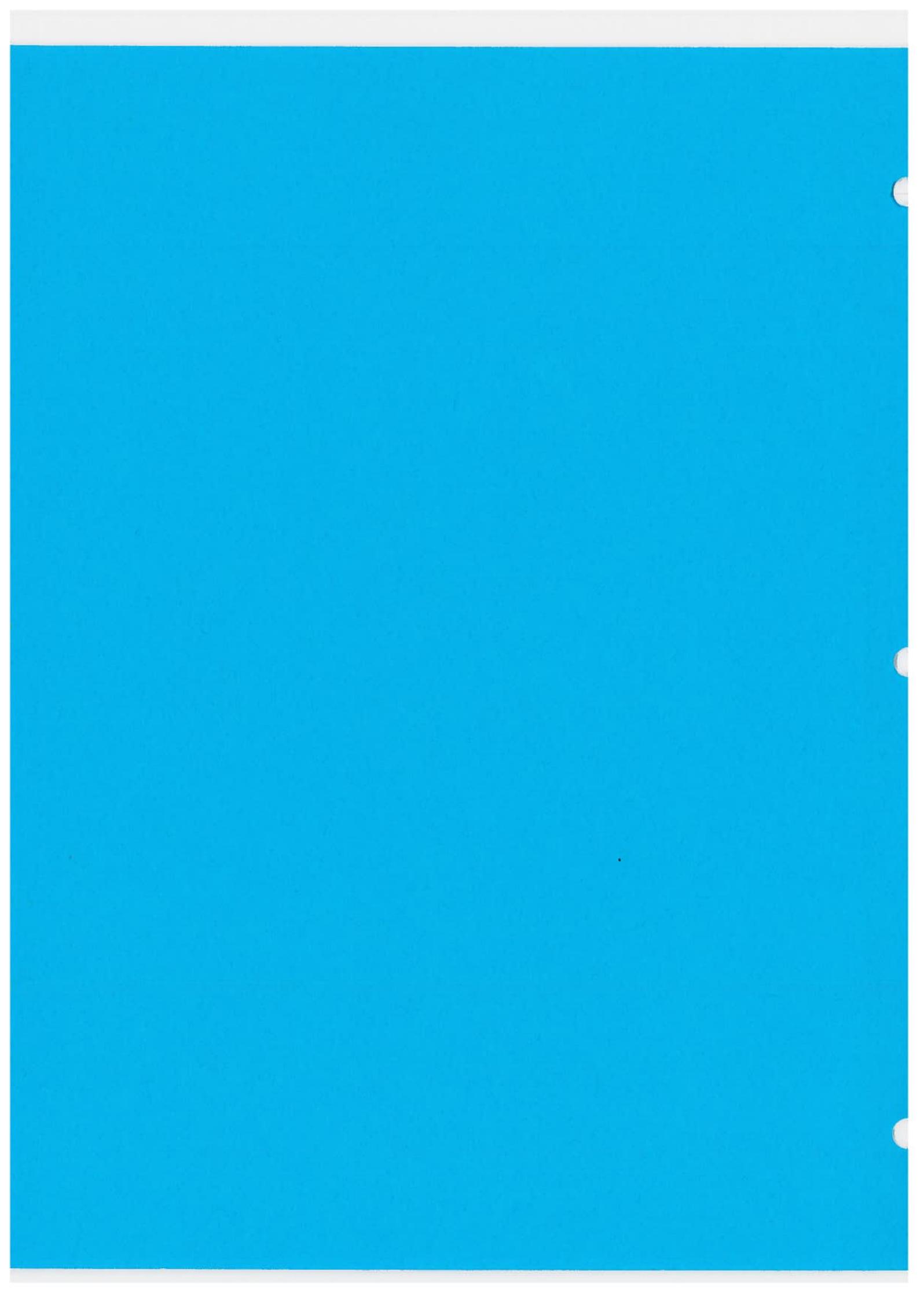
The National Response Team has developed an Integrated Contingency Plan (ICP or "One Plan") Guidance that provides a way to consolidate the multiple plans that a facility may have prepared to comply with various regulations into one functional emergency response plan. In addition to consolidating their existing plans, facilities can use the ICP

Guidance to simplify their plan development and update process. The ICP Guidance is also intended to improve coordination of response activities within the facility and with outside responders. The ICP format is based on the Incident Command System (ICS), which allows the plan to dovetail with established response management practices and promote the usefulness of any given plan in an emergency (NRT 1998).

Facilities near the Reservation that have prepared ICP response plans and/or Clean Air Act Risk Management Plans include:

- British Petroleum (BP) Cherry Point Oil Refinery (formerly ARCO)
- ConocoPhillips Oil Refinery (formerly Tosco/Mobil)
- ALCOA-Intalco Works Aluminum Smelter
- Tenaska Cogeneration Plant
- Georgia-Pacific West Paper Mill
- BP Olympic Pipeline (Gasoline, Jet Fuel)
- Terasen Pipeline (Crude Oil)
- Cascade Natural Gas Pipeline





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**Appendix C: Draft Lummi Nation Comprehensive Emergency Management Plan**

with a few additional files (mainly, `main.c`)

**THE LUMMI INDIAN NATION  
COMPREHENSIVE EMERGENCY MANAGEMENT  
PLAN**



**REVISION DATE  
November 12, 2004**

# THE LUMMI NATION COMPREHENSIVE EMERGENCY MANAGEMENT PLAN

## 1) SECTION ONE – OVERVIEW

### i) Purpose

The purpose of the Lummi Comprehensive Emergency Management Plan (CEMP) is to provide a structured planning, preparedness and response process from which Tribal Government and the Lummi Community may take appropriate steps to anticipate and prepare for a variety of disaster events that may occur within or impact the Lummi Nation and its reservation community. This plan and its implementation are essential to protect the lives, property and resources of the Lummi Nation. Due to the ultra-serious nature of major disaster events, the response to such incidents will be identified as a major emergency management response mobilization or CEMP mobilization.

### ii) Design

This plan is designed to address any significant emergency or disaster situation in which the Lummi Nation is required to mobilize a substantial and/or prolonged response independently within its own community or in coordination with other local, state and federal agencies. The Comprehensive Emergency Management Plan calls for a number of activities to take place to anticipate and prepare for major emergencies. The Plan requires that the Lummi Nation initiate:

- (a) Community-wide disaster plan development and preparedness
- (b) Assess identifiable threats and the risk they pose to the community
- (c) Assign response, coordination and decision-making roles and responsibilities
- (d) Coordinated responses with other local, state and federal response entities

### iii) Scope

The Comprehensive Emergency Management Plan represents the policy of the Lummi Nation as it applies to preparing and responding to major emergency and disaster events within the jurisdiction of the Lummi Nation. The Plan shall be utilized to respond to natural and manmade emergency and disaster events that warrant an emergency response mobilization to protect and preserve the lives, health, environmental resources and property of the Lummi Nation or within its jurisdiction.

**iv) Authority**

Upon completion of the Comprehensive Emergency Management Plan, it will be presented by resolution by the Lummi Indian Business Council (LIBC) to be established as Tribal Government's official emergency response management plan for major emergency and disaster events and the policy of the Lummi Nation. At such time as this plan is formally adopted by the LIBC, all elected or appointed Tribal officials, division directors, department managers, unit supervisors and employees are responsible to respond to and comply with the guidance and direction provided by the Plan.

Upon adoption of this plan and in compliance with *Homeland Security Presidential Directive (HSPD)-5, Management of Domestic Incidents* and letter to Governors dated September 8, 2004 from the Department of Homeland Security (appendix L) the LIBC Comprehensive Emergency Management Plan shall align with the National Incident Management System (NIMS) and if conflicts exists between this plan and the NIMS then the federal plan shall take precedence.

Refer to Resolution #: \_\_\_\_\_ Dated: \_\_\_\_\_

**2) SECTION TWO – PLANNING AND PREPAREDNESS****i) Responsibilities**

In order for the Lummi Nation to be adequately prepared to face, respond to and manage a disaster event, government, business, families and individual community members must be prepared to respond. Advanced preparation will provide for a more coordinated and effective response in the face of most disasters that may occur within the jurisdiction of the Lummi Nation. The failure to adequately prepare for such events may render any subsequent response ineffective or less effective that it should and could have been. Inadequate, unprepared or uncoordinated responses may cause lives, property and resources to be endangered, lost or destroyed.

**(a) Tribal Government**

All elected and appointed Tribal Government officials shall be responsible for the preparation, readiness and response to identified emergency and disaster events in accordance with the elements of this plan. Additionally, officials, directors and managers shall be responsible for the development of such individual sub plans as may be necessary to direct unit responses to emergencies and disasters that may affect the operation of individual units of Tribal Government. Such sub plans shall be developed to be consistent with and complementary with this plan, and may include provisions for building evacuation, sheltering-in-place, emergency closure and disaster response.

**(b) Governments or Disaster Response Entities**

The Lummi Nation will, where possible and practical, work with other governments and disaster response entities in a cooperative manner so as to enhance the extra-jurisdictional or regional response to disaster events that go beyond the border of the reservation or the jurisdiction of the Lummi Nation. To this end, the Lummi Nation will work and coordinate with appropriate local, state and federal disaster response and management agencies, especially the Whatcom County Division of Emergency Management, wherever it is appropriate and reasonably possible to do so.

**(c) Businesses and Organizations**

All businesses and organizations within the jurisdiction and boundaries of the Lummi Reservation are responsible for preparing for and responding to disaster events. Wherever possible and practical, it is the desire of the Lummi Nation to work with such entities in a cooperative manner so as to enhance the community's response to disaster events. To this end, the Lummi Nation will make reasonable efforts to cooperate and work cooperatively with such entities in the event of a disaster event. However, the extent to which the Lummi Nation engages in such cooperative and/or supportive efforts shall be at the discretion of the Lummi Nation.

**(d) Families and Individuals**

The protection and survival of individuals and families is of primary interest of the Lummi Nation in every respect. To this end, individuals and families are encouraged to seek out disaster preparedness and response information from all appropriate sources. Tribal Government will prepare to provide such information to community members and to make the same available through its communications entities and directly from Tribal Government agencies and offices. Such information will be posted or links provided on Tribal Government websites. Information will be disseminated through Tribal Government publications and specific information will be made available in brochure form through Tribal Government offices, such as Housing, Planning and Police. In addition to acquiring disaster preparedness and response information, individuals and families are encouraged to take appropriate and reasonable action to prepare themselves and their families for the occurrence of disaster events as circumstances may indicate.

### 3) SECTION THREE – THREATS AND RISK ASSESSMENT

Refer to annexes for specific hazard response criteria

#### i) Potential Disaster Events

A variety of different types of disastrous events have the potential of creating circumstances necessitating activating the Comprehensive Emergency Management Plan, although the actual occurrence of such events is rare. However, it is vitally important that preparations for an appropriate response to disasters that do occur can be managed effectively to minimize loss of life and injury, damage to property, resources and public facilities, and disruption of normal activities. Such events may take the form of any of the following:

##### (a) **Natural Disasters**

Naturally occurring events such as floods, fires, earthquakes, tsunamis, tornadoes, volcanic eruptions and unusually severe storms and weather conditions all have the potential to pose serious threats to the health, safety and well-being of people, animals, facilities and resources. While some, like flooding, may be routinely predictable, other may only rarely occur without warning. All have the potential to cause serious injury, death, destruction and disruption.

##### (b) **Manmade Disasters**

Manmade or technological disasters occur on an irregular basis. All such occurrences have, at least, the potential to escalate to a serious level posing serious threats to the health, safety and well-being of people, animals, facilities and resources. Like natural disasters, such events are normally of limited duration, seriousness and impact as to render them manageable without activation of the Comprehensive Emergency Management Plan. However, as with natural disasters, some unique events are of such a serious magnitude and level of threat, that they require a major mobilization and response of the Community's emergency resources for a prolonged period. It is at these times when the use of the Comprehensive Emergency Management Plan is essential.

#### (ii) Risk Assessment

A substantial number of potential threat sources may be found within the local environment that poses substantial threats and risks to the Lummi Nation and its community. Potential threats, the levels of risk and potential for harm they pose are identified in the hazard tables below:

**Natural Hazards**

<b>Hazard</b>	<b>Risk</b>	<b>Vulnerability</b>
Flood	High	Moderate
Earthquake	Mod/High	High
Mudflow/Landslide	High	Moderate
Severe Weather	High	High
Forest Fire	Moderate	Low/Mod
Tidal Overflow	Moderate	Low
Seiche	Low	Mod/High
Tsunami	Low	Moderate/High
Tornado/ Funnel Cloud	Low	Low
Epidemic	Low	Low/Mod
Volcanic Eruption	Low	Mod/High

**Technological/Manmade Hazards**

<b>Hazard</b>	<b>Risk</b>	<b>Vulnerability</b>
Hazardous Materials	High	Mod/High
Fire/Explosion	High	Low/Mod
Transportation Accident	Mod/High	Mod/High
Utility Failure	High	High
Civil Unrest	Moderate	Low
Terrorism	Low/Mod	Moderate
Resource Shortages	Low	Moderate
Dam Failure	Low	Moderate
Radiological Accident	Low	Low

Refer to appendix A for definitions of each hazard.

#### 4) SECTION FOUR – RESPONSE ACTIVATION THRESHOLDS

##### i) Classification of Events

During the normal course of community life, a variety of events will occur that warrant different levels of emergency response. Most events will be effectively and efficiently handled through normal means. Some emergency events will have the potential to become disasters and a few events will actually be disasters requiring a Comprehensive Emergency Management mobilization.

##### (a) Normal Emergency Events

It is important to recognize that emergency events occur in communities across America that have harmful and even disastrous impacts on those involved in them. However, such events are not the focus of this plan. Such events are effectively addressed through the normal emergency response systems that are managed on a daily basis by community law enforcement, fire and rescue agencies. Most of the events noted in the threat and risk assessment sections above are managed in a highly effective manner by the normal community emergency response agencies, entities and resources. Such event will not normally result in Comprehensive Emergency Management mobilization.

##### (b) Serious Emergency Events – (Escalation Possible)

On a less than frequent basis, emergency events may occur that are more serious than normal or daily emergency events. Such events may not be within the ability of initial responders to contain, control and resolve without exceptional actions or significant additional resources. Some may rise to the level of a disaster, although most will not. Those that do not rise to the level of a disaster will ultimately be handled with normally available resources. The few that do escalate to the level of a disaster will necessitate a Comprehensive Emergency Management mobilization.

##### (c) Major Emergency and/or Disaster Events

Events will occasionally occur that are of such a magnitude and/or are so serious that they rise or occur above the ability of the normal emergency response resources to effectively contain, control and resolve them within a reasonable timeframe. Events that threaten the safety of a portion of or the whole community in a serious manner are generally considered to be potential or actual disasters warranting a Comprehensive Emergency Management mobilization.

## ii) Activation Thresholds

The decision to initiate a disaster response to an emergency event may occur at several levels. Once the decision to mobilize a disaster response to an event, a predictable series of events must then take place in order to ensure an appropriate response. For the purpose of this section, the response levels shall be as follows:

### (a) Level One Event

1. **Classification:** Routine Emergency Event.
2. **Emergency Incident** – Emergency response units (police, fire, ambulance, and hazmat) respond to an actual or reported emergency event for which such units have the training, equipment and time to handle effectively. Such situations are contained, do not have significant potential to escalate to a more serious situation and do not represent an uncontrolled threat to the Community.
3. **Action** – The emergency event contained, managed and resolved through normal means by regular emergency response personnel and resources. No Comprehensive Emergency Management mobilization is indicated or initiated.
4. **Management** - The event is monitored by on scene personnel for a greater response if such is indicated. The event is managed to conclusion by on-scene or other available personnel and resources.

### (b) Level Two Event

1. **Classification:** Escalating Major Emergency Event
2. **Escalating Emergency** – Emergency response units (police, fire, ambulance, and hazmat) respond to an actual or reported emergency event for which such units have the training, equipment and time to handle effectively. However, the event is of such a nature that it may escalate or is escalating to a level beyond which on-scene and/or immediately available back up units are able to control. Such events are serious and may or may not be initially contained or appear to be contained, but either escalate or are determined to be worse than initially believed. Such situations have the potential to threaten or do actually threaten portions of or the whole Community.

**3. Action** – Normal effort made to contain, manage and resolve the event through normal means by regular emergency response personnel and resources. If circumstances escalate or are determined to be more serious than initially believed, a Comprehensive Emergency Management mobilization may be indicated. On-scene or command personnel overseeing event shall monitor the event and shall make recommendations regarding the initiation of a Comprehensive Emergency Management mobilization as circumstances warrant.

a. Notify Incident Command Executive Team of possible or actual Level Two Event.

**4. Management** - The situation is monitored by on-scene and command personnel in order to determine if a greater response is needed. At the point at which on-scene or command personnel determine that the event is reaching or is likely to reach a critical level beyond which available resources are able to control, contain and resolve the situation, the decision will be made to call in additional resources and whether a major emergency mobilization response is warranted. Critical escalation moves to a Level Three Event warranting MER Plan activation.

#### **(c) Level Three Event**

**1. Classification:** Actual or Declared Major Emergency Event.

**2. Disaster Event** – Emergency response units or other officials or persons become aware of an actual, imminent or reported disaster event. Such events clearly threaten the safety, health and well-being of the community or a significant portion of the community and warrant a Comprehensive Emergency Management mobilization. Threats to the security of the homeland of the Reservation of the United States would also be included.

**3. Action** – Review of available information supports the belief that a Comprehensive Emergency Management mobilization is indicated. Upon determination that the event warrants MER Plan activation, the appropriate person in authority initiates activation of the MER Plan by calling the Lummi Police Department and notifying the dispatcher or police official of the decision to initiate a MER Plan activation.

**4. Management** – Events that pose a clear and present danger to the Community or a significant portion of it will normally warrant a Comprehensive Emergency Management. At the point when

MER Plan activation is initiated, a full or phased response may be initiated depending on the circumstances. Managed to conclusion of initial, mitigation and recovery stages.

## **5) SECTION FIVE – COMPREHENSIVE EMERGENCY MANAGEMENT**

### **i) Activation of the Comprehensive Emergency Management Plan**

#### **(a) Activation Decision**

The decision to activate the Comprehensive Emergency Management Plan (CEMP) Plan shall generally rests with the Chairman of the Lummi Indian Business Council (LIBC) or in the absence of the Chairman, an elected LIBC officer, or the General Manager, or in his absence, the Chief of Police, or his designee. The basis for such a decision is that an event has occurred or is clearly imminent that either requires or would be best handled through the implementation of the CEMP Plan. (See Section Four).

#### **(b) All Necessary Action**

Once the CEMP Plan has been implemented, the Emergency Operations Center (EOC) may be activated and the event managed under the Incident Command Authority of Tribal Government. The designated Incident Commander shall, in concert with the Incident Command Executive Team, shall take all necessary action to respond to, manage and bring to conclusion the major emergency event for which the emergency mobilization was initiated.

#### **(c) Extended Action**

Upon the conclusion of a major emergency event, the Incident Command Authority may initiate or recommend such immediate or continuing mitigation, recovery and follow-up action as may be deemed to be required.

### **ii) Emergency Response Priorities**

To the greatest extent possible, all of the operations of the MER Plan will be directed toward the achievement of the priorities noted below:

1. Protect life
2. Protect the environment
3. Protect public and private property
4. Provide an effective coordinated response
5. Provide critical emergency services

6. Restore essential services
7. Develop and disseminate public information
8. Minimize economic disruption to the community
9. Preserve existing tribal organizations and enterprises
10. Document and record decisions, costs, lessons learned, etc.
11. Insure feedback mechanisms are in place for the community

### **iii) Comprehensive Emergency Management Plan Activation Response**

**(a) CEMP Plan Notification** - In the event of CEMP Plan activation, it is essential that key command staff and response and resource personnel be notified from the CEMP Telephone Callout list. Generally, it shall be the responsibility of the Tribal Police Department dispatcher, a specific designee, or the What-Comm Dispatch Center (if available) to initiate notification of the following:

1. The Chairman, General Manager and Chief of Police, or their respective designees shall be immediately notified.
2. Emergency Command Center Staff and support personnel shall be notified as need dictates.
3. All emergency response personnel contained on the Key Responder Notification List shall be notified as need dictates.
4. The Emergency 911 Dispatch Center will be notified.
5. The Director of Whatcom County's Emergency Management Division will be notified.

**(b) Required Response** - Upon notification or awareness of an actual or designated CEMP Plan level emergency or disaster, all designated command and support personnel shall, without delay, contact the Tribal EOC, by whatever means are available, to determine whether they are needed at the EOC or at another location.

1. **Non Availability** - If a primary senior Tribal official, department director, key responder or support person is either not available or not able to effectively respond to the EOC, the EOC Operations Officer shall be so notified, at which time he/she will initiate contact with the next-in-line official to respond and assume the duties of the absent primary official.
2. **Notification and Contact** – It shall be the responsibility of the senior ranking officer or support person on duty or on call to

initiate notification and contact with Tribal Officials of an emergency event requiring a second or third level emergency or Comprehensive Emergency Management.

#### **iv) Command Structure**

##### **(a) Incident Command System**

Once the decision to initiate the CEMP Plan has been made, all notification, coordination and responses will be directed by the Incident Commander, authorized command staff or field commanders, or the Emergency Operations Center (EOC), pursuant to the protocols established under the Incident Command System (ICS).

##### **(b) Incident Command Executive Team**

The Incident Command Executive (ICE) Team (normally the Chairman, General Manager and Chief of Police/Incident Commander) shall be responsible to provide policy and administrative oversight, direction and decision-making necessary to effectively manage and respond to a declared CEMP Plan mobilization. Once notified or otherwise aware of a CEMP Plan activation, Executive Team members shall proceed to the Emergency Operations Center (EOC) of the Lummi Nation without delay in order to assume their assignment as part of the ICE Team. The ICE Team shall be responsible for overseeing the management of the emergency situation until it is concluded.

1. **Chief Policy Officer** – The LIBC Chairman, or designee, shall assume the chairmanship of the Incident Command Executive Team to oversee the decision-making process of the Team.
2. **Chief Administrative Officer** – The General Manager, or designee, shall participate in the Incident Command Executive Team's decision making process and ensure that compliance, availability and support of all Tribal Government personnel and resources in responding to and managing the emergency event. In the absence of the LIBC Chairman or his/her designee, the General Manager shall assume the chairmanship of the ICE Team.
3. **Incident Commander** – The Chief of Police, or designee, shall oversee and coordinate the response of all emergency personnel and resources to the emergency Event.
4. **Other Members or Advisors** – The Incident Command Executive Team Chairman may expand the Executive Team or

include such advisors as may be deemed to be necessary and appropriate.

5. **Incident Command Authority** – The Incident Command Executive Team shall represent the lawful authority of Lummi Tribal Government to oversee and determine its response to any major emergency event within the boundaries of the Lummi Reservation and is, therefore, the Incident Command Authority.

v) **Emergency Operations Center (EOC)**

Unless otherwise designated, the Lummi Police Department, located at 2616 Kwina Road, will serve as the EOC for the Tribal Community.

(a) **EOC Operations**

The EOC shall serve as the primary command center for the management of any CEMP level emergency or disaster from the initial response to its final conclusion. The EOC shall provide both general and specific direction to guide Tribal Government's response to a crisis incident. All communication for major decisions shall be directed to the EOC. Only those persons needed to provide services or support shall be permitted to enter or remain in the EOC. The Emergency Operations Officer shall be responsible for maintaining the security of the EOC.

(b) **EOC Operational Roles and Responsibilities**

The following duties and responsibilities shall be assigned within the EOC as circumstances warrant or as the Incident Command Executive Team or Incident Commander directs:

1. **Information Officer** – The Information Officer is the person designated to act as the primary information and press liaison person responsible for gathering, organizing and disseminating information the public, press and other persons or entities making inquiries for information at the EOC during emergency events.
2. **Safety Officer** – The Safety Officer is the person designated to be responsible for anticipating, noting and responding to safety considerations, both inside the EOC and for the emergency event.
3. **Liaison Officer** - The Liaison Officer is the person designated to be responsible for engaging in liaison contacts and activities with other emergency operations centers or response entities, such as Whatcom County, the State of Washington or the Federal Government during the emergency event. In the event

of a multi-jurisdictional emergency event. The Liaison Officer may be dispatched to the Whatcom County EOC to represent the interests and needs of the Lummi Nation. In such a circumstance, the Liaison Officer would be able to provide timely communication and coordination between the Tribal EOC and the County or other EOC.

4. **Operations Coordinator** - The Operations Coordinator is the person designated to act as the primary coordinator and communicator with various personnel and resources. The Operations Coordinator would normally coordinate the following:
  - i. Emergency Medical Services
  - ii. Fire Services
  - iii. Law Enforcement
  - iv. Search and Rescue
  - v. Public Works
  - vi. Energy and Utility
  - vii. Public Health and Mortuary
5. **Planning Coordinator** - The Planning Coordinator is the person designated to act as the primary coordinator of event documentation to enable the maintenance of an accurate record and timeline of events. This position shall be responsible to make note of issues that are important for follow-up review of the current event and planning for future events.
6. **Logistics Coordinator** – The Logistics Coordinator is the person designated to act as the primary coordinator and communicator with various personnel and resources associated with logistical needs during an emergency event. The Logistics Coordinator would normally coordinate the following:
  - i. Resource management and supply
  - ii. Transportation
  - iii. Food and water
  - iv. Mass care and shelter
  - v. Volunteer and religious affairs
  - vi. Emergency communications
  - vii. Military support to civil authorities
7. **Administration and Finance Coordinator** - The Administration and Finance Coordinator is the person designated to act as the primary coordinator of event documentation. He/she shall also be responsible for the timely and responsive acquisition of the services, materials and resources needed to support emergency response activities. This position is responsible to ensure that

all appropriate contracting and purchasing requirements are properly addressed.

**(c) Individual Command and Support Roles and Responsibilities**

In the event of an CEMP Plan activation in response to a serious event or circumstance threatening all or part of the Lummi Community, various Tribal Government Officials shall be responsible to assume specific roles and responsibilities until such time as the threatening event or circumstances abate and the mobilization concluded.

1. **Chairman** – Shall assume primary policy authority as the Chair of the Incident Command Executive (ICE) Team and have ultimate responsibility for overseeing the management of disaster or emergency event. In this role, the Chairman or designee shall be responsible to speak and act on behalf of the Lummi Nation and the LIBC. The Chairman shall have the authority and responsibility to ensure that all necessary Tribal resources are brought to bear on an emergency to preserve the Tribe, its members, its property and resources. The Chairman shall be responsible to make policy decisions regarding issues that are beyond the authority of the General Manager or the Chief of Police.
2. **Vice Chairman** – Shall assume primary command authority and responsibility in the event of any CEMP Plan activation in the absence of the Chairman or upon delegation by the Chairman. The Vice Chairman shall oversee revisions to the Lummi Emergency Management Plan.
3. **LIBC General Manager** - Shall assume duties as a member of the Incident Command Executive Team and assume primary command authority and responsibility in the event of any CEMP Plan activation in the absence of the Chairman or LIBC Officer, or upon delegation by the Chairman or Vice Chairman. The General Manager shall have the authority and responsibility to ensure that all of the operational resources of the Tribal Government are made available to respond to an emergency.
4. **Chief of Police/Incident Commander** – The Lummi Police Chief shall assume the duties of a member of the Incident Command Executive Team and shall act as the Incident Commander of any emergency event that occurs within the jurisdictional boundaries and authority of the Lummi Nation. Such responsibility shall be so assigned unless otherwise relieved of such responsibility by Tribal Government's Command authority for specific cause and a replacement is named to assume those duties. The Incident Commander shall

direct general field operations of all emergency responder personnel or resources. In the absence of the Chief of Police, the Police Lieutenant, and subsequently the senior on duty sergeant, or other person designated by the Incident Command Executive Team, shall assume duties of the Incident Commander.

5. **Emergency Operations Officer** – The Emergency Operations Officer EOO shall be a person designated by the Incident Commander (normally the Chief of Police) to act as the primary support and resource person responsible for the operation of the Emergency Operations Center. The EOO will make certain that the EOC is maintained before and during emergencies in an operational manner that enables it to provide for the efficient management of emergency events.
6. **Team Support** - Once all of the members of the Incident Command Executive Team have arrived at the EOC, the EOC Operations Officer shall provide all due assistance and support to the Command team.

#### **(d) Operations and Support Responsibilities**

**Division Directors and Department Managers and Supervisors** - In order to make informed decisions and to ensure they are properly implemented, the department directors listed below will make themselves available to the Incident Command Authority or Team at the EOC, either in-person or via telephone and shall be prepared to provide current status reports as necessary and requested by the Incident Command Authority and/or the Emergency Operations Center, and to be ready to initiate such event-related activities as may be required. Directors that are to be available to the Incident Command Authority are as follows:

1. Planning Director
2. Life Center Director
3. School Superintendent
4. Housing Director
5. Information Services Director
6. Natural Resources Director
7. Tribal Attorney

- (e) **Other Personnel** - Other directors, managers and supervisors and Tribal Government employees shall be prepared to make themselves available for assignment should the need arise throughout the duration of the MER Plan event. In the event that the Director is not available, the person with delegation of authority for the Director shall make themselves available.

**vi) General Operational Roles and Responsibilities**

**(a) Emergency Responders** – Including police, fire, and ambulance services, at the direction of the Incident Command Authority, shall be responsible for responding to scenes of emergency incidents to:

1. Make primary assessments and report to their commands
2. Provide initial emergency services
3. Control the scene of a specific incident
4. Provide direction and control for search and rescue
5. Provide other services as directed by the Incident Command Authority

**(b) Communications** – At the direction of the Incident Command Authority will:

1. Provide for the development and release of press information
2. Provide liaison between EOC Command and the public and media
3. Provide for maintaining the LIBC Emergency Hotline
4. Provide other services as directed by the Incident Command Authority

**(c) Emergency Operations Center Liaison** – At the direction of the Incident Command Authority will:

1. Establish a liaison link with the Whatcom County EOC
2. Represent the needs of the Lummi Nation
3. Advise on the Lummi Nation's existing capacity to provide services
4. Coordinate County emergency response and recovery efforts
5. Provide other services as directed by the Incident Command Authority

**(d) Public Works** - At the direction of the Incident Command Authority will:

1. Assess the condition and availability of Tribal structures, facilities and roads
2. Coordinate use of heavy equipment and labor during response or recovery
3. Inspect and determine safety of all structures, facilities, homes and roads
4. Compile damage information and public facility needs
5. Provide for emergency repairs to Tribal rental homes, facilities and roads

6. Consider hazard mitigation in the development of policy and the design.
7. Provides technical information on damaged structures
8. Assist in debris removal from public structures, facilities and roads
9. Coordinate replacement of damaged or missing road signage
10. Assist in establishing and maintaining road closure and detour barricades
11. Assist in limited communication support (radio)
12. Provide other services as directed by the Incident Command Authority

**(e) Transportation** - At the direction of the Incident Command Authority will:

1. Make provisions for access and use of transportation facilities and vehicles
2. Assist in providing transportation assets to support emergency response
3. Assist private parties to gain access to transportation when possible
4. Provide other services as directed by the Incident Command Authority

**(f) Housing** - At the direction of the Incident Command Authority will:

1. Provide maps and address information
2. Coordinate emergency shelter for displaced persons
3. Assure healthy and safe HUD and rental structures
4. Maintain availability of emergency housing resources
5. Facilitate applications for FIMA eligibility and serves as liaison (FIMA)
6. Coordinate repair and rehabilitation of HUD and rental homes
7. Provide other services as directed by the Incident Command Authority

**(g) Medical Support Services** - At the direction of the Incident Command Authority will:

1. Provide medical triage at the scene or at removed triage location
2. Provide such medication care and treatment that may be indicated
3. Provide medical referral and treatment information as appropriate
4. Provide other services as directed by the Incident Command Authority

**(h) Operational Support** - At the direction of the Incident Command Authority will:

1. Provide needed facilities, vehicles or other resources
2. Assist in moving, preparation and set-up of evacuation shelters
3. Assist in set up and utilization of temporary morgue
4. Provide other services as directed by the Incident Command Authority

**(i) Public Utilities** - At the direction of the Incident Command Authority will:

1. Provide for safe drinking water
2. Ensure the containment and proper disposal of contaminated water
3. Coordinate the restoration of public water facilities
4. Assist with assessment, recovery and reactivation of:
  - i. Wells
  - ii. Hydrants
  - iii. Electricity
  - iv. Propane lines
  - v. Gas lines
  - vi. Underground fuel storage
5. Provide other services as directed by the Incident Command Authority

**(j) Other Emergency, Auxiliary or Support Responders** - At the direction of the Incident Command Authority will:

1. Provide such response, assistance and response as may be deemed necessary or desirable.
2. Observe and report event-related matters to the EOC.

## **6) SECTION SIX – EXTERNAL EMERGENCY RESPONSE COORDINATION**

**i) Plan Integration**

The Lummi Nation will work with other external emergency entities and agencies to develop an integrated approach to responding to and managing disasters and major emergencies. To this end, the Chairman shall direct that plan integration efforts will be initiated, pursued and completed by the Lummi Nation with the following emergency response entities to the extent that it is deemed to be necessary, beneficial and appropriate:

**(a)** Whatcom County Division of Emergency Management (DEM)

**(b)** State of Washington

1. Via Whatcom County DEM

2. Directly where appropriate
- (c) Federal Government
  1. Via Whatcom County DEM
  2. Directly where appropriate
- (d) Local Municipalities and Industry
  1. Via Whatcom County DEM
  2. Directly where appropriate

ii) **Cooperative Efforts and Support**

The Lummi Nation shall engage in such cooperative emergency planning, response, mitigation and restoration with other jurisdictions and industry as it may be deemed to be necessary, beneficial and appropriate.

iii) **Mutual Aid Agreements**

The Lummi Nation shall endeavor to negotiate and implement mutual aid agreements with external government entities, specifically Whatcom County DEM. After doing so the Lummi Nation shall review the mutual aid agreements to ensure applicability and feasibility as often as necessary. At no time shall mutual aid agreements interfere with or abrogate tribal sovereignty.

**7) SECTION SEVEN – POLICY DEVELOPMENT AND ADDITIONAL ACTIVITIES**

i) **Emergency Manager**

The Lummi Indian Business Council shall designate one individual to manage and update the CEMP. To coordinate training, drills, exercises, and communications between all interested and necessary parties. To coordinate community preparedness and education efforts. To develop and begin community emergency supply stockpiles as needed. To update and revise all plans within the Lummi Community to ensure continuity and

ii) **Duration of Interim Policy**

Upon formal adoption by the Lummi Indian Business Council, this Interim Comprehensive Emergency Management Policy shall remain in effect until it is replaced by a successor policy.

iii) **Additional Support Documents to be Developed or Gathered**

- (a) The CEMP Plan Development Team will continue to facilitate the development of such additional documentation as may be deemed necessary to enhance the effectiveness of the Interim MER Plan.
  1. A telephone listing and call out rosters of all key officials and response and resource agencies, businesses, organizations and people shall be developed and distributed as necessary.

2. Task Manuals (multiple copies) will be developed for each position within the Incident command operations structure of the EOC to provide specific details regarding the specific task assignments within the Incident Command Structure of the EOC.
  3. A glossary of terms will be developed for inclusion in this and subsequent policies.
- (b) Existing internal department and division policies existing or that may be developed subsequent to this policy shall be included within or referenced by this policy document.
- (c) Identification Badges shall be researched and recommendations made to the General Manager for purchase of such official identification as may be necessary to provide for the proper and timely identification of emergency responders and public officials.

**iv) Final Version CEMP Plan Document to be Researched and Developed**

- (a) The CEMP Plan Development Team shall continue to research and work to develop a CEMP Plan that is fully integrated with other similar plans and emergency response structures that exist at the local, state and federal level. Upon completion, the final CEMP Plan Policy shall be submitted to the LIBC for review and formal approval.
- (b) The Final Version of the CEMP Plan Policy shall include a section addressing the following areas:
1. Search and Rescue Operations
  2. Homeland Security Operations

**v) Incident Command System (ICS) Training and Exercises**

- (a) The Chief of Police shall be responsible to coordinate the search for and facilitation of Incident Command System Training for all appropriate tribal officials.
- (b) As soon as practicable, the Chief of Police will coordinate the development of a table top disaster drill with the Whatcom County Division of Emergency Management and other community emergency response entities.

# Appendix A

## Definitions:

**Flood:** A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from:

- Overflow of inland or tidal waters,
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- A mudflow.

Floods can be slow or fast rising but generally develop over a period of days.

**Earthquake:** A shaking of the earth caused by a sudden movement of rock beneath the Earth's surface. An earthquake occurs on a fault, which is a thin layer of crushed rock between two blocks of rock. A fault can range in length from a few centimeters to thousands of miles. The San Andreas fault in California is 650 miles long and ten miles deep in places. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the rock to cause the shaking that we feel during an earthquake.

**Mudflow/Landslide:** The movement of earth, rocks and debris which have been loosened by water, or weathering, down a mountain or hill; the movement may be instantaneous as down a steep mountain, or slow as in the case of large masses of mud moving down a gentle slope.

**Severe Weather:** Generally, any destructive weather event, but usually applies to localized storms, such as blizzards, intense thunderstorms, or tornadoes

**Forest Fire:** any wildfire or prescribed fire that is burning in forest, grass, alpine or tundra vegetation types

**Tidal Overflow:** See flood

**Seiche:** A resonant standing wave in an enclosed or semi-enclosed water body that continues to oscillate after the cessation of the originating force, which may have been seismic, atmospheric, tidal or wave induced.

**Tsunami:** A series of waves generated by an undersea disturbance such as an earthquake. From the area of the disturbance, the waves will travel outward in all directions, much like the ripples caused by throwing a rock into a pond. The time between wave crests may be from 5 to 90 minutes, and the wave speed in the open ocean will average 450 miles per hour.

**Tornado/ Funnel Cloud:** A rotating column of air ranging in width from a few yards to more than a mile and whirling at destructively high speeds, usually accompanied by a funnel-shaped downward extension of a cumulonimbus cloud.

**Epidemic:** a widespread outbreak of a disease, or a large number of cases of a disease in a single community or relatively small area. Disease may spread from person to person, and/or by the exposure of many persons to a single source, such as a water supply.

**Volcanic Eruption:** the sudden occurrence of a violent discharge of steam and volcanic material, usually from a known volcano

**Hazardous Materials:** Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed

**Fire/Explosion:** the process of combustion of inflammable materials producing heat and light and (often) smoke & a violent release of energy caused by a chemical or nuclear reaction

**Transportation Accident:** an incident or accident involving the transportation of people or goods, via motor vehicle, rail car, airplane, or pipeline, that result in injury to people, environment, and/or property

**Utility Failure:**

**Civil Unrest:**

**Terrorism:** As defined by the FBI, "the unlawful use of force against persons or property to intimidate or coerce a government, the civilian population or any segment thereof, in the furtherance of political or social objectives". This definition includes three elements: (1) Terrorist activities are illegal and involve the use of force. (2) The actions are intended to intimidate or coerce. (3) The actions are committed in support of political or social objectives. This includes domestic as well international individuals and/or groups.

**Resource Shortages:** long term shortages in availability of foodstuffs, water, medicines, and other commodities people and/or livestock require to survive

**Dam Failure:** A breach in a dam releasing stored water caused intentionally via terrorism or unintentional via a natural occurrence such as an earthquake.

**Radiological Accident:** An unintentional release of radioactive materials from reactors, during transportation, or other means into the environment, including groundwater with the potential to injure or harm people, agriculture, livestock, the environment, and/or property

**Disaster:** A crisis event that surpasses the ability of the affected individual, community, or society to control or recover from its consequences.

**Exposure:** The number, types, qualities, and monetary values of property or infrastructure and life that may be subject to an undesirable or injurious hazard event.

**Hazard:** An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss.

**Risk:** The potential for losses associated with a hazard, defined in terms of expected severity and/or frequency, and locations or areas affected.

**Vulnerability:** The level of exposure of human life, property, and resources to impact from hazards.

## Appendix L

September 8, 2004

Dear Governor:

In Homeland Security Presidential Directive (HSPD)-5, *Management of Domestic Incidents*, the President directed me to develop and administer the National Incident Management System (NIMS). The NIMS provides a consistent nationwide approach for Federal, State<sup>1</sup>, territorial, tribal, and local<sup>2</sup> governments to work effectively and efficiently together to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. On March 1, 2004, the Department of Homeland Security (DHS) issued the NIMS to provide a comprehensive national approach to incident management, applicable at all jurisdictional levels and across functional disciplines. HSPD-5 also required DHS to establish a mechanism for ongoing coordination to provide strategic direction for, and oversight of, the NIMS. To this end, the NIMS Integration Center (NIC) was established to support both routine maintenance and the continuous refinement of the NIMS.

All Federal departments and agencies are required to adopt the NIMS and use it in their individual domestic incident management and emergency prevention, preparedness, response, recovery, and mitigation activities, as well as in support of all actions taken to assist State or local entities. The NIC is working with Federal departments and agencies to ensure that they develop a plan to adopt NIMS and that all fiscal year (FY) 2005 Federal preparedness assistance program documents begin the process of addressing State, territorial, tribal, and local NIMS implementation.

This letter outlines the important steps that State, territorial, tribal, and local entities should take during FY 2005 (October 1, 2004- September 30, 2005) to become compliant with the NIMS.

The NIMS provides the framework for locals, tribes, territories, States, and the Federal Government to work together to respond to any domestic incident. Many of the NIMS requirements are specific to local jurisdictions. In order for NIMS to be implemented successfully across the nation, it is critical that States provide support and leadership to tribal and local entities to ensure full NIMS implementation. We are looking to you and your State Administrative Agency (SAA) to coordinate with the State agencies, tribal governments, and local jurisdictions to ensure NIMS implementation. Given the importance and urgency of this effort, Federal, State, territorial, tribal, and local entities should begin efforts to implement the NIMS, if such efforts are not already underway.

---

<sup>1</sup> As defined in the Homeland Security Act of 2002, the term "State" means any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any possession of the United States." 6 U.S.C. 101 (14)

<sup>2</sup> As defined in the Homeland Security Act of 2002, Section 2(10): the term "local government" means "(A) county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of governments... regional or interstate government entity, or agency or instrumentality of a local government: an Indian tribe or authorized tribal organization, or in Alaska a Native village or Alaska Regional Native Corporation; and a rural community, unincorporated town or village, or other public entity." 6 U.S.C. 101(10)

Implementation of and compliance with the NIMS is critical to ensuring full and robust preparedness across our nation. HSPD-5 established ambitious deadlines for NIMS adoption and implementation. FY 2005 is a start up year for NIMS implementation and full compliance with the NIMS is not required for you to receive FY 2005 grant funds. Since FY 2005 is a critical year for initial NIMS adoption, you should start now by prioritizing your FY 2005 preparedness assistance (in accordance with the eligibility and allowable uses of the grant) to facilitate its implementation. The NIC is working with the Federal departments and agencies to identify all of preparedness assistance programs. The NIC will then provide this information to the States, territories, tribes, and local governments.

To the maximum extent possible, States, territories, tribes, and local entities are encouraged to achieve full NIMS implementation and institutionalization across the entire response system during FY 2005. This memorandum highlights the important features of NIMS implementation that should receive special emphasis in FY 2005, but does not represent all of the actions necessary to fully implement the NIMS.

The NIMS is the nation's first-ever standardized approach to incident management and response. The NIMS unifies Federal, State, territorial, tribal, and local lines of government into one coordinated effort. This integrated system makes America safer by establishing a uniform set of processes, protocols, and procedures that all emergency responders, at every level of government, will use to conduct response actions. This system ensures that those involved in emergency response operations understand what their roles are and have the tools they need to be effective.

This system encompasses much more than the Incident Command System (ICS), although ICS is a critical component of the NIMS. It also provides a common foundation for training and other preparedness efforts, communicating and sharing information with other responders and with the public, ordering resources to assist with a response effort, and for integrating new technologies and standards to support incident management. For the first time, all of the nation's emergency responders will use a common language, and a common set of procedures when working individually and together to keep America safe. The NIMS ensures that they will have the same preparation, the same goals and expectations, and most importantly, they will be speaking the same language.

## **Minimum FY 2005 NIMS Compliance Requirements:**

State and territory level efforts to implement the NIMS must include the following:

- **Incorporating NIMS into existing training programs and exercises**
- **Ensuring that Federal preparedness funding (including DHS Homeland Security Grant Program, Urban Area Security Initiative (UASI) funds) support NIMS implementation at the State and local levels** (in accordance with the eligibility and allowable uses of the grants)
- **Incorporating NIMS into Emergency Operations Plans (EOP)**
- **Promotion of intrastate mutual aid agreements**
- **Coordinating and providing technical assistance to local entities regarding NIMS**

- **Institutionalizing the use of the Incident Command System (ICS)**

At the State, territorial, tribal, and local levels, jurisdictions should support NIMS implementation by:

- **Completing the NIMS Awareness Course: "National Incident Management System (NIMS), An Introduction" IS 700**

This independent study course developed by the Emergency Management Institute (EMI) explains the purpose, principles, key components and benefits of NIMS. The course also contains "Planning Activity" screens, allowing participants an opportunity to complete some planning tasks during the course. The planning activity screens are printable so that they can be used after the course is complete. The course is available on-line and will take between forty-five minutes to three hours to complete. The course is available on the EMI web page at: <http://training.fema.gov/EMIWeb/IS/is700.asp>.

- **Formally recognizing the NIMS and adopting the NIMS principles and policies**  
States, territories, tribes, and local entities should establish legislation, executive orders, resolutions, or ordinances to formally adopt the NIMS. The NIC will provide sample language and templates to assist you in formally adopting the NIMS through legislative and/or executive/administrative means.

- **Establish a NIMS baseline by determining which NIMS requirements you already meet**  
We recognize that State, territorial, tribal, and local entities have already implemented many of the concepts and protocols identified in the NIMS. The 2004 DHS Homeland Security Grant Program encouraged grantees to begin utilizing the NIMS concepts, principles, terminology, and technologies. The NIC is developing the NIMS Capability Assessment Support Tool (NIMCAST). The NIMCAST is a web-based self-assessment system that States, territories, tribes, and local governments can use to evaluate their incident response and management capabilities. This useful tool identifies the requirements established within the NIMS and can assist you in determining the extent to which you are already compliant, as well as identify the NIMS requirements that you are not currently meeting. As gaps in compliance with the NIMS are identified, States, territories, tribes, and local entities should use existing initiatives, such as the Office for Domestic Preparedness (ODP) Homeland Security grant programs, to develop strategies for addressing those gaps. The NIC will formally pilot the NIMCAST with a limited number of States in September. Upon completion of the pilot, the NIC will provide all potential future users with voluntary access to the system. Additional information about the NIMCAST tool will be provided later this year.

- **Establishing a timeframe and developing a strategy for full NIMS implementation**  
States, territories, tribes, and local entities are encouraged to achieve full NIMS implementation during FY 2005. To the extent that full implementation is not possible during FY 2005, Federal preparedness assistance must be leveraged to complete NIMS implementation by FY 2006. By FY 2007, Federal preparedness assistance will be conditioned by full compliance with the NIMS. Again, in order for NIMS to be implemented successfully across the nation, it is critical that States provide support and leadership to tribal and local entities to ensure full NIMS implementation. States should work with the tribal and local governments to develop a strategy for statewide compliance with the NIMS.

- **Institutionalizing the use of the Incident Command System (ICS)**

If State, territorial, tribal, and local entities are not already using ICS, you must institutionalize the use of ICS (consistent with the concepts and principles taught by DHS) across the entire response system. The 9/11 Commission Report recommended national adoption of the Incident Command System (ICS) to enhance command, control, and communications capabilities. All Federal, State, territory, tribal, and local jurisdictions will be required to adopt ICS in order to be compliant with the NIMS. Additional information about adopting ICS will be provided to you by the NIC.

**FY 2006 and FY 2007 Requirements:**

In order to receive FY 2006 preparedness funding, the minimum FY 2005 compliance requirements described above must be met. Applicants will be required to certify as part of their FY 2006 grant applications that they have met the FY 2005 NIMS requirements. Additional information about NIMS compliance and resources for achieving compliance will be forthcoming from the NIC. In addition, FY 2005 Federal preparedness assistance program documents will address State and local NIMS compliance. The NIC web page, [www.fema.gov/nims](http://www.fema.gov/nims), will be updated regularly with information about the NIMS and guidance for implementation. The NIC may be contacted at the following:

Gil Jamieson, Acting Director  
NIMS Integration Center  
500 C Street, SW  
Washington, DC 20472  
(202) 646-3850  
[NIMS-Integration-Center@dhs.gov](mailto:NIMS-Integration-Center@dhs.gov)  
web page: [www.fema.gov/nims](http://www.fema.gov/nims)

Thank you for your support in implementing the NIMS. I look forward to continuing our collective efforts to better secure the homeland and protect our citizens and appreciate all of your hard work in this important endeavor.

Sincerely,

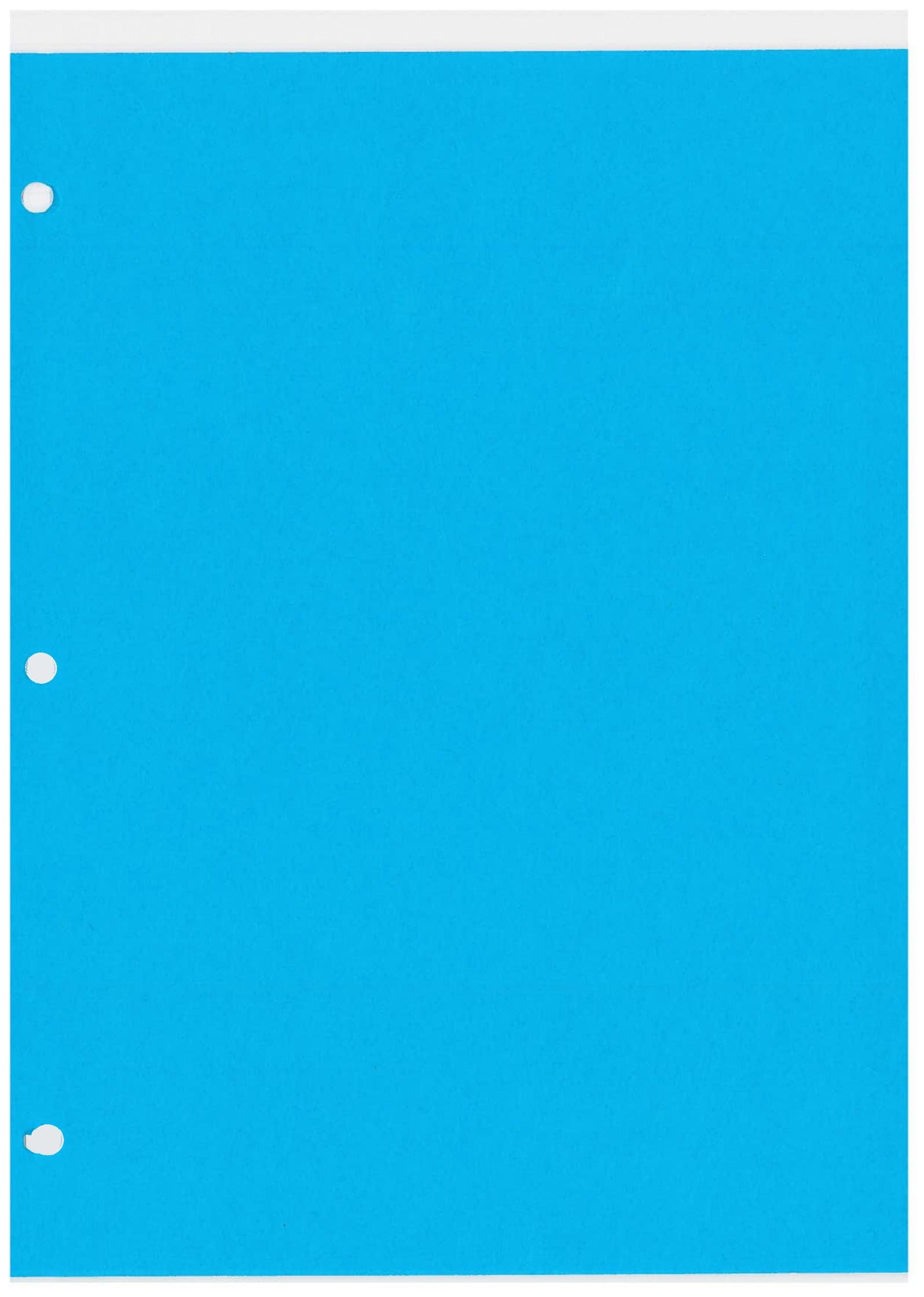
Tom Ridge

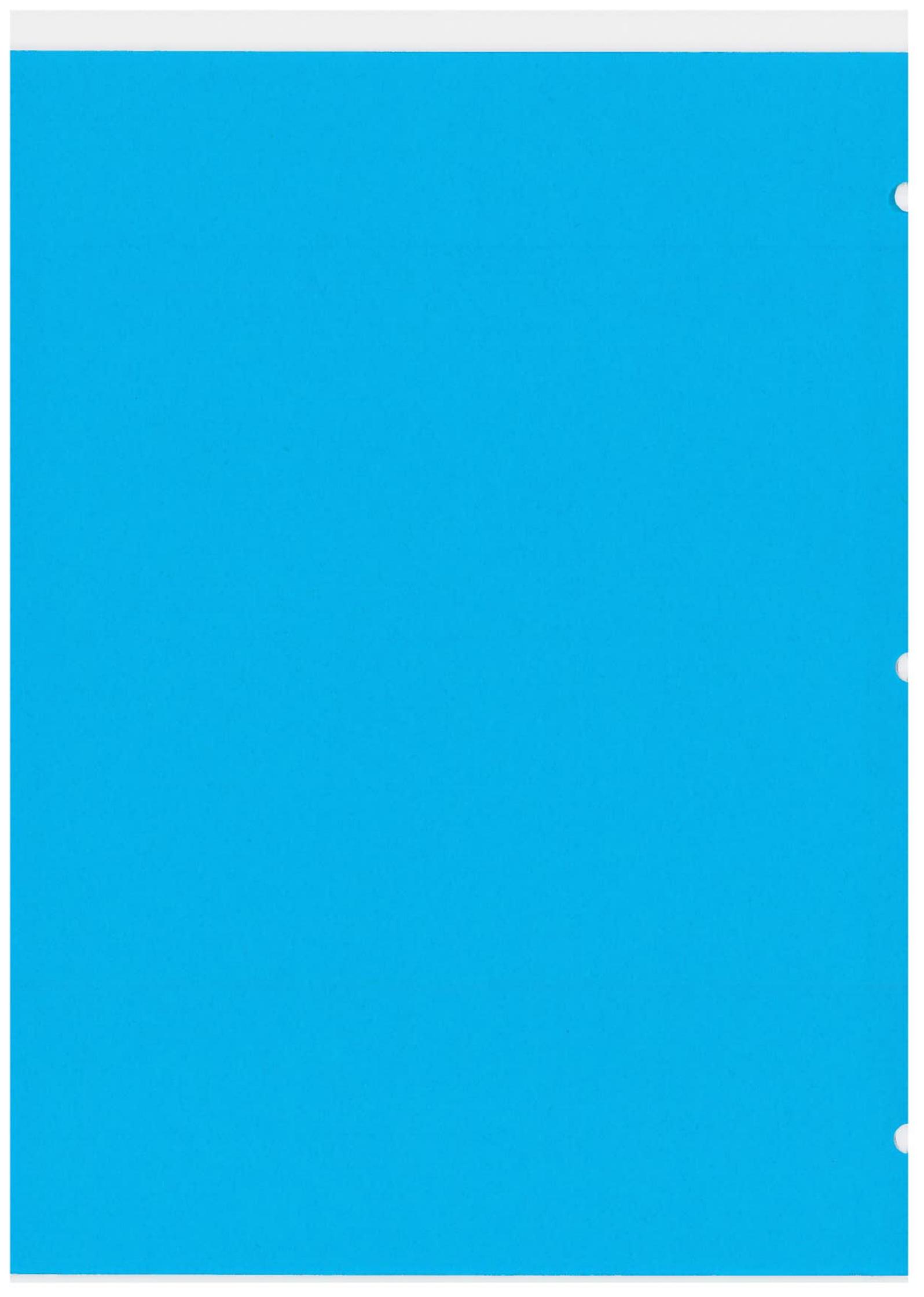
cc: State Administrative Agency  
State Emergency Management Director

State Homeland Security Advisor  
DHS Directorates and Offices  
Homeland Security Advisory Council

## ANNEXES

<b>NATURAL HAZARDS</b>	<b>ANNEX #</b>
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• UTILITY FAILURE	O
• CIVIL UNREST	P
• TERRORISM	Q
• RESOURCE SHORTAGES	R
• DAM FAILURE	S
• RADIOLOGICAL ACCIDENT	T
	U
	V



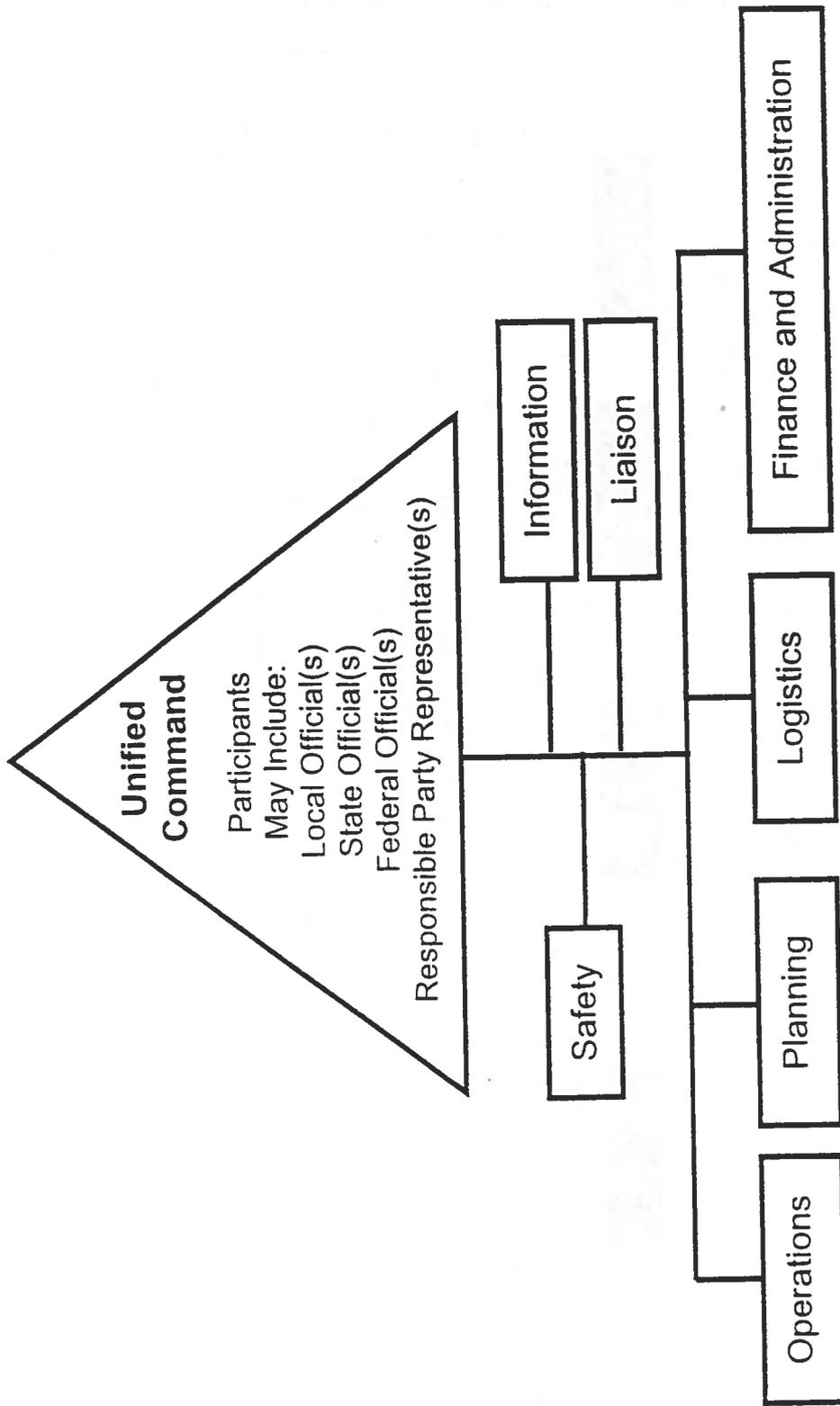


**Appendix D: Incident Command System / Unified Command Structure and  
Technical Assistance Document**

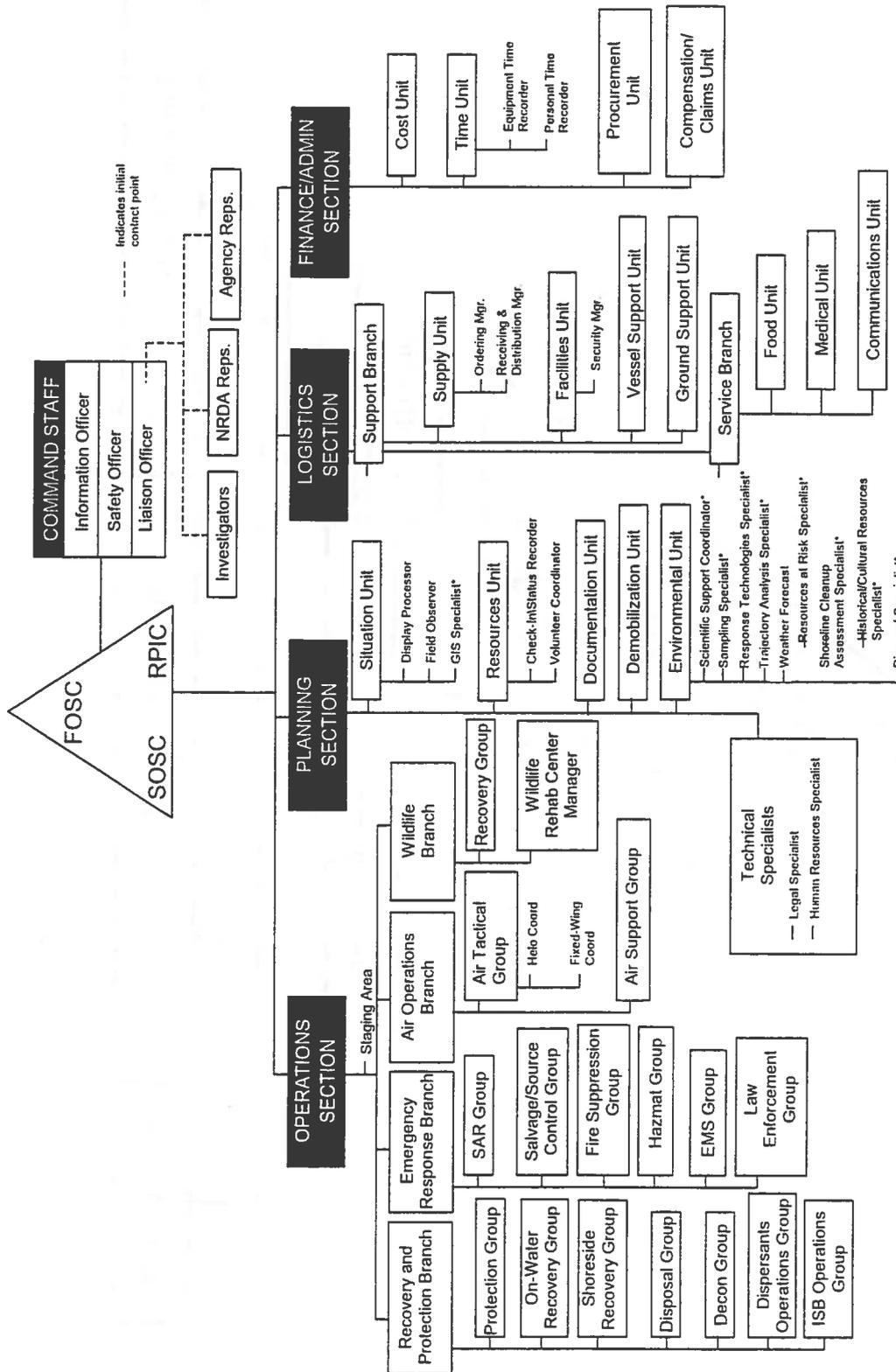
THE UNIVERSITY OF CHICAGO

1964

**Figure 2 — Relationship between ICS and UC**



EXAMPLE RESPONSE ORGANIZATION



\* Possible Assignment of Technical Specialists



## *Incident Command System/ Unified Command (ICS/UC)*

### *Technical Assistance Document*

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## ACKNOWLEDGMENTS

This document is a product of the U. S. National Response Team (NRT), the organization of 16 federal agencies responsible for national planning and coordination of oil and hazardous substance emergency preparedness and response. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP)<sup>1</sup> establishes the roles and responsibilities of the NRT and the Regional Response Team (RRTs). The NCP implements legislative authorities including the Clean Water Act<sup>2</sup> (CWA), as amended by the Oil Pollution Act of 1990 (OPA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)<sup>3</sup>; and the Emergency Planning and Community Right-to-Know Act (EPCRA) or Title III of the Superfund Amendments and Reauthorization Act [SARA]<sup>4</sup>). The NRT is chaired by the U.S. Environmental Protection Agency (EPA), and the U.S. Coast Guard (USCG) serves as Vice Chair. The RRTs are co-chaired by EPA and USCG.

The NRT acknowledges the federal agencies participating in the NRT, and state and federal agencies participating on the RRTs, for their contributions in preparing this document. We invite your comments or concerns on the usefulness of this document in planning for responses to oil discharges or hazardous substance releases. Please send your comments to:

U.S. National Response Team  
NRT Response Committee  
U.S. Environmental Protection Agency  
(Mail Code 5104A)  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20460

U.S. National Response Team Member Agencies:

**Chair:** U.S. Environmental Protection Agency  
**Vice Chair:** U.S. Coast Guard

U.S. Department of Agriculture	U.S. Department of Labor
U.S. Department of Commerce	U.S. Department of State
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U.S. Department of Health and Human Services	U.S. General Services Administration
U.S. Department of the Interior	U.S. Nuclear Regulatory Commission
U.S. Department of Justice	U.S. Department of Transportation

For more information on the NRT, please visit [www.nrt.org](http://www.nrt.org)

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<sup>1</sup> 40 CFR part 300

<sup>2</sup> 33 U.S.C. § 1251 et seq.

<sup>3</sup> 42 U.S.C. § 9601 et seq.

<sup>4</sup> 42 U.S.C. § 11002 et seq.

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## DOCUMENT PURPOSE AND ORGANIZATION

The purpose of this U.S. National Response Team (NRT) technical assistance document is to provide guidance to all responders who are part of the National Response System (NRS) on the organizational management concept of an Incident Command System (ICS) led by a Unified Command (UC) for emergency response.<sup>5</sup> The NRT and Regional Response Team (RRTs) hope that this document will:

- ◆ Increase awareness of ICS/UC;
- ◆ Improve coordination among responders during responses and exercises;
- ◆ Encourage interagency training programs;
- ◆ Encourage development of a common language and response culture among all response agencies; and
- ◆ Help members of the NRS achieve consistent, effective, and efficient responses.

This document updates the *ICS/UC Technical Assistance Document* published by the NRT in 1996. It highlights the issues and lessons learned identified by NRT member agencies that have arisen through responses to major incidents throughout the U.S. since the 1996 document was completed. It also provides guidance that should lead to more effective and efficient responses under the NRS. Issues and lessons learned include:

- ICS is flexible and should be viewed as a response tool, not a response rule;
- ICS application will vary depending on the needs of the incident;
- One individual can fill multiple ICS functions;
- ICS administration should not detract from response efforts;
- UC members should possess response decision-making authority;
- Planning for and exercising ICS/UC is critical to its success;
- The Liaison Officer can play a key role in interfacing with criminal investigators;
- The RRT is a valuable resource to obtain consensus when the UC cannot; and
- Local government responders are key participants in establishing ICS/UC.

The NRT believes that clarifying and promoting the use of ICS will join local, state, and federal response efforts - through common structures, training, and joint exercises - that will continue to make safer and more effective incident response. The NRT plans to update this technical assistance document periodically to reflect the evolving use of an ICS led by a UC.

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<sup>5</sup> This document is available on the NRT's web site at [www.nrt.org](http://www.nrt.org).

For the purposes of this document On-Scene Coordinator (OSC) means federal On-Scene Coordinator (FOSC) unless otherwise specified.

Note: This document is intended solely as guidance and was designed to provide technical assistance from the NRT on management of responses to releases of hazardous substances, pollutants, or contaminants, or discharges of oils (or threats of either). This document does not impose any legal obligations or duties on any party. This document does not supersede the NCP or any regulations issued by Federal agencies.

## 1. INTRODUCTION: ICS/UC AND THE NRS

Managing a major response – especially a complex, multi-jurisdictional response – is one of the most important challenges facing the National Response System (NRS). Effective coordination among local, state, and federal responders at the scene of a response is a key factor in ensuring successful responses to major incidents. An Incident Command System/Unified Command (ICS/UC) is an efficient on-site tool to manage all emergency response incidents, and UC is a necessary tool for managing multi-jurisdictional responses to oil spills or hazardous substance releases. Understanding the concepts of ICS/UC is as important for local responders, who generally arrive on-scene first and thus are most likely to implement the management system, as it is for state and Federal organizations that may be joining the ICS/UC.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that the NRS functions as an ICS under the direction of the On-Scene Coordinator (OSC).<sup>6</sup> The NCP also states that the basic framework for the NRS response management structure is a system (e.g., a unified command system) that brings together the functions of the local government, state government, federal government, and the Responsible Party (RP) to achieve an effective and efficient response.<sup>7</sup> In addition, the Hazardous Waste Operations and Emergency Response (HAZWOPER) standards include the Incident Command System for emergency response.<sup>8</sup>

When planned for and practiced, ICS/UC is viewed as the most effective response management system to address discharges or releases. As a result, the U.S. National Response Team (NRT) and Regional Response Teams (RRTs) endorse the use of ICS/UC and hope that this document helps the entire response community understand the basic concepts of ICS/UC. ICS/UC is an integrated and flexible structure that emphasizes cooperation and coordination in local, state, and federal responses to complex multi-jurisdictional, multi-agency incidents. This structure is necessary to use resources effectively – whether the resource comes from the parties responsible for the release or discharge, the NRT and RRT federal agencies, or the affected local governments and states. Although ICS/UC was originally developed for multi-jurisdictional incidents, the NRT advocates ICS/UC as an effective tool for managing both large and small incidents, especially those involving hazardous substance releases or oil spills.

### **ICS: An Effective System**

The U.S. Department of Transportation, the U.S. Department of the Interior, and the U.S. Environmental Protection Agency issued the National Preparedness for Response Exercise Program guidelines describing ICS as “the system to achieve the coordination necessary to carry out an effective and efficient response.”

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<sup>6</sup> Appendix E to part 300. “Oil Spill Response.”

<sup>7</sup> Title 40 CFR 300.105(d).

<sup>8</sup> Title 29 CFR 1910.120 and 29 CFR 1926.65 for OSHA and 40 CFR 311 for EPA.

## 2. WHAT IS ICS/UC?

### 2.1 What is an Incident Command System?

ICS is a standardized on-scene incident management concept designed specifically to allow responders to adopt an integrated organizational structure equal to the complexity and demands of any single incident or multiple incidents without being hindered by jurisdictional boundaries.

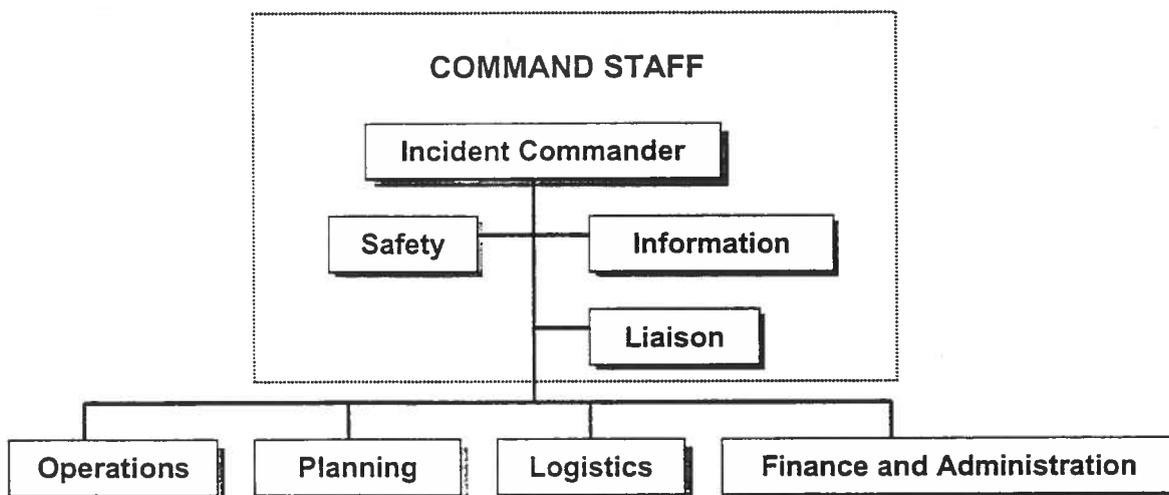
In the early 1970s, ICS was developed to manage rapidly moving wildfires and to address the following problems:

- Too many people reporting to one supervisor;
- Different emergency response organizational structures;
- Lack of reliable incident information;
- Inadequate and incompatible communications;
- Lack of structure for coordinated planning among agencies;
- Unclear lines of authority;
- Terminology differences among agencies; and
- Unclear or unspecified incident objectives.

In 1980, federal officials transitioned ICS into a national program called the National Interagency Incident Management System (NIIMS), which became the basis of a response management system for all federal agencies with wildfire management responsibilities. Since then, many federal agencies have endorsed the use of ICS, and several have mandated its use.

An ICS enables integrated communication and planning by establishing a manageable span of control. An ICS divides an emergency response into five manageable functions essential for emergency response operations: Command, Operations, Planning, Logistics, and Finance and Administration. Figure 1 below shows a typical ICS structure.

Figure 1 — Incident Command System Structure



The following is a list of the duties generally associated with each ICS function.<sup>9</sup>

- The **Incident Commander (IC)** or the **Unified Command (UC)** is responsible for all aspects of the response, including developing incident objectives and managing all incident operations.
- The **Command Staff** is responsible for public affairs, health and safety, and liaison activities within the incident command structure. The IC/UC remains responsible for these activities or may assign individuals to carry out these responsibilities and report directly to the IC/UC.

- The **Information Officer's** role is to develop and release information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations.
- The **Liaison Officer's** role is to serve as the point of contact for assisting and coordinating activities between the IC/UC and various agencies and groups. This may include Congressional personnel, local government officials, and criminal investigating organizations and investigators arriving on the scene.
- The **Safety Officer's** role is to develop and recommend measures to the IC/UC for assuring personnel health and safety and to assess and/or anticipate hazardous and unsafe situations. The Safety Officer also develops the Site Safety Plan, reviews the Incident Action Plan for safety implications, and provides timely, complete, specific, and accurate assessment of hazards and required controls.

#### **Incident Commander**

The IC is faced with many responsibilities when he/she arrives on scene. Unless specifically assigned to another member of the Command or General Staffs, these responsibilities remain with the IC. Some of the more complex responsibilities include:

- Establish immediate priorities especially the safety of responders, other emergency workers, bystanders, and people involved in the incident
- Stabilize the incident by ensuring life safety and managing resources efficiently and cost effectively.
- Determine incident objectives and strategy to achieve the objectives.
- Establish and monitor incident organization.
- Approve the implementation of the written or oral Incident Action Plan.
- Ensure adequate health and safety measures are in place.

- The **General Staff** includes **Operations, Planning, Logistics, and Finance/Administrative** responsibilities. These responsibilities remain with the IC until they are assigned to another individual. When the Operations, Planning, Logistics or Finance/Administrative responsibilities are established as separate functions under the IC, they are managed by a section chief and can be supported by other functional units.
  - The **Operations Staff** is responsible for all operations directly applicable to the primary mission of the response.
  - The **Planning Staff** is responsible for collecting, evaluating, and disseminating the tactical information related to the incident, and for preparing and documenting Incident Action Plans (IAPs).
  - The **Logistics Staff** is responsible for providing facilities, services, and materials for the incident response.

<sup>10</sup> See Appendix A for more information about the five sections of an ICS.

- The **Finance and Administrative** Staff is responsible for all financial, administrative, and cost analysis aspects of the incident.

The following is a list of Command Staff and General Staff responsibilities that either the IC or UC (see Section 2.2) of any response should perform or assign to appropriate members of the Command or General Staffs:

- ◆ Provide response direction;
- ◆ Coordinate effective communication;
- ◆ Coordinate resources;
- ◆ Establish incident priorities;
- ◆ Develop mutually agreed-upon incident objectives and approve response strategies;
- ◆ Assign objectives to the response structure;
- ◆ Review and approve IAPs;
- ◆ Ensure integration of response organizations into the ICS/UC;
- ◆ Establish protocols;
- ◆ Ensure worker and public health and safety; and
- ◆ Inform the media.

The modular organization of the ICS allows responders to scale their efforts and apply the parts of the ICS structure that best meet the demands of the incident. In other words, there are no hard and fast rules for when or how to expand the ICS organization. Many incidents will never require the activation of Planning, Logistics, or Finance/Administration Sections, while others will require some or all of them to be established. A major advantage of the ICS organization is the ability to fill only those parts of the organization that are required. For some incidents, and in some applications, only a few of the organization's functional elements may be required. However, if there is a need to expand the organization, additional positions exist within the ICS framework to meet virtually any need. For example, in responses involving responders from a single jurisdiction, the ICS establishes an organization for comprehensive response management. However, when an incident involves more than one agency or jurisdiction, responders can expand the ICS framework to address a multi-jurisdictional incident.

The roles of the ICS participants will also vary depending on the incident and may even vary during the same incident. Staffing considerations are always based on the needs of the incident. The number of personnel and the organization structure are totally dependent on the size and complexity of the incident. There is no absolute standard to follow. However, large-scale incidents will usually require that each component, or section, is set up separately with different staff members managing each section. A basic operating guideline is that the Incident Commander is responsible for all activities until command authority is transferred to another person.

Another key aspect of an ICS that warrants mention is the development of an IAP. A planning cycle is typically established by the Incident Commander and Planning Section Chief, and an IAP is then developed by the Planning Section for the next operational period (usually 12- or 24-hours in length) and submitted to the Incident Commander for approval. Creation of a planning cycle and development of an IAP for a particular operational period help focus available resources on the highest priorities/incident objectives. The planning cycle, if properly practiced, brings together everyone's input and identifies critical shortfalls that need to be addressed to carry out the Incident Commander's objectives for that period.

## 2.2 What is a Unified Command?

Although a single Incident Commander normally handles the command function, an ICS organization may be expanded into a Unified Command (UC). The UC is a structure that brings together the "Incident Commanders" of all major organizations involved in the incident in order to coordinate an effective response while at the same time carrying out their own jurisdictional responsibilities. The UC links the organizations responding to the incident and provides a forum for these entities to make consensus decisions. Under the UC, the various jurisdictions and/or agencies and non-government responders may blend together throughout the operation to create an integrated response team.

The UC is responsible for overall management of the incident. The UC directs incident activities, including development and implementation of overall objectives and strategies, and approves ordering and releasing of resources. Members of the UC work together to develop a common set of incident objectives and strategies, share information, maximize the use of available resources, and enhance the efficiency of the individual response organizations.

### 2.2.1 *When should a UC be used?*

The UC may be used whenever multiple jurisdictions are involved in a response effort. These jurisdictions could be represented by:

- Geographic boundaries (e.g., two states, Indian Tribal Land);
- Governmental levels (e.g., local, state, federal);
- Functional responsibilities (e.g., fire fighting, oil spill, Emergency Medical Services (EMS));
- Statutory responsibilities (e.g., federal land or resource managers, responsible party under OPA or CERCLA); or
- Some combination of the above.

### 2.2.2 *Who is in a UC?*

Actual UC makeup for a specific incident will be determined on a case-by-case basis taking into account: (1) the specifics of the incident; (2) determinations outlined in existing response plans; or (3) decisions reached during the initial meeting of the UC. The makeup of the UC may change as an incident progresses, in order to account for changes in the situation. The UC is a team effort, but to be effective, the number of personnel should be kept as small as possible.

Frequently, the first responders to arrive at the scene of an incident are emergency response personnel from local fire and police departments. The majority of local responders are familiar with NIIMS ICS and are likely to establish one immediately. As local, state, federal, and private party responders arrive on-scene for multi-jurisdictional incidents, responders would integrate into the ICS organization and establish a UC to direct the expanded organization. Although the role of local and state responders can vary depending on state laws and practices, local responders will usually be part of the ICS/UC.

Members in the UC have decision-making authority for the response. To be considered for inclusion as a UC representative, the representative's organization must:

- Have jurisdictional authority or functional responsibility under a law or ordinance for the incident;

- Have an area of responsibility that is affected by the incident or response operations;
- Be specifically charged with commanding, coordinating, or managing a major aspect of the response; and
- Have the resources to support participation in the response organization.

In addition, UC representatives must also be able to:

- Agree on common incident objectives and priorities;
- Have the capability to sustain a 24-hour-a-day, 7-day-a-week commitment to the incident;
- Have the authority to commit agency or company resources to the incident;
- Have the authority to spend agency or company funds;
- Agree on an incident response organization;
- Agree on the appropriate Command and General Staff position assignments to ensure clear direction for on-scene tactical resources;
- Commit to speak with “one voice” through the Information Officer or Joint Information Center (JIC), if established;
- Agree on logistical support procedures; and
- Agree on cost-sharing procedures, as appropriate.

UC members bring their authorities to the UC, as well as the resources to carry out their responsibilities. The UC members may change as the response transitions out of emergency response and into long-term cleanup. Members in a UC have a responsibility to the UC, and also to their agency or organization. These individuals in the response management system do not relinquish agency authority, responsibility, or accountability. The addition of a UC to the ICS enables responders to carry out their own responsibilities while working cooperatively within one response management system. Under the NCP, the UC may consist of a pre-designated OSC, the state OSC, the Incident Commander for the RP, and the local emergency response Incident Commander.

Generally, for spills on federal lands or resources, federal land and resource managers have authorities and responsibilities comparable to those of local and state responders and federally recognized Indian tribes. For this reason, federal land and resource managers should be invited to participate in the UC for spills on federal lands and resources under their control. Similarly, for incidents on tribal lands of federally recognized Indian tribes, a representative from the Indian tribe must be invited to participate in the UC.

### *2.2.3 How does the UC make decisions?*

The UC is not “decision by committee.” The principals are there to command the response to an incident. Time is of the essence. The UC should develop synergy based on the significant capabilities that are brought by the various representatives. There should be personal acknowledgement of each representative's unique capabilities, a shared understanding of the situation, and agreement on the common objectives. With the different perspectives on the UC comes the risk of disagreements, most of which can be resolved through an understanding of the underlying issues.

Contentious issues may arise, but the UC framework provides a forum and a process to resolve problems and find solutions. If situations arise where members of the UC cannot reach consensus, the UC member representing the agency with primary jurisdiction over the issue would normally be deferred to for the final decision. If this approach does not work, the RRT may be called on to serve as a forum where differences can be thoroughly discussed and to assist in resolving the disagreement.

The bottom line is that the UC has certain responsibilities as noted above. Failure to provide clear objectives for the next operational period means that the Command function has failed. While the UC structure is an excellent vehicle (and the only nationally recognized vehicle) for coordination, cooperation, and communication, the duly authorized representatives must make the system work successfully. A strong Command – a single Incident Commander or a UC – is essential to an effective response.

Each UC member may assign Deputy Incident Commander(s) to assist in carrying out Incident Commander responsibilities. UC members may also be assigned individual legal and administrative support from their own organizations.

#### *2.2.4 What if your agency is not a part of the UC?*

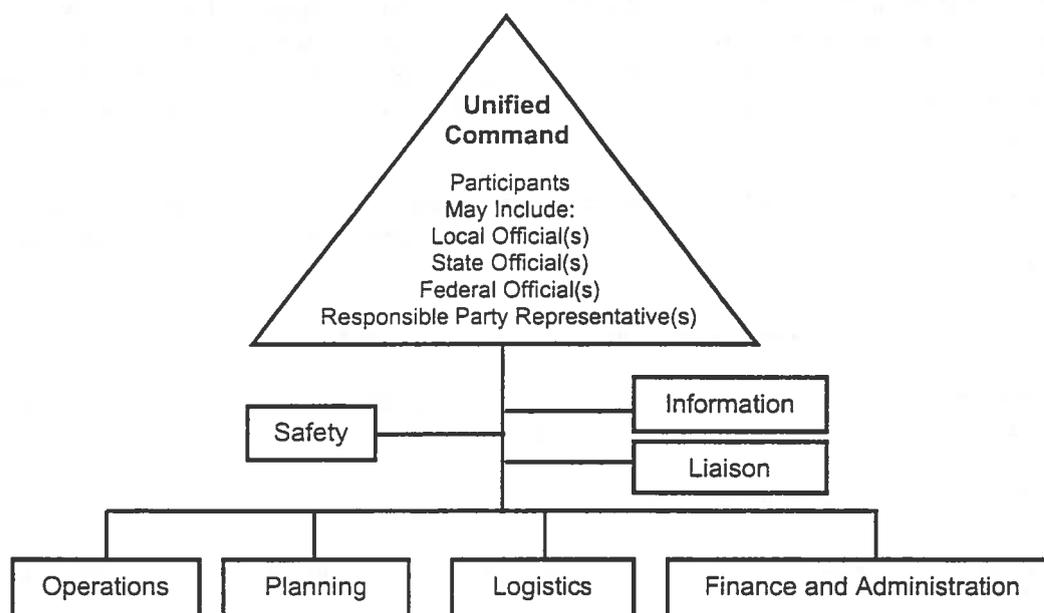
To ensure that your organization's concerns or issues are addressed if your agency is not represented within the UC, your organization should assign representatives to:

- Serve as an agency or company representative;
- Provide input to your agency or company representative, who has direct contact with the Liaison Officer;
- Provide stakeholder input to the Liaison Officer (for environmental, economic, or political issues);
- Serve as a Technical Specialist in the appropriate section; and/or
- Provide input to a UC member.

#### **2.3 What is the Relationship between an ICS and a UC?**

An ICS may be expanded to include a UC for complex responses, which often require multi-agency resources from the local, state, and federal levels. When it becomes necessary to establish a UC, the UC replaces the Incident Commander function and becomes an essential component of an ICS. In this way, the UC provides the organizational management tool to facilitate and coordinate the effective involvement of the various agencies; it creates the link between the organizations responding to the incident and provides a forum for these agencies to make decisions with which all responders can agree. Figure 2 on the next page shows the relationship between a UC and an ICS.

Figure 2 — Relationship between ICS and UC



The decision to include a UC will be based in large part upon the level of the response and the need for additional resources to respond effectively. It is important to remember that ICS/UC should be viewed as a response tool, not a response rule. The ICS/UC organization adheres to a “form follows function” philosophy. In other words, the organization at any given time should reflect only what is required to meet planned tactical objectives. Similarly, while an ICS will generally include the components identified in Figure 2, the ICS/UC response management structure does not attempt to prescribe a specific item-by-item functional description of where particular organizations or individuals fit within a single response structure for a given response. Along those lines, the establishment and administration of an ICS/UC should never detract from response efforts. In the early stages of a response, it may be necessary to commit the limited number of response personnel to field operations and scale back less critical ICS/UC administration procedures until more assets and resources become available.

Ideally, an ICS/UC should allow for information sharing both horizontally and vertically throughout the response organization, allowing a multi-jurisdictional response to be conducted effectively. However, horizontal and vertical information-sharing does not always work, because although the UC integrates different parties, the parties are not always integrated below the UC. This problem has surfaced in exercises and incidents. For example, although an RP is in the UC, the RP may not necessarily be involved in the ICS sections (e.g., Planning and Operations). The decision to include the RP in the UC may, in part, depend on its relationship with the members of the ICS. For ICS/UC to work effectively, all parties participating in the response need to be integrated throughout the response, not just in the UC. However, this does not mean that each agency should have representatives in each section, only that the responders need to be working together within and throughout the sections.

Furthermore, in many responses, incident-specific issues emerge that have a tendency to dominate the response effort and have a large effect on its eventual outcome. These aspects of a response could include salvage operations, criminal investigations, responder safety, etc. In situations such as these, the ICS must be flexible enough to allow these concerns to be addressed at the appropriate functional level and create an open dialogue between the UC and the section/branch that is handling the issue. For example,

when salvage issues become the focal point of a response effort, it is important that the UC have access to correct salvage support and information.

### *2.3.1 What are the Advantages of an ICS/UC?<sup>10</sup>*

An ICS led by a UC has been used to manage local, state, and federal responses to complex multi-agency, multi-jurisdictional incidents. The following is a list of the advantages of an ICS/UC:

- ◆ Uses a common language and response culture;
- ◆ Optimizes combined efforts;
- ◆ Eliminates duplicative efforts;
- ◆ Establishes a single command post;
- ◆ Allows for collective approval of operations, logistics, planning, and finance activities;
- ◆ Encourages a cooperative response environment;
- ◆ Allows for shared facilities, reducing response costs, maximizing efficiency, and minimizing communication breakdowns; and
- ◆ Permits responders to develop and implement one consolidated IAP.

#### **ICS/UC and Weapons of Mass Destruction (WMD)**

In May 2000, several NRT member agencies participated in a major WMD exercise, called TOPOFF (Top Officials). TOPOFF was designed to assess the nation's crisis and consequence management capabilities to respond to geographically dispersed terrorist threats and acts.

The advantages of using ICS/UC at the incident site were evident during this complex, multi-agency, multi-jurisdictional exercise. As a result, the NRT recommended to Congress via the Department of Justice Exercise Observation Report that the federal government should adopt the NIIMS ICS/UC system as the standard response management system at incident sites, including WMD incidents.

The ICS/UC structure outlines responsibilities and functions, thereby reducing potential conflicts, and improving information flow among all participating organizations. The ICS maintains its modular organizational structure, so that none of the advantages of the ICS are lost by the introduction of a UC.

### **3. HOW DO RESPONDERS PREPARE FOR ICS/UC IMPLEMENTATION?**

The key to successful implementation of an ICS/UC is planning and exercising at the regional and area levels. Practice using an ICS/UC prior to an incident will help responders understand their roles and responsibilities and prepared them to work together in the ICS. According to the NCP, the area contingency planning process, which brings together appropriate representatives from local, state, and federal agencies to enhance contingency planning, is the forum for working out the details of how the ICS will be applied in each area. When responders understand each other's roles and responsibilities and have a plan for working together, they are more likely to be able to reach consensus on response strategies and tactics. The OSC and the Area Committee are responsible for developing, adopting, and implementing a response management system, such as ICS/UC, through the Area Contingency Plan (ACP). Use of a NIIMS-based ICS/UC as the model for response management in the ACP can be helpful in ensuring an effective response.

To be most effective, there are four keys to implementing an ICS with a UC.<sup>11</sup>

<sup>10</sup> Texas General Land Office. Oil Spill Prevention and Response Division. "ICS Unified Command" video. 1995.

<sup>11</sup> Ibid.

**Learn.** The NRT encourages all responders to learn ICS/UC. The better it is understood, and the more familiar it is, the easier it will be to form a common structure when demanded by an incident.

**Plan.** How the ICS/UC will be implemented in varying situations should be decided well in advance of an incident. The ACP process should be used to identify roles and responsibilities of the various participants during different response scenarios.

**Start early.** As soon as two organizations are determined to have responsibility for, or in, a response, an ICS/UC should be implemented.

**Practice.** Periodic training and drills are crucial to providing training and role-playing opportunities. To maintain proficiency, using ICS on smaller spills and non-spill events should be considered. Planners and responders at all levels need to understand the authorities and resources each response organization brings to a specific incident. When plans and procedures are understood, agencies can support each other effectively. However, each response results in new lessons learned, which necessitates continuing refinement of the procedures and processes, development of better methods, and meshing of agency needs and actions.

**Memoranda of Agreement (MOA): Effective Planning Tools to Implement a Successful ICS/UC**

Using a unique approach to ensure coordination and cooperation at the scene of an incident, the State of Wisconsin Department of Natural Resources (DNR) established an MOA with EPA Region V and the USCG 9<sup>th</sup> District for emergency response to discharges of oil and releases of hazardous substances occurring within their jurisdictions. The MOA acknowledges the respective authorities of local, state, and federal responders and stresses the importance of including local authorities in the UC. The MOA also advocates that roles and responsibilities of all involved parties be clearly defined well in advance of an incident by using the area, state, and regional contingency planning processes.

Because most responses that require an ICS with a UC will be multi-agency and may be multi-jurisdictional, all participating organizations must understand the complexities of coordination. The question is not “Who is in charge?” but “How can all responders work together for the best results?” The goal of an ICS is to enhance response efficiency by eliminating duplication of effort and lessening response time – and consequently response costs. The best way to reduce confusion and conflict is to anticipate problems and develop possible solutions. This requires scenario-based planning and exercises with constant communications and coordination among all participants, working together as a team.

The following is a list of elements that should be in place and documented in relevant plans well before an incident occurs for an ICS/UC to be effective:

- The structure must be formalized and accepted by all parties concerned;
- Specific ICS functions and responsibilities must be well defined;
- Individuals must be designated for each function and the reporting mechanisms defined and accepted. However, it is important to note that the scope and complexity of the incident will determine the extent of the organizational positions actually staffed;
- Establish a methodology for developing an Incident Action Plan (IAP) and Site Safety Plan;<sup>12</sup>
- The participating organizations must make a committed effort to respond as a team;<sup>13</sup>

<sup>12</sup> Title 40 CFR 300.150(a)

<sup>13</sup> Texas General Land Office. Oil Spill Prevention and Response Division. “ICS Unified Command” video, 1995.

- Contingency plans (including ACPs, facility and vessel response plans, and local emergency response plans) must address training and ensure familiarity with an ICS/UC;
- Relationships and interactions with entities outside the ICS but relevant to the NRS (e.g., RRT, natural resource trustees<sup>14</sup>) must be defined.

Each ACP should fully address and describe key organizational components of the NRS, such as the role of the RRT. Under OPA, the Area Committees are required to include local and state governments in the planning process and are encouraged to invite the private sector to participate. Because key participants differ from area to area, however, Area Committees must have flexibility to adapt the ICS/UC to be effective in each specific area.

The following items should be considered when developing ACPs particularly when considering the implementation of ICS:

- ◆ Jurisdictional responsibilities;
- ◆ Roles of all levels of government in the UC (e.g., local, state, and federal);
- ◆ Existing local, state, and federal laws, regulations, policies, and procedures;
- ◆ Financial agreements;
- ◆ Information dissemination;
- ◆ Communications;
- ◆ Training and exercising;
- ◆ Logistics;
- ◆ Potentially responsible parties;
- ◆ Response organization;
- ◆ NRS organizational components; and
- ◆ Lessons learned.

The ICS as described in the ACP should be sufficient to assist the OSC in directing, monitoring, and coordinating response efforts. Assuming that a significant discharge will tax and possibly overwhelm EPA, USCG, or other federal agency personnel in the region(s) in which the incident occurs, the ACP should plan to fully integrate other response resources into the ICS. In addition, the ACP should include a specialized “ICS expansion plan” that covers drastic changes in the size and/or scope of the response effort.

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<sup>14</sup> Section 107(f)(2) of CERCLA (as amended by section 1006 of OPA) authorize state, federal, and Indian tribal trustees to act on behalf of the public to present a claim for and recover damages to natural resources injured by an oil spill or hazardous substance release. As part of this process, the natural resource trustees may conduct a natural resource damage assessment (NRDA), which can involve some data collection during emergency response. Section 300.135(j)(2) of the NCP requires the OSC to “coordinate all response activities with the affected natural resource trustees and, for discharges of oil...consult with the affected trustees on the appropriate removal action to be taken.” The NCP also calls for the trustees to designate a lead administrative trustee to ensure coordination between response and NRDA activities. Thus, although NRDA activities are not carried out under the direction of the OSC, a means of coordination between the OSC and the trustees needs to be established as part of pre-incident planning. For more information about natural resources trustees and ICS/UC, see the NRT fact sheet titled, “Federal Natural Resource Trustees and the ICS/UC,” available on the NRT web site at <http://www.nrt.org>.

### **3.1 What Are the OSC's Planning Roles and Responsibilities?**

Under the NCP, OSCs have the responsibility to oversee development of the ACP in the area of the OSC's responsibility. The NCP states that the development of ACPs should be accomplished in cooperation with the RRT, and designated local and state representatives, as appropriate.<sup>15</sup> In both contingency planning and spill response, the OSC is responsible for coordinating, directing, and reviewing the work of other agencies, Area Committees, RPs, and contractors to ensure compliance with the NCP and other plans applicable to the response.<sup>16</sup>

In developing the ACP, the OSC must coordinate with state and local response organizations, including those represented on the State Emergency Response Commissions (SERCs) and Local Emergency Planning Committees (LEPCs).<sup>17</sup> It is the OSC's and Area Committee's responsibility to ensure that the ACP provides for a well coordinated response that is integrated and compatible, to the greatest extent possible, with all appropriate response plans of local, state, and non-federal entities, and especially with SARA Title III local emergency response plans. The OSC should also include, to the extent possible, a discussion of relationships with potential RPs. In addition, the OSC must periodically conduct drills of spill removal capability, including fish and wildlife response capability, without prior notice, in areas for which ACPs are required and under relevant tank vessel and facility response plans.<sup>18</sup> In the event of a significant discharge, OSCs should implement the ICS specified in the ACP.

### **3.2 What Are the RRT's Planning Roles and Responsibilities?**

As outlined in § 300.115 of the NCP, regional planning and coordination of preparedness and response actions are accomplished through the RRT. The RRT agency membership parallels that of the NRT, but also includes state and local representation. The RRT provides the appropriate regional mechanism for development and coordination of preparedness activities before a response action is taken and for coordination of assistance and advice to the OSC during response actions. As appropriate, the RRT also provides guidance to Area Committees to ensure inter-area consistency and consistency of individual ACPs with the Regional Contingency Plan and the NCP.

The two principal components of the RRT mechanism are a standing team and an incident-specific team. (See Chapter 4 for more information about the incident-specific RRT.)<sup>19</sup> The standing team consists of designated representatives from each participating local and state government and federal agency. There are 13 standing RRTs, one for each of ten federal regions, and additional RRTs for Alaska, the Caribbean, and the Pacific Basin. The role of the standing RRT includes providing regional access to communications systems and procedures, planning, coordination, training, and evaluation. It also includes coordination of Area Committees for these functions in areas within their respective regions, as appropriate.

## **4. HOW DO RESPONDERS IMPLEMENT ICS/UC DURING AN INCIDENT?**

### **4.1 What Are the OSC's Response Roles and Responsibilities?**

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<sup>15</sup> Title 40 CFR 300.120(e).

<sup>16</sup> Ibid.

<sup>17</sup> Title 40 CFR 300.210.

<sup>18</sup> Title 40 CFR 300.212.

<sup>19</sup> For more information on the RRT, please see the "Role of the RRT Factsheet," which can be found at [www.nrt.org](http://www.nrt.org).

The use of the ICS/UC as a management tool does not relieve the OSC of her or his obligation to direct, monitor, and coordinate response actions. The OSC in every case retains the authority to direct the response, and must direct responses to discharges of oil that pose a substantial threat to the public health or welfare of the United States. In most situations, however, the OSC will choose to monitor the actions of the RP and/or local and state governments and provide support and advice where appropriate. It is the OSC's responsibility to explain the OSC's authority at a response during both the planning and response phases. The ICS/UC also is a useful mechanism in obtaining input from other responders to help the OSC in directing and coordinating response efforts.

The OSC should either implement an ICS at the beginning of a response, or be prepared to integrate into an existing, properly functioning, ICS during a response. It is important to recognize that local and/or state responders may already have established an ICS when the OSC arrives on-scene. In many cases, the OSC will fill multiple positions within the ICS organization. An OSC also may elect to establish any of the functions of an ICS by assigning responsibility to another individual.

#### **4.2 What Takes Place in the Initial UC Meeting?**

Open and early discussion among members of the UC is critical to ensuring effective implementation of the NRS and use of the ICS/UC when an incident occurs and plans need to be implemented. The establishment of a UC must begin with an initial meeting of the incident commanders and their staffs from each of the involved jurisdictions. During this meeting – which should be brief – the incident commanders must come to consensus on priorities, a collective set of incident objectives, an overall strategy, and selection of a UC spokesperson before they can effectively work together to carry out the response.

The initial meeting also will provide an opportunity for the incident commanders to establish a Joint Information Center (JIC), as needed.<sup>20</sup> In addition, if not established in pre-planning activities, the incident commanders must use the initial meeting as an opportunity to determine the appropriate roles and responsibilities of all representatives involved in the ICS (e.g., local and state governments, and the RP). This conversation will help establish the membership of the UC.

Effective planning can facilitate assembly and conduct of the initial UC meeting. The responsibilities discussed above should be preplanned to the greatest extent possible. Although an initial meeting is critical for ensuring the effective integration of all responders into the ICS/UC, the steps involved in the UC meeting (as identified below) may have to be revisited periodically as information on the incident or the demands of the incident change. These meetings will provide a private opportunity for the incident commanders to speak openly and honestly about their priorities, considerations, and concerns. However, once participants in the UC leave this meeting, they must speak with one voice.

##### **4.2.1 Step 1 – Set Priorities and Objectives**

For the UC to work, each participant must be committed to working together to solve a common problem. Each responding agency will have individual objectives to carry out. In addition, the primary objectives of each responding agency are established under the NCP as “national response priorities,” which state:<sup>21</sup>

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<sup>20</sup> The NRT has developed a generic JIC model that describes how to structure a JIC to conduct crisis communications during emergency responses and non-emergency events. To view or download an electronic copy of the JIC model, please visit [www.nrt.org](http://www.nrt.org).

<sup>21</sup> Title 40 CFR 300.317.

- Preserve the safety of human life;
- Stabilize the situation to prevent the event from worsening;
- Use all necessary containment and removal tactics in a coordinated manner to ensure a timely, effective response that minimizes adverse impacts to the environment; and
- Address all three of these priorities concurrently.

However, each responding entity will likely have other significant priorities requiring consideration, which might include the following factors:

- ◆ Maintaining business survival;
- ◆ Minimizing response costs;
- ◆ Maintaining or improving public image;
- ◆ Minimizing economic or tourism impacts;
- ◆ Minimizing environmental impacts;
- ◆ Evaluating prospects of criminal prosecution; and
- ◆ Meeting certain reasonable stakeholder expectations.

Understanding all the issues facing the UC participants is important in any negotiation. Because consensus must be reached for the UC to be effective, it is critical that the UC engage in coordination whenever necessary. If consensus cannot be reached, the RRT can be used as a forum for achieving consensus. The incident-specific RRT provides a mechanism for the OSC to seek assistance and conflict resolution from the leadership of his or her own agency, other federal agencies, and local and state governments. To do this, the RRT can convene either by telephone or in person.

#### **4.2.2 Step 2 – Present Considerations**

At the onset of the initial meeting, UC members have an obligation to raise and discuss honestly what each response organization can provide in terms of authorities, equipment, skills, and experience, including their response capabilities. All incident commanders must be free to speak openly with the other members of the UC about their constraints or limitations, whether practical or political in nature, because these constraints may have an impact on how the UC's objectives can best be achieved.

#### **4.2.3 Step 3 – Develop a Collective Set of Incident Objectives**

The planning process for the UC is similar to that used for a single jurisdiction or agency incident. However, because each agency will bring its own set of objectives and considerations to the response, the UC must decide upon a collective set of incident-specific objectives — to identify what the UC as a whole needs to accomplish — before an overall response strategy can be developed. To be effective, these objectives should be specific, measurable, assignable, reasonable, and time-related. The UC must come to consensus on a set of general objectives that can then be documented to provide focus for the response organization. This process includes establishing and agreeing upon acceptable priorities.

#### **4.2.4 Step 4 – Adopt an Overall Strategy**

Strategy is the development of policies and plans to achieve the objectives for a response. If the UC knows exactly how to accomplish an objective, it should specify the strategy. Because there are frequently multiple possible strategies that would accomplish the same objective, the UC staff will often ask the Planning Section to recommend strategies for later UC approval. This allows for better input and discussion from the responders, and also reduces meeting time for the incident commanders.

#### **4.2.5 Step 5 – Select a UC Spokesperson**

Frequently, the UC will establish a JIC and designate a single spokesperson. The spokesperson is typically a member of the UC, and serves as a point of contact and a single voice of the members of the incident management team at external and internal briefings. The spokesperson may change during the course of an incident as the situation develops. For example, a different agency may designate a spokesperson if it has more expertise in a particular area at a certain time. In addition, different departments within the same agency could designate a spokesperson at different times during the same incident, as appropriate.

### **5. CONCLUSION**

The ICS/UC is designed to be flexible in order to lend itself to integration at the decision-making and operational levels, and to expansion and contraction when needed. Complex and/or multi-jurisdictional incidents will call for an ICS led by a UC. A commitment to cooperation by all involved parties is necessary for the creation of an improved organizational and operational process.

ICS/UC is an important concept to practice as part of response exercises and include in local and area contingency plans. Such exercising and planning will facilitate coordination and cooperation between local, state, federal, and private party responders when the ICS/UC is implemented at an incident, and ensure that all responders are able to work together effectively to protect human health and the environment.

## **Appendix A: Key ICS Terms**

**COMMAND/INCIDENT COMMANDER** – The Command Function of an Incident Command System (ICS) is responsible for directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. The individual responsible for the overall management of the response is called the Incident Commander. For responses under the National Response System (NRS), the pre-designated On-Scene Coordinator (OSC) generally assumes the role of Incident Commander. The Command Function sets objectives and priorities and defines the ICS organization for the particular response. Even if other positions are not assigned, the Incident Commander will always be designated. In some instances, the Unified Command (UC) may designate a spill manager to direct the response and coordinate the activities of the functional managers. Depending on the magnitude, complexity, and impact of the discharge or release, the Command Function may be further divided in staff elements.

**COMMAND STAFF** – The OSC may appoint a person or persons to be in charge of specific staff functions including the Information, Safety, and Liaison functions. These tasks also may include spill management, public and Congressional affairs, media relations, and legal issues, among others. The members of the Command Staff report directly to the Incident Commander and will support, advise, and keep the other key functional managers informed.

The Incident Commander may appoint functional managers responsible for specific tasks (operations, planning, logistics, and finance and administration). These tasks remain the responsibility of the Incident Commander unless they are delegated to someone else. The tasks are as follows:

- ◆ **OPERATIONS** – Operations Staff direct tactical actions to meet incident objectives, administer staging areas, and identify and utilize resources.
- ◆ **PLANNING** – Planning Staff collect, evaluate, and display incident information; prepare an action plan and health and safety plan; evaluate disposal options; plan for demobilization; and maintain documentation.
- ◆ **LOGISTICS** – Logistics Staff provide adequate service and support to meet incident or event needs, including supplies, first aid, food, communications, ground support, and transportation and vehicle maintenance.
- ◆ **FINANCE/ADMINISTRATION** – Finance and Administration Staff track incident costs, personnel and equipment records, claims, and procurement contracts; and provide legal expertise.

**GENERAL STAFF** – The group of incident management personnel comprised of: the Incident Commander or Unified Command, the Operations Section Chief, the Planning Section Chief, the Logistics Section Chief, and the Finance/Administration Section Chief.

**INCIDENT ACTION PLAN (IAP)** – Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The Plan may have a number of forms as attachments (e.g., safety plan).

**JOINT INFORMATION CENTER (JIC)** – A facility established within or near the incident command post where the information officer and staff can coordinate and provide information on the incident to the public, media, and other agencies. The JIC is normally staffed with representatives from the federal OSC, state OSC, and RP.

**OPERATIONAL PERIOD** – The period of time scheduled for execution of a given set of operation actions as specified in the IAP. Operational Periods can be various lengths, usually not over 24 hours. The Operational Period coincides with the completion of one planning cycle.

**UNIFIED COMMAND (UC)** – A unified team that manages an incident by establishing a common set of incident objectives and strategies. This is accomplished without loss or abdication of agency or organizational authority, responsibility, or accountability.

## **Appendix B History of NRT Efforts in ICS/UC Implementation**

The first efforts by the NRT to address response management began following the *Exxon Valdez* oil spill in 1989. The spill was the largest in U.S. history and tested the abilities of the government and the private sector to respond to a disaster of such magnitude. Many factors, including the lack of an effective response management structure, complicated the cleanup efforts following the spill and tested existing response plans for dealing with such an event. These findings were made by the NRT in its report to the President of the United States, which was prepared in the weeks following the incident (see [www.nrt.org](http://www.nrt.org) for the complete report).

In the aftermath of the *Exxon Valdez* incident, Congress passed the Oil Pollution Act of 1990, which provided new requirements for contingency planning and called for revision of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR part 300). The NRT Report to the President on the *Exxon Valdez* oil spill identified several lessons learned that illustrated the need to promote the use of a clear response management system that utilized a "team approach." It called for a coordinated system that effectively utilizes the resources of local, state, and federal governments. It also recommended that the NCP be reviewed to "determine the most appropriate organizational structure for catastrophic spills." The NCP was subsequently revised to reinforce that "the basic framework for the response management structure is a system (e.g., a unified command system), that brings together the functions of the federal government, the state government, and the responsible party to achieve an effective and efficient response, where the OSC [On-Scene Coordinator] retains authority."

In addition to the lack of clear response management and command coordination, response assets (personnel and equipment) could not be effectively integrated into the response organization during the *Exxon Valdez* response because many of the participating response organizations utilized differing response structures or systems. Over time, the NRT came to advocate the National Interagency Incident Management System (NIIMS)-based ICS structure. This system, which consists of five functions (command, operations, planning, logistics, and finance/administration), was the response structure originally developed to combat wildfires at the local level. It has been increasingly accepted that the use of a NIIMS-based ICS together with UC can greatly improve response efforts.

The following examples cite the increasing acceptance and promotion of ICS/UC within NRT member agencies:

- ◆ The use of ICS/UC in response to the attacks on the World Trade Center and the assistance provided by NRT agencies.
- ◆ The USCG has adopted the National Interagency Incident Management (NIIMS) Incident Command System (ICS) as its standard response management system for all responses. To ensure that ICS was fully integrated into Coast Guard policy and doctrine an array of initiatives were undertaken: (1) the development of an implementation and training plan that set minimum training standards and a timeline for implementation of ICS; (2) a National Incident Command Protocol was established in the event an incident's size or complexity requires senior executive-level response coordination such as a Spill of National Significance; (3) two Incident Management Assist Teams were established to provide command and control surge capability to Coast Guard Incident Commanders; and, (4) a multi-contingency Incident Management Handbook was developed to provide ICS doctrine to field responders.

- ◆ EPA is in the process of implementing an agency-wide policy on ICS/UC, which states that an ICS/UC based on the concepts of NIIMS ICS is the preferred response management system for use by EPA in an emergency response to significant incidents, especially for complex, multi-agency incidents. EPA Regions have the flexibility to adopt those portions of NIIMS ICS or other response systems that are best suited to their Region when carrying out their responsibilities within the National Response System. The preferred response management system must be specified in the applicable Area Contingency Plan. EPA OSC are encouraged to integrate into any response management system, which is adequately addressing the major issues associated with discharges or releases. To fully implement the ICS/UC policy, EPA will (1) train its OSCs to an advanced level of NIIMS ICS, (2) ensure that regions and areas define their ICS/UC response management organization and incorporate it into their plans (e.g., Area Plans and Regional Contingency Plans), and (3) exercise the plans regularly to confirm the effectiveness of the response management system identified in the Regional plan along with other objectives.
- ◆ The United States Fire Administration (USFA), in conjunction with the Federal Emergency Management Agency (FEMA) and the Federal Bureau of Investigation (FBI), is developing a conference series for first responders on the application of ICS/UC.
- ◆ The Justice Department is preparing video tapes on ICS and UC to be distributed nationally to local responders.

#### *ICS/UC Products Developed by the NRT*

Following the completion of the first ICS/UC Technical Assistance Document published by the NRT in 1996, the NRT began developing several additional products to further elaborate on particular issues related to ICS/UC. Each of these products is available electronically at [www.nrt.org](http://www.nrt.org) and a summary of each is provided below:

- ◆ **ICS/UC PowerPoint Presentation** – this presentation was developed to introduce the concepts of ICS/UC, outline the assistance that can be provided by the federal On-Scene Coordinator, and provide an outreach tool to discuss multi-jurisdictional response.
- ◆ **Federal Natural Resource Trustees and the Incident Command System/Unified Command (ICS/UC)** – this fact sheet describes how federal natural resource trustees fit into ICS/UC; the resources and assistance Federal trustees can provide during response and preparedness activities; and where in ICS/UC the coordination link occurs between Federal trustee response and natural resource damage assessment (NRDA) activities. This includes appendices from the National Oceanic and Atmospheric Administration and the Department of the Interior addressing each agency's emergency response and NRDA activities, as well as resources for which each agency is responsible, authorities under which each operates programs relevant to response, and other relevant information.
- ◆ **ICS/UC Minimum Essential Training Elements** – this document identifies the minimum essential elements that should be considered in developing or evaluating ICS training for responders. Users should evaluate which of these elements are needed for their purposes. This document also contains a listing of NRT agencies and their policies regarding the use of an ICS and provides a compilation of sources of ICS training in the Federal government.
- ◆ **Joint Information Center (JIC) Model** - This model describes how to structure a JIC to conduct crisis communications during emergency responses and non-emergency events. This model is generic and can be adapted for use in a diverse range of responses likely to be performed by NRT member

agencies, ranging from a large multiple-agency, all-hazards response to a small single-agency, single-hazard response. This document is only available in Adobe PDF format.

- ◆ **NRT Training Recommendations on the Use of Incident Command System/Unified Command (ICS/UC) for Weapons of Mass Destruction (WMD) Incidents and Hazardous Materials Emergency Preparedness (HMEP) Grant Program Training Standards** – In October 2000, the NRT tasked the Training Subcommittee of the Preparedness Committee to begin efforts to assist local, state, and Federal responders to train, educate, advocate, and plan for the use of ICS/UC at response sites involving WMD. This action resulted from the NRT's recommendations to the Justice Department concerning lessons learned from Exercise TOPOFF 2000, the largest domestic counter-terrorism exercise in the U.S. to date. As a first step, the NRT has approved training recommendations on use of ICS/UC for WMD incidents. These recommendations will be included in the Special Topics section of the 2002 Hazardous Materials Emergency Preparedness (HMEP) Grant Program. The recommendations include:
  - The ICS/UC structure recommended by the NRT be used by response personnel when responding to hazmat incidents, oil spills, and intentional releases, including those involving the use of WMD;
  - Federal responder ICS/UC training programs be developed or adapted, and all federal personnel who may participate in the response to such incidents be required to take initial and annual refresher training course in ICS/UC; and
  - Agencies not using ICS/UC in their response efforts should nevertheless be trained in ICS/UC to ensure effective response coordination with those agencies that use ICS/UC.

## **Appendix C: ICS/UC at Work**

### **Section 1 – EPA Example of ICS/UC**

#### **U.S. EPA Region III Professional Food Systems Site Emergency Response Bedford, Bedford County, Virginia March 19 - 24, 2000**

#### **RESPONSE SUMMARY**

This summary of the response to the Professional Food Systems (PFS) release of anhydrous ammonia in the Bedford area of the Commonwealth of Virginia provides an example of successful and flexible use of an Incident Command System/Unified Command (ICS/UC) at a typical response.

PFS, the potentially responsible party (PRP), is located in an industrial park that lies within a half mile of a residential area. The release of anhydrous ammonia at the PFS site was the result of a leak in the check valve on an accumulator assembly of an anhydrous ammonia-based refrigeration system at the meat storage and processing facility. Approximately 4,000 - 5,000 pounds of anhydrous ammonia contained in the refrigeration system were leaking at four to five pounds per hour. An unknown quantity of anhydrous ammonia was released from the valve into the PFS building and outside environment.

The leak was initially identified by a mechanical contractor on March 19, 2000, as PFS personnel were performing a repair operation on the refrigeration unit. The mechanical contractor and PFS personnel could not control the leak and contacted local responders. The Bedford Volunteer Fire Company and the Roanoke Valley Regional Hazardous Materials Response Team (the Regional Hazmat Team) responded to the scene. In addition, the Bedford County Hazardous Materials Response Team responded to assist the fire company, and the Bedford County Director of Public Safety was on scene. The leak was slowed by the initial responders, but was not completely contained due to difficulties presented by the configuration and limited space around the leaking valve (as well as significant concentrations of ammonia gas accumulating in the building). The Virginia Department of Emergency Services (VA DES) responded to the incident, and the Virginia Emergency Operations Center (VA EOC) requested assistance from EPA Region III the following morning because the need for technical expertise was immediate and additional response resources were necessary.

The federal On-Scene Coordinator (OSC) initiated response activities from off-site in Philadelphia by arranging for technical expertise from the EPA Environmental Response Team (ERT) to be available for chemical and engineering advice. The federal OSC contacted the U.S. Coast Guard Atlantic Strike Team (USCG-AST) in Fort Dix, New Jersey, and mobilized a Site Assessment and Technical Assistance (SATA) response team capable of Level A entry and ammonia monitoring capability [Level A protection is required when the greatest potential for exposure to hazards exists, and when the greatest level of skin, respiratory, and eye protection is required].

The federal OSC discussed refrigeration systems and likely response strategy with EPA chemical safety personnel, and met ERT and advance USCG-AST members in Chester County, Pennsylvania. The federal OSC arranged for a charter flight to the vicinity of the scene to allow for preparation and strategy meetings en route. Upon arrival on March 20th, the federal OSC met with the VA DES and the Bedford Volunteer Fire Company Incident Commander (IC) to establish the federal OSC's role in the Unified Command (UC). Working through the UC, the federal OSC also immediately identified roles and positions for the USCG-AST and contractor resources that he brought to the response and integrated these federal resources into the response organization.

The Regional Hazmat Team and the USCG-AST shared the majority of the hot zone and decontamination operations, with the USCG-AST working the night shift and the Roanoke team working the day shift. After the initial response activities were conducted, SATA also was divided into similar shifts to cover air monitoring, documentation, hot zone monitoring, and other work assignments. USCG-AST personnel also acted as Safety Officers for the response and prepared a Site Safety Plan. ERT assisted in developing plans to implement the UC's strategy in the Planning Section of the ICS. Throughout the response, the federal OSC worked with the other key UC representatives to develop and implement a response strategy.

The federal OSC directed the USCG-AST to make entries into the building to determine the concentration of ammonia within the building and to isolate the pump room from the remainder of the building. SATA was tasked by the federal OSC to perform perimeter (within 100 yards of the facility) and off-site air monitoring. No ammonia levels above 3ppm were measured at a distance of 50 yards from the building. The USCG-AST and the Regional Hazmat Team made several Level B entries with the PRP's mechanical subcontractor in order to evaluate the condition of the refrigeration system. The lack of documentation and unknown positioning and integrity of many of the valves made it difficult to isolate the system. SATA was commissioned to develop a device, later termed the "gizmotron," that converted some of the anhydrous ammonia into ammonium hydroxide (by spraying water on the leaking valve). With the "gizmotron" in place, the USCG-AST, with the mechanical subcontractor's input, was able to tap into the system and bubble the remaining ammonia through the water in Baker tanks provided by the RP contractor. Once the release was stabilized, the UC began to focus on removing the ammonia from the facility in a controlled manner.

VA DES, ERT, and SATA were requested to complete Computer-Aided Management of Emergency Operations (CAMEO) air dispersion modeling to determine if the isolated cold storage rooms could be vented. Meteorological conditions were obtained from the USCG-AST weather station and the VA DES command center. Approximately 14 potential scenarios were developed, modeled, and evaluated. Prior to ventilation operations, area maps were provided by local officials, which were used to identify potential downwind receptors. Wind vector profiles were identified to determine the safest wind directions in the event of a release operation.

During the UC meetings, plans were made to ventilate the building using existing roof fans and auxiliary positive pressure ventilation fans. Due to the close proximity of an elementary school, an agreement was made with local officials to ventilate the lower level areas and perform all process manipulations between the hours of 4:00 p.m. and 6:00 a.m., to avoid a potential ammonia air release during school hours. Concentrated ventilation operations began at 11:30 p.m., March 21, 1999. The USCG-AST continually monitored wind direction using a weather station and the data were compared to the prepared maps during ventilation operations. The federal OSC maintained a thorough air-monitoring program through March 24, 1999, in order to ensure the safety and health of the public.

Once the ammonia system was drained, this ventilation plan proved to be very effective in lowering the ammonia level so Level C protected contractors could proceed into the facility to complete work and repairs on the refrigeration system. This also allowed U.S. Department of Agriculture (USDA) officials to inspect products in the facility, and for PFS to remove products deemed undamaged.

### **THE ROLE OF ICS/UC**

ICS/UC is an effective response management tool for all sizes of spills and discharges. Additionally, the ICS/UC structure can be used in both formal and informal settings to best achieve the desired outcome of any response: safe, timely, and successful mitigation.

The Bedford incident presented several difficulties that immediately identified it as a more than routine emergency response: the ammonia release could not be stopped in a timely manner, and the response

teams entering the plant to control the dangerous gas levels required Level A personal protective equipment. These issues, coupled with the complexity of multi-agency involvement in the incident, suggested the need for ICS/UC structure. However, the size and likely short-term duration of the Bedford incident suggested that ICS/UC would best be informally applied. Few ICS forms or formalities were applied, but the basic concepts of ICS were used to allow the UC to effectively manage the diverse responding agencies and effectively implement their strategies. The Incident Command recognized the value of the ICS/UC structure and allowed that structure to guide and facilitate the response. Responders decided that they would use enough of the ICS/UC structure to assist them without allowing it to consume the response effort.

The ICS established in response to the Bedford incident was initiated by the local responders. When the federal OSC arrived on-scene, he merged into the existing structure, which was already functioning properly. The federal OSC fostered use of local authorities' knowledge, education, experience, and planning in establishing and maintaining an effective ICS/UC.

### **Unified Command**

The federal OSC, the state Hazardous Materials Officer, the local IC, and a representative of PFS functioned as the UC. The members of the UC changed over time, but local, state, and federal officials always shared command responsibilities. Since local, state, and federal agencies each shared responsibilities in and provided assets to the response, each organization benefited from its presence in the UC. Additionally, because the primary role of the site entry team shifted between state and federal assets during a 24-hour cycle, the coordination between and the presence of the federal OSC and state OSC in the UC was necessary to ensure seamless operations. The PRP representative provided the command with contractor support for site expertise and recovery operations.

The following is list of actions taken by the UC at the Bedford incident, which contributed to an effective and successful response:

1. Early and continued presence of the USCG-AST, the EPA ERT, and the SATA team provided continuity throughout the response. The expertise, knowledge, and additional resources they made available were invaluable to the successful management of the response.
2. Early coordination with local, state, and federal response teams played a key role in the success of mitigation efforts by giving the federal OSC rapid access to a large supporting team and assisting in the resolution of many problems.
3. Having representatives from all appropriate levels of government in the UC expedited coordination efforts with other agencies at all levels.
4. Close and early coordination with the ERT and SATA team ensured that efforts were not duplicated during air quality monitoring, and their knowledge assisted EPA enforcement officials when working with the PRP. Representatives from the ERT and SATA team helped the UC achieve an integrated release response and risk assessment and effectively address the concerns of the public.

### **Command Staff**

The Command Staff included a representative from the USCG-AST (Site Safety Officer) and the Chief of the Bedford Police Department (Information Officer and Liaison Officer). The USCG-AST representative shared Safety Officer responsibilities with designated representatives of the Regional Hazmat Team during their shift. The Chief of the Bedford Police Department provided the command with the best liaison to the affected community. Thus, communications and briefings were handled by the local jurisdiction.

### **Operations Section**

Senior members of the Bedford Volunteer Fire Company, the Regional Hazmat Team, and the USCG-AST each formed the nucleus of the Operations Section of the ICS. Depending upon the shift, a designee from the Regional Hazmat Team or the USCG-AST directed building entry operations in conjunction with support from numerous local agencies. The senior official representing the local fire department and emergency medical services assets directed personnel to fulfill the many supporting functions. The federal OSC and the state OSC developed common response objectives and shared approval responsibilities for operational elements depending upon the lead agency conducting work in the Operations Section.

### **Planning Section**

Members of the EPA ERT, VA DES, USCG AST, and EPA's SATA contractor formed the entire Planning Section. These individuals collected and documented information derived from the entry operations and relayed this information to the Command. Status of ammonia concentration, wind direction, modeling iterations, and the results of numerous entries into the building were forwarded to the UC. This information allowed the UC to develop objectives for the following four to six hours. When ammonia levels were found to exist at levels that would allow for work in lower levels of protection, the UC could decide to allow PRP contractors into certain sections of the building to move their products to safety. The PRP representative in the UC facilitated this decision by prioritizing critical products, areas of the facility requiring activity, and providing direction to PRP personnel.

The existence of a Planning Section also enabled the UC to forecast appropriate time periods for venting the ammonia from the facility. Since a representative of the local fire department was part of the UC and the local police chief served as Liaison to the community, the UC was able to quickly work out a solution for venting the ammonia that would result in minimal impact. The UC was able to provide the community with accurate and timely information derived from the SATA team, USCG AST, VA DES, and ERT efforts in planning functions.

### **CONCLUSION**

The ICS/UC established at the Bedford incident was a typical ICS/UC that will likely exist for most, if not all, of EPA's response activities and assistance efforts with state and local jurisdictions. The cooperative nature of the UC immediately resulted in relief for state and local resources at the end of long shifts. This was an incident objective that resulted in immediate abatement results and reduced the ongoing projected incident duration. In addition, the sharing of responsibilities ensured that the full attention of the response community was focused at all times. Standard ICS forms and wire diagrams were not employed due to the limited projected duration of the response, the familiarity and good working relationship between EPA and VA DES and their assets, and the observable degree of professionalism and cooperation of the local response community. Although the responders felt that much of the ICS

formality would be unnecessary at the Bedford incident, many of the tools and benefits of the ICS/UC structure were used, forming the foundation of the response management employed by the UC. Because the responders understood the basic principles, concepts, and features of ICS/UC and ensured that key personnel understood their roles and functions within the response management structure, management of the Bedford incident was able to forgo much of the formality typically associated with NIIMS ICS/UC.

The co-location of local, state, federal, and PRP representatives in a single command post and the proximity of all ICS sections and response personnel ensured that command decisions and field-derived information were easily communicated and implemented.

The ICS/UC implemented at the Bedford incident release was the key to successful mitigation operations. The ICS/UC allowed the UC to effectively manage and coordinate an emergency response that included the participation of approximately 30 local, state, and federal agencies. The timely and frequent coordination of all members of the response team with the PRP and local representatives greatly enhanced the reduction of anhydrous ammonia released and provided a more efficient and cost-effective response. The success of the clean-up operation, and the lack of negative publicity that resulted, supports the premise that all levels of government can function efficiently within a group.

The table on the next page lists the agencies and organizations that participated in the response and a brief description of their duties.

Table 1 - Participating Agencies and Duties Performed

Agency	Brief Description of Duties
<b>Unified Command/Command Staff</b>	
U.S. EPA Region III Removal Response Section	Provided the federal OSC who assisted in response activities as the federal representative of the UC; assisted the federal OSC in coordinating site activities; and provided chemical engineering assistance.
Commonwealth of Virginia Department of Emergency Services (VA DES)	Provided the State Hazmat Officer and assisted in response activities as the state representative (state OSC) of the UC.
Bedford, Virginia Volunteer Fire Company	Served as the initial IC and assisted in response activities as a local representative of the UC.
Forest, Virginia Volunteer Fire Company	Assisted in response activities as a local representative of the UC.
United States Coast Guard National Strike Force Atlantic Strike Team (USCG- AST)	Assisted EPA with health and safety, logistics, interior monitoring, and entry operations (also see Operations and Logistics Sections).
Roanoke Valley Regional Hazardous Materials Response Team	Daytime hazardous materials team provided health and safety, logistics, interior monitoring, and entry operations (also see Operations Section).
Bedford, Virginia, Police Department	Participated in UC; served as liaison to local resources; provided site security and a command post (also see Operations Section).
Professional Food Systems (PFS)	Assisted in response activities as the PRP representative of the UC.
<b>Planning Section</b>	
U.S. EPA Environmental Response Team (ERT)	Advised the federal OSC on actions taken during the response, and worked with SATA on running a CAMEO model for the response.
U.S. Department of Agriculture (USDA)	Inspected PFS' products that remained within the facility during the release.
Roy F. Weston Inc. Site Assessment Technical Assistance (SATA) Team	Provided technical support to the federal OSC, including air monitoring, documentation of activities, implementing CAMEO, and designing, building, and installing the "gizmotron" to control the release.
<b>Operations Section</b>	
United States Coast Guard National Strike Force Atlantic Strike Team, (USCG- AST)	Assisted EPA with health and safety, logistics, interior monitoring, and entry operations (see also Command Staff and Logistics Sections).

Appendix C: ICS/UC at Work

Agency	Brief Description of Duties
Roanoke Valley Regional Hazardous Materials Response Team	Daytime hazardous materials team provided health and safety, logistics, interior monitoring, and entry operations.
City of Bedford, Virginia	Provided a Fire/Building Inspector, and a Building and Code Official to supervise post-incident activities for local officials.
Bedford, Virginia, Police Department	Participated in UC; served as liaison to local resources; provided site security.
<p><i>Virginia Fire Departments</i></p> <ul style="list-style-type: none"> <li>• Bedford</li> <li>• Franklin County</li> <li>• Evington</li> <li>• Smith Mt. Lake</li> <li>• Lyn/Dan Heights</li> <li>• Forrest</li> <li>• Stuartsville/Chamblissberg</li> <li>• Huddleston</li> <li>• Chamblissberg</li> <li>• Moneta</li> <li>• Boonesboro</li> <li>• Montvale</li> <li>• Saunders</li> </ul>	Provided fire suppression and logistical support, including pumping, water supply, electricity, breathing air, ventilation, and decontamination (see also Logistics Section).
<p><i>Virginia Rescue Squads</i></p> <ul style="list-style-type: none"> <li>• Bedford</li> <li>• Goode</li> <li>• Campbell</li> <li>• Huddleston</li> <li>• Moneta</li> <li>• Boonesboro</li> </ul>	Provided on-site EMS support.
Webb Technologies	Provided contractor support, as directed by the PRP.
<b>Logistics</b>	
United States Coast Guard National Strike Force Atlantic Strike Team (USCG-AST)	Assisted EPA with health and safety, logistics, interior monitoring, and entry operations.
<p><i>Virginia Fire Departments</i></p> <ul style="list-style-type: none"> <li>• Bedford</li> <li>• Franklin County</li> <li>• Evington</li> <li>• Smith Mt. Lake</li> <li>• Lyn/Dan Heights</li> <li>• Forrest</li> </ul>	Provided fire suppression and logistical support, including pumping, water supply, electricity, breathing air, ventilation, and decontamination.

<b>Agency</b>	<b>Brief Description of Duties</b>
<ul style="list-style-type: none"><li>• Stuartsville/Chamblissberg</li><li>• Huddleston</li><li>• Chamblissberg</li><li>• Moneta</li><li>• Boonesboro</li><li>• Montvale</li><li>• Saunders</li></ul>	
<b>Finance/Administration</b>	
Because each agency maintained responsibility for tracking and managing its own finances, using disparate systems, financial tracking was not integrated. Each agency maintained its own records.	

**Section 2 – U.S. Coast Guard Example of ICS/UC**

The U.S. Coast Guard will be developing an example of the Coast Guard’s ICS/UC use, to be placed on [www.NRT.org](http://www.NRT.org), the NRT website, as a supplement to this document.

Appendix D: More Information**Appendix D: Sources of More ICS Information**

In addition to this ICS/UC Technical Assistance Document, the NRT has developed several other ICS/UC-related documents, including:

- “Minimum Essential ICS Training Elements,” at <http://www.nrt.org>
- “Federal Natural Resource Trustees and the ICS/UC,” at <http://www.nrt.org>
- Annex 3 of the NRT Integrated Contingency Plan (ICP) Guidance (61 FR 28641) (Annex 3 [on page 28647] provides a description of a response management system based on NIIMS ICS.)

The USCG has developed a number of ICS/UC guidance documents and maintains several ICS/UC-related web sites, including:

- Incident Management Handbook (New FOG) at <http://www.uscg.mil/hq/nsfcc/nsfweb/NSF/onlinedoc.html>
- USCG HQ ICS web site, at <http://www.uscg.mil/hq/g-m/mor/articles/ics.htm>
- RRTs I and II ICS in Oil Spill Response web site, at <http://www.uscg.mil/d1/staff/m/rrt/ics.html>
- On-scene Command and Control Prototype – OSC2, at <http://www.uscg.mil/hq/g-m/mor/articles/osc2.htm>
- National Strike Force Coordination Center (NSFCC) ICS web site – Spill Management Support Service, at <http://www.uscg.mil/hq/nsfcc/nsfweb/nsfcc/ops/ics.html>

Other ICS resources include the following:

- National Wildfire Coordinating Group (NWCG) publications including ICS position task books, ICS job aids, ICS position descriptions and responsibilities, and an ICS glossary, at <http://www.nwcg.gov/teams/pmswt/pms.htm>
- NWCG ICS National Training Curriculum modules, 1994, at <http://www.neotecinc.com/neo/ics100.html>
- Computer-assisted Instruction for ICS: Self-study Course, FEMA and the U.S. Fire Administration, National Fire Academy, in cooperation with the U.S. Army Reserve
- Additional information on ICS/UC, U.S. Department of Labor Occupational Safety and Health Administration web site <http://www.OSHA.gov>
- NOAA Electronic ICS Forms – ICSFORMS Solution, at <http://response.restoration.noaa.gov/oil/aids/ICS/intro.html>
- “Setting Objectives in a Unified Command: The ‘Cost’ of Leadership,” 1997 International Oil Spill Conference (IOSC) Proceedings

**Appendix D: More Information**

- ICS, Fire Protection Publications, Oklahoma State University, 1983, at <http://www.fireprograms.okstate.edu/fpp/Index.htm>
- “Unified Command: The Mechanism for Ensuring a Comprehensive, Coordinated Response,” 1995 IOSC Proceedings
- ICS Unified Command Video, Texas General Land Office, Oil Spill Prevention and Response Division, 1995

Appendix E: Acronyms

## Appendix E: Acronyms

ACP	Area Contingency Plan
AST	Atlantic Strike Team
CAMEO	Computer-Aided Management of Emergency Operations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DES	Department of Emergency Services
DNR	Department of Natural Resources
DOI	U.S. Department of the Interior
EMS	Emergency Management Services
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERT	Environmental Response Team (EPA)
FBI	U.S. Federal Bureau of Investigation
FEMA	U.S. Federal Emergency Management Agency
FR	Federal Register
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMEP	Hazardous Materials Emergency Preparedness
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
JIC	Joint Information Center
LEPC	Local Emergency Planning Committee
MOA	Memorandum of Agreement
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIIMS	National Interagency Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
NRDAR	Natural Resource Damage Assessment and Restoration
NSFCC	National Strike Force Coordination Center
NRS	U.S. National Response System
NRT	U.S. National Response Team
OPA	Oil Pollution Act of 1990
OSC	On-Scene Coordinator
PFS	Professional Food Systems
PRP	Potentially Responsible Party
RP	Responsible Party
RRT	Regional Response Team
SARA	Superfund Amendments and Reauthorization Act
SATA	Site Assessment and Technical Assistance
SERC	State Emergency Response Commission
UC	Unified Command
U.S.C.	United States Code
USCG	United States Coast Guard
USDA	U.S. Department of Agriculture
WMD	Weapons of Mass Destruction

1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

2. This section covers the various methods used to collect and analyze data.

3. The following table provides a summary of the key findings from the study.

4. The data shows a significant increase in sales over the period.

5. This is due to the implementation of the new marketing strategy.

6. The results indicate that the strategy was highly effective.

7. The overall trend is positive and encouraging.

8. The data supports the hypothesis that the strategy will lead to growth.

9. The findings are consistent with previous research in the field.

10. The study has several limitations that should be noted.

11. The sample size was relatively small, which may affect the generalizability of the results.

12. The data was collected over a short period, so long-term trends are not yet clear.

13. The study was conducted in a controlled environment, which may not reflect real-world conditions.

14. The results suggest that further research is needed to explore the long-term effects of the strategy.

15. The study has provided valuable insights into the effectiveness of the marketing strategy.

16. The findings have important implications for businesses looking to improve their marketing efforts.

17. The study has identified key factors that contribute to the success of the strategy.

18. The results have provided a clear picture of the current state of the market.

19. The study has highlighted the need for continuous monitoring and evaluation of the strategy.

20. The findings have provided a solid foundation for future research in this area.

21. The study has provided a comprehensive overview of the marketing strategy's performance.

22. The results have provided a clear picture of the current state of the market.

23. The study has highlighted the need for continuous monitoring and evaluation of the strategy.

24. The findings have provided a solid foundation for future research in this area.

25. The study has provided a comprehensive overview of the marketing strategy's performance.

26. The results have provided a clear picture of the current state of the market.

27. The study has highlighted the need for continuous monitoring and evaluation of the strategy.

28. The findings have provided a solid foundation for future research in this area.

29. The study has provided a comprehensive overview of the marketing strategy's performance.

30. The results have provided a clear picture of the current state of the market.

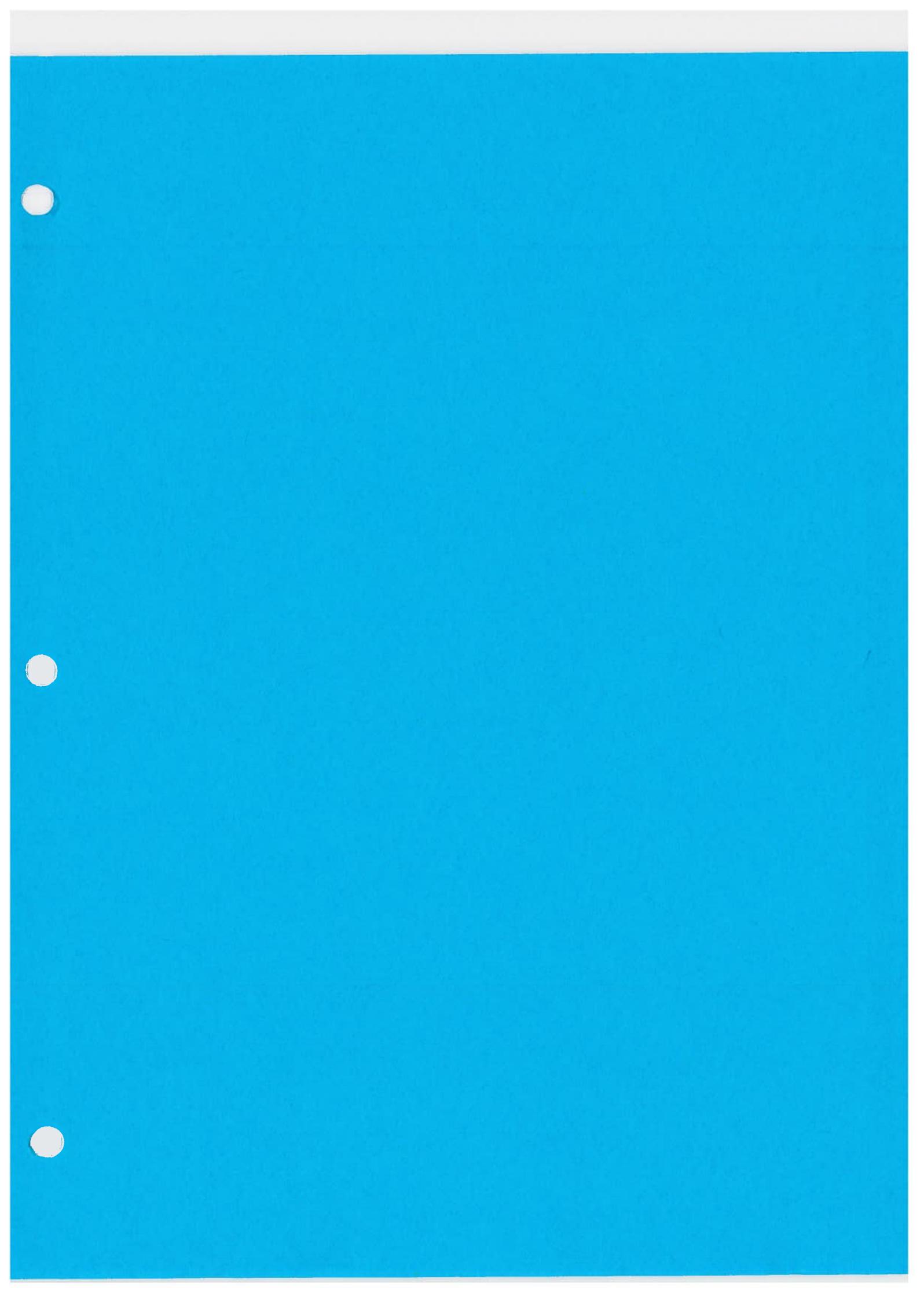
31. The study has highlighted the need for continuous monitoring and evaluation of the strategy.

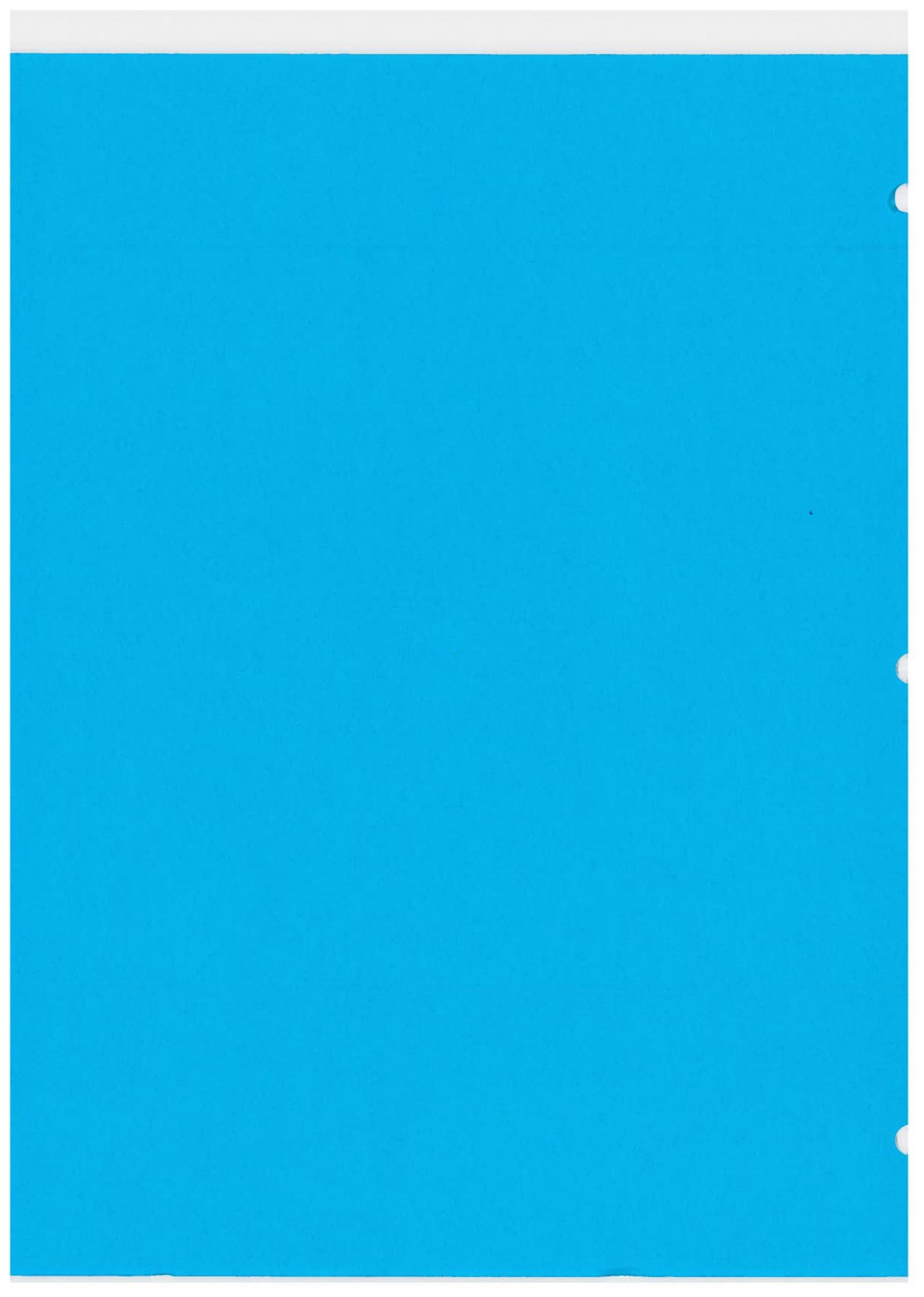
32. The findings have provided a solid foundation for future research in this area.

33. The study has provided a comprehensive overview of the marketing strategy's performance.

34. The results have provided a clear picture of the current state of the market.

35. The study has highlighted the need for continuous monitoring and evaluation of the strategy.





**Appendix E: OSHA Training Requirements for Spill Response Workers**

THE UNIVERSITY OF CHICAGO



# OSHA FactSheet

## Hazardous Waste Operations and Emergency Response

OSHA's standards for general industry and the construction industry on hazardous waste operations and emergency response (29 CFR 1910.120 or 29 CFR 1926.65) cover all employees involved in:

- Clean-up operations of hazardous substances at uncontrolled hazardous waste sites required by Federal, state, local or other governments;
- Corrective actions involving clean-up procedures at sites covered by the Resource Conservation and Recovery Act (RCRA);
- Voluntary clean-up operations at sites recognized as uncontrolled hazardous waste sites by Federal, state, local or other governments;
- Operations involving hazardous waste that are conducted at treatment, storage and disposal facilities licensed under RCRA;
- Emergency response operations for hazardous substance releases or substantial threats of releases.

Exceptions are permitted if the employer can demonstrate that the operation does not involve employee exposure or a reasonable possibility of such exposure to hazards.

State and local government employees are covered by equivalent standards in the 26 states with OSHA-approved state plans and by the Environment Protection Agency's hazardous waste standard in states without plans.

### Hazardous Waste Operations

Each employer must have:

- A written, readily-accessible safety and health program that identifies, evaluates and controls safety and health hazards and provides for emergency response.
- A preliminary site evaluation conducted by a qualified person to identify potential site hazards and to aid in the selection of appropriate employee protection methods.
- A site control program to protect employees against hazardous contamination. At a minimum it must have a site map, site work zones,

site communications, safe work practices, the use of a "buddy system," and identification of the nearest medical aid.

- Employee training for everyone working on a hazardous waste site.
- Medical surveillance of workers exposed at or above permissible exposure limits for hazardous substances, conducted (1) at least annually, (2) when a worker moves to a new worksite, (3) when a worker experiences exposure from unexpected or emergency releases and (4) at the end of employment.

Other requirements include controls to reduce and monitor exposure levels of hazardous materials, an informational program describing any exposure during operations and the inspection of drums and containers prior to removal or opening. Decontamination procedures and emergency response plans (described under Emergency Response) must be in place before employees begin working in hazardous waste operations. Employers must also create safer environments by developing and implementing effective new technologies.

### RCRA Sites

In addition to programs for safety and health, training, medical surveillance, decontamination, new technology and emergency response, employers at RCRA sites also need the following:

- A written hazard communication program meeting the requirements of 29 CFR 1900.1200.
- Procedures to effectively control and handle drums and containers.

### Emergency Response

Employers must develop an emergency response plan to handle possible on-site emergencies and coordinate off-site response. Rehearsed regularly and reviewed/amended periodically, the plan must address: personnel roles; lines of authority, training and communications; emergency recognition and prevention; site security; evacuation

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routes and procedures; decontamination procedures; emergency medical treatment; and emergency alerting procedures. Training is required before employees engage in hazardous waste operations and emergency response.

### **Training Requirements**

#### **Uncontrolled hazardous waste operations**

- 40 hours of initial training; 3 days of actual field experience for regular employees to be certified.
- 24 hours of initial training; 1 day of supervised field experience for employees visiting the site occasionally.
- 8 hours of additional waste management training for supervisors and managers.
- 8 hours of annual refresher training.

#### **Sites licensed under RCRA**

- 24 hours of training.
- 8 hours of annual refresher training.

#### **Emergency response operations at sites not RCRA licensed or at uncontrolled hazardous waste site clean-ups**

1) **First responders at the "awareness level"** (witness or discover a hazardous substance release and initiate the emergency response) must demonstrate competency in areas such as recognizing the presence of hazardous materials in an emergency, the risks involved and the role they

play in their employer's plan.

2) **First responders at the "operations level"** (respond to prevent the spread, exposures to and the further release of hazardous materials) must have **8 hours** of training plus "awareness level" competency.

3) **Hazardous materials technicians** (respond to stop the release) must have **24 hours** of training equal to the "operations level" and know how to implement the employer's plan and carry out decontamination.

4) **Hazardous materials specialists** (require specific knowledge of the substances to be contained) must have **24 hours** of training equal to the "technical level" and act as liaison with all government authorities.

5) **On-scene incident commanders** (assume control of the scene) must have **24 hours** of training equal to the "operations level" and demonstrate competence in implementing the incident command system, the employer's plan and the state and local emergency response plans.

Annual refresher training is required for each level of response.

For further information about hazardous waste operations and emergency response, please visit OSHA's Hazardous Waste page at [www.osha.gov](http://www.osha.gov).

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

**Think Safety!**

For more complete information:



U.S. Department of Labor

[www.osha.gov](http://www.osha.gov)

(800) 321-OSHA

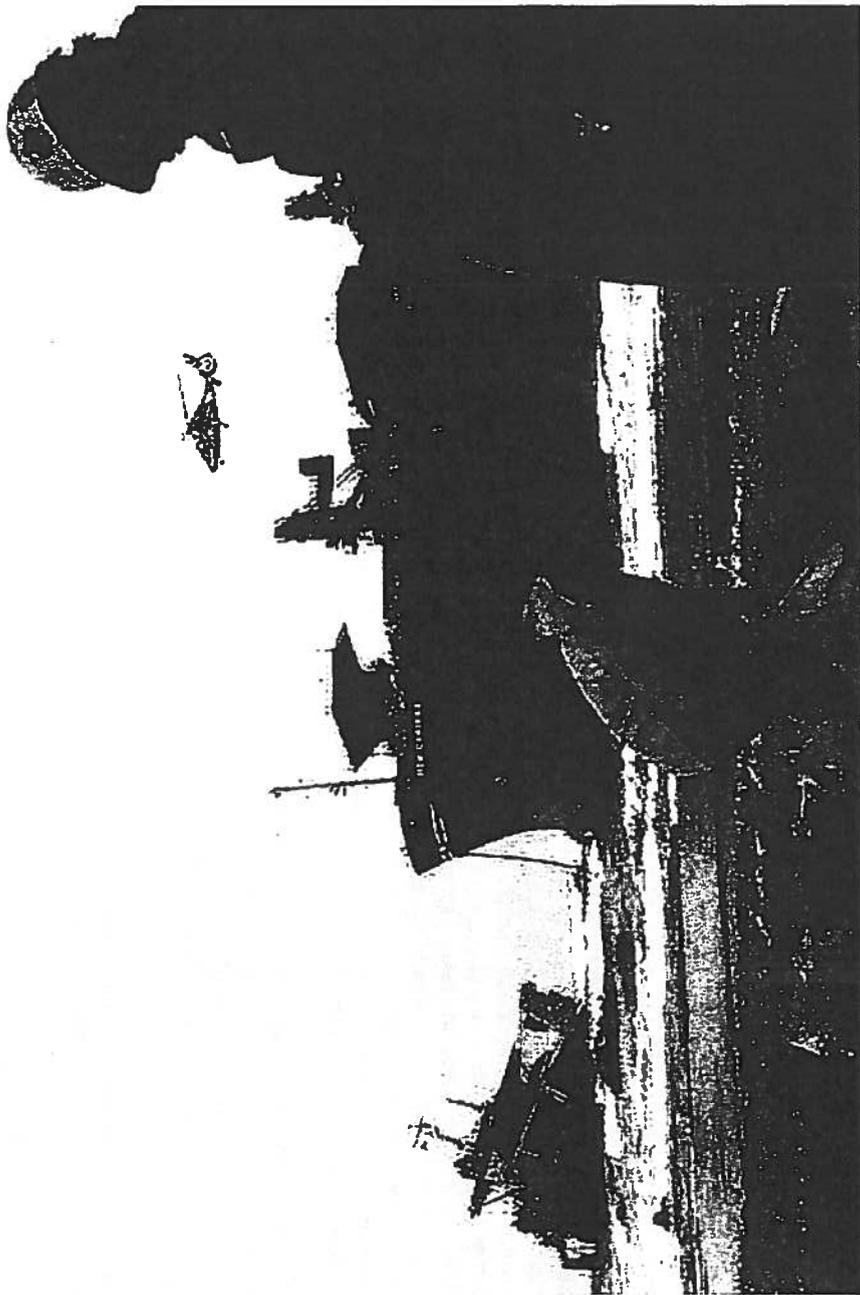


# Training Marine Oil Spill Response Workers Under OSHA's Hazardous Waste Operations and Emergency Response Standard



U.S. Department of Labor  
Occupational Safety and Health Administration

OSHA 3172  
2001



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## About this Booklet

This informational booklet is intended to provide a generic, non-exhaustive overview of a particular standards-related topic. This publication does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves and the *Occupational Safety and Health Act*. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current and administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the Courts.

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Teletypewriter: (TTY) 1-877-889-5627

See also OSHA's Website at [www.osha.gov](http://www.osha.gov)

# **Training Marine Oil Spill Response Workers Under OSHA's Hazardous Waste Operations and Emergency Response Standard**

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U.S. Department of Labor  
Elaine L. Chao, Secretary

Occupational Safety and Health Administration  
John L. Henshaw, Assistant Secretary

OSHA 3172  
2001

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## Introduction

This booklet, written for marine oil spill response employers,\* describes the training your employees need under HAZWOPER, the Hazardous Waste Operations and Emergency Response standard, *Title 29 of Code of Federal Regulations (CFR) 1910.120*. The Occupational Safety and Health Administration (OSHA) published HAZWOPER to protect

**Train workers to the HIGHEST LEVEL of responsibility you may assign them.**

workers involved in hazardous substance emergency response and cleanup operations.

Not every spill response worker needs the same amount of training. The type of training you give your workers depends on how close they will be to a spill and what role they will have in stopping, containing, or recovering the spilled material from the release. For example, if you have workers who control an oil spill early in an incident, they need more training than workers who simply warn others about a spill. This booklet explains how HAZWOPER training requirements apply to the range of workers who participate in marine oil spill response. To use this guidance effectively, you need to know the duties you expect your workers to perform and the

exposure conditions under which you would allow them to work. You must train your workers to the highest level of skill, responsibility, and exposure that you will assign them.

This booklet was prepared by OSHA's Office of Health Compliance Assistance in conjunction with the U.S. Coast Guard Office of Response.

\*Oil spill response accounts for the majority of marine spill response operations and is the focus of this pamphlet. HAZWOPER training, however, is required for all marine spill response operations conducted under the National Contingency Plan. The training you provide must cover the range of hazardous substance spills you expect your marine response employees to handle.

## How Marine Oil Spill Responses Are Organized and Managed

Marine oil spill response is organized and managed according to the regulations found in 40 CFR 300, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). These regulations describe procedures for responding to hazardous substance releases and oil discharges. Appendix E of the regulation specifically addresses oil spill response. The U.S. Coast Guard (USCG) and the Environmental Protection Agency (EPA) jointly led the development of the NCP.

Marine oil spill response involves a network of government agencies, community organizations, industry groups, and contractors. Federal and/or state agencies usually monitor the responsible party (generally the owner or operator of the vessel, facility, port, or pipeline involved in the spill). The Federal Government can direct clean-up operations if the responsible party does not respond adequately, is not capable of taking action, or is unknown.

An On-Scene Coordinator (OSC) acts as the leader for response activities. In the coastal areas of the United States, USCG serves as the OSC for oil spill responses. In inland areas, including rivers and other inland waters, EPA generally takes the lead.

HAZWOPER requires that a senior official who is present at the response site, an Incident Commander, lead an emergency response operation. For marine oil spills, the ranking Coast Guard officer or EPA official at the spill scene usually functions as the On-Scene Incident Commander. The emergency response remains in effect until the Incident Commander declares it completed.

OSHA is responsible for assuring safe and healthful working conditions for working men and women. During marine oil spill response, OSHA provides advice and consultation at the request of other government agencies. If necessary, OSHA uses enforcement action to assure that workers are properly protected.

### Emergency Response vs. Post-Emergency Response

The HAZWOPER standard identifies two basic phases of a response action: emergency response and post-emergency response. Depending on the size of the spill, these phases may be managed differently. In addition, workers who participate **ONLY** in post-emergency response require different training than emergency response workers receive.

Emergency response is "a response effort...to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance" (29 CFR 1910.120(a)(3)). For marine oil spills, an uncontrolled release is a situation in which the oil and its associated airborne and surface contamination hazards are releasing into the environment or are in danger of releasing into the environment and posing a worker exposure hazard. Oil in grounded ships, which is in danger of being released into the environment, represents an emergency response situation. On-water containment, skimming operations, and underwater oil recovery operations also are considered to be emergency response activities because the oil is still in danger of being released into the environment. Shoreline cleanup is normally considered to be a post-emergency response unless the oil is below the high-tide mark or storm surge boundary (active or forecasted) and can reasonably be expected to be re-released into the marine environment.



A spill and safety briefing at a major oil spill.

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Post-emergency response is performed "after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun" (29 CFR 1910.120(a)(3)). Oil spilled into a marine environment is considered to be stabilized when it is in a stable container with no compromised structural integrity, to limit the potential for worker exposure to associated hazards. This includes floating bladders, barges, drums, and roll-off containers on shore. Oil also is considered to be stabilized when it is stranded on shore and not reasonably expected to re-release into the environment through wave or storm effects. Floating oil is not considered to be stabilized, even if contained within a boom.

During response to a large release such as a marine oil spill, emergency response and post-emergency response cleanup activities may occur at the same time. In these cases, the boundaries between the emergency response area and the post-emergency response area must be well defined and explained to responders and cleanup workers.

## Applying the HAZWOPER Standard to Marine Oil Spills

### HAZWOPER Requirements that Apply to Marine Oil Spills

The NCP defines oil as any kind of oil in any form, including petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes but not dredged spoil (dirt or rock).

Response actions conducted under the NCP must comply with the provisions of HAZWOPER. You'll find this requirement in 40 CFR 300.150. Therefore, if your workers are participating in a response action under the NCP, you must have an occupational safety and health program consistent with HAZWOPER and you must train your workers according to HAZWOPER's training requirements. This applies whether the responsible party or a government agency is directing the cleanup.

For marine oil spill emergency response, the HAZWOPER provisions that most directly apply include:

- Emergency response operations in HAZWOPER paragraph (q), and
- Post-emergency response cleanup operations in paragraph (q)(11).

See also emergency response training provisions in paragraph (q)(6), and post-emergency response training requirements in paragraph (q)(11).

### When HAZWOPER Does Not Apply

HAZWOPER does not apply to incidental releases that are limited in quantity and pose no safety and health threat to employees working in the immediate vicinity of the spill. These oil spills can be

absorbed or controlled at the time of the release by employees in the immediate vicinity. The difference between emergency

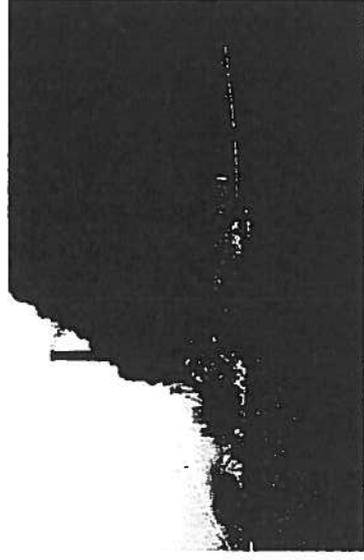
**The NCP defines oil as any kind of oil in any form, including petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes but not dredged spoil (dirt or rock.)**

spills and incidental releases is described in the definition of emergency response in HAZWOPER paragraph (a)(3). An incidental release does not have the potential to become an emergency within a short time. If an incidental release occurs, employers do not need to implement HAZWOPER.

### HAZWOPER Coverage for Volunteers

Volunteers frequently participate in marine oil spill response, but Federal OSHA standards do not cover uncompensated workers. In states

approved to manage their own occupational health and safety program (called OSHA state plan states), volunteers are often covered under state plan HAZWOPER requirements. In states administered by Federal OSHA, volunteers are covered by the EPA HAZWOPER standard (40 CFR 31.1). EPA's HAZWOPER standard has **identical requirements**, but the coverage is different from Federal OSHA standard coverage. The EPA standard covers local and state government employees, both compensated and volunteers.



A ship exploded and caught fire off the coast of New Jersey. About 127,000 gallons of oil were unaccounted for after the incident.

## Hazards to Marine Oil Spill Responders

Marine oil spill responders face a variety of health and safety hazards, including fire and explosion, oxygen deficiency, exposure to carcinogens and other chemical hazards, heat and cold stress, and safety hazards associated with working around heavy equipment in a marine environment. A full discussion of these hazards is beyond the scope of this training booklet, but a brief list of hazards and their known health consequences is shown in Table 1. Your workers should be trained to anticipate and control exposure to the hazards associated with their assigned duties.

To determine acceptable levels of exposure and train your workers about them, consult OSHA's exposure limits in Subparts G and Z. If OSHA does not regulate an exposure of concern, consult the National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) and Immediately Dangerous to Life and Health (IDLH) levels. If neither OSHA nor NIOSH has established a limit, consult the American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) for chemical, physical, and biological agents. You may use a more protective limit than OSHA's if one has been established and plan your controls accordingly. Material Safety Data Sheets from the product manufacturer may provide useful information for worker training.

### Additional Hazards

Marine oil spill responders need training to work safely around these and other potential hazards. You should decide which hazards apply to your operations.

- Biological (e.g., plants, animals, insects, remediation materials)
- Drowning
- Noise
- Electricity
- Slips and Trips
- Biohazardous debris (e.g., syringes on shoreline)
- Ergonomic Stresses (e.g., repetitive strain, low back pain)
- Sunburn
- Confined Spaces
- Underwater Diving
- Falls
- Unguarded Equipment
- Cranes
- Fatigue
- Vehicles (e.g., aircraft, boats, cars, trucks)
- Cutting and Welding
- Fire and Explosion
- Degreasers
- Heat or Cold Stress
- Dispersants
- In-Situ Burning Particles

Other OSHA standards apply to marine oil spill response and cleanup operations. See Appendix A, Related OSHA Standards.



Fire ensues after oil is released during a lightering accident.

**Table 1. Hazardous Chemicals and Their Effects**

<b>Hazardous Chemicals</b>	<b>Adverse Health Effects</b>
Benzene (crude oils high in BTEX, benzene, toluene, ethylbenzene, and xylene)	Irritation to eyes, skin, and respiratory system; dizziness; rapid heart rate; headaches; tremors; confusion; unconsciousness; anemia; cancer
Benzo(a)pyrene (a polycyclic aromatic hydrocarbon reproductive [see below], formed when oil or gasoline burns)	Irritation to eyes and skin, cancer, possible effects
Carbon dioxide (inerting atmosphere, byproduct of combustion)	Dizziness, headaches, elevated blood pressure, rapid heart rate, loss of consciousness asphyxiation, coma
Carbon monoxide (byproduct of combustion) Irritation to eyes, skin, and respiratory	Dizziness, confusion, headaches, nausea, weakness, loss of consciousness, asphyxiation, coma
Ethyl benzene (high in gasoline)	Irritation to eyes, skin, and respiratory system; loss of consciousness; asphyxiation; nervous system effects
Hydrogen sulfide (oils high in sulfur, decaying plants and animals)	Irritation to eyes, skin, and respiratory system; dizziness; drowsiness; cough; headaches; nervous system effects
Methyl tert-butyl ether (MTBE) (octane booster and clean air additive for gasoline, or pure MTBE)	Irritation to eyes, skin, and respiratory system; headaches; nausea; dizziness; confusion; fatigue; weakness; nervous system, liver, and kidney
Polycyclic aromatic hydrocarbons (PAHs) (occur in crude oil, and formed during burning of oil)	Irritation to eyes and skin, cancer, possible reproductive effects, immune system effects
Sulfuric acid (byproduct of combustion of sour petroleum product)	Irritation to eyes, skin, teeth, and upper respiratory system; severe tissue burns; cancer
Toluene (high BTEX crude oils)	Irritation to eyes, skin, respiratory system; fatigue; confusion; dizziness; headaches; memory loss; nausea; nervous system, liver, and kidney effects
Xylenes (high BTEX crude oils)	Irritation to eyes, skin, respiratory system; dizziness; confusion; change in sense of balance; nervous system gastrointestinal system, liver, kidney, and blood effects

## Training Requirements

HAZWOPER training requirements that apply to marine oil spill emergency response are located in 29 CFR 1910.120(q)(6). Requirements and training guidance for post-emergency response are in HAZWOPER paragraph (q)(11) and in OSHA Instruction CPL 2-2.51, Inspection Guidelines for Post-Emergency Response Operations Under 29 CFR 1910.120. The HAZWOPER training requirements are based on your workers' assigned duties during an oil spill. For example, if you have deck hands who are assigned to equipment decontamination during and after an oil spill, you need to provide the level of HAZWOPER training required for the duties and hazards of the decontamination tasks.

Figures 1 and 2 comprise a training decision flowchart. Begin at the top of the chart (Figure 1) if your workers participate in emergency response. Begin at Figure 2 (indicated by the arrow) if your workers perform cleanup only after the release is stabilized (post-emergency). Emergency response workers may perform cleanup activities without further HAZWOPER training if you can certify that they have the skills and knowledge to do so safely.

After you determine the type(s) of training your workers need, turn to Table 2 or 3, as indicated on Figure 1. These tables show each type or category of training described in the flowchart. Table 2 contains the emergency response training requirements. For each type of emer-

gency response training shown in the flowchart, Table 2 lists the specific HAZWOPER training requirements and examples of corresponding oil spill job functions.

Table 3 shows post-emergency response training. In the left-hand column, you'll find the hazard characteristics that distinguish each type of training because this is how the HAZWOPER standard itself separates cleanup training categories. Verify that the hazards your workers might face fit within the training category you've chosen. Table 3 also lists the HAZWOPER training requirements and examples of job functions that might require that training.

### Training Content

Because workers need to be trained **before** they respond, you should train your emergency response workers to the highest level of responsibility they might need to assume. You should train your cleanup workers to the highest exposure conditions they may encounter. You must never expect or allow your workers to perform an emergency response or cleanup operation without proper training and certification.

Table 4 lists training topics and competencies for categories of training described in Tables 2 and 3. The listed topics paraphrase the HAZWOPER required competencies listed in paragraphs (q) and (e) of the standard. As an

example, if your workers perform defensive actions for all emergency response operations, they need 8 hours of training in areas 31-36 and competency in areas 25-30 on Table 4. This is equivalent to HAZWOPER requirements for the first-responder operations level in (q)(6)(ii) of the standard.



A vessel carrying more than 7 million gallons of oil breaks apart, spilling its entire cargo.

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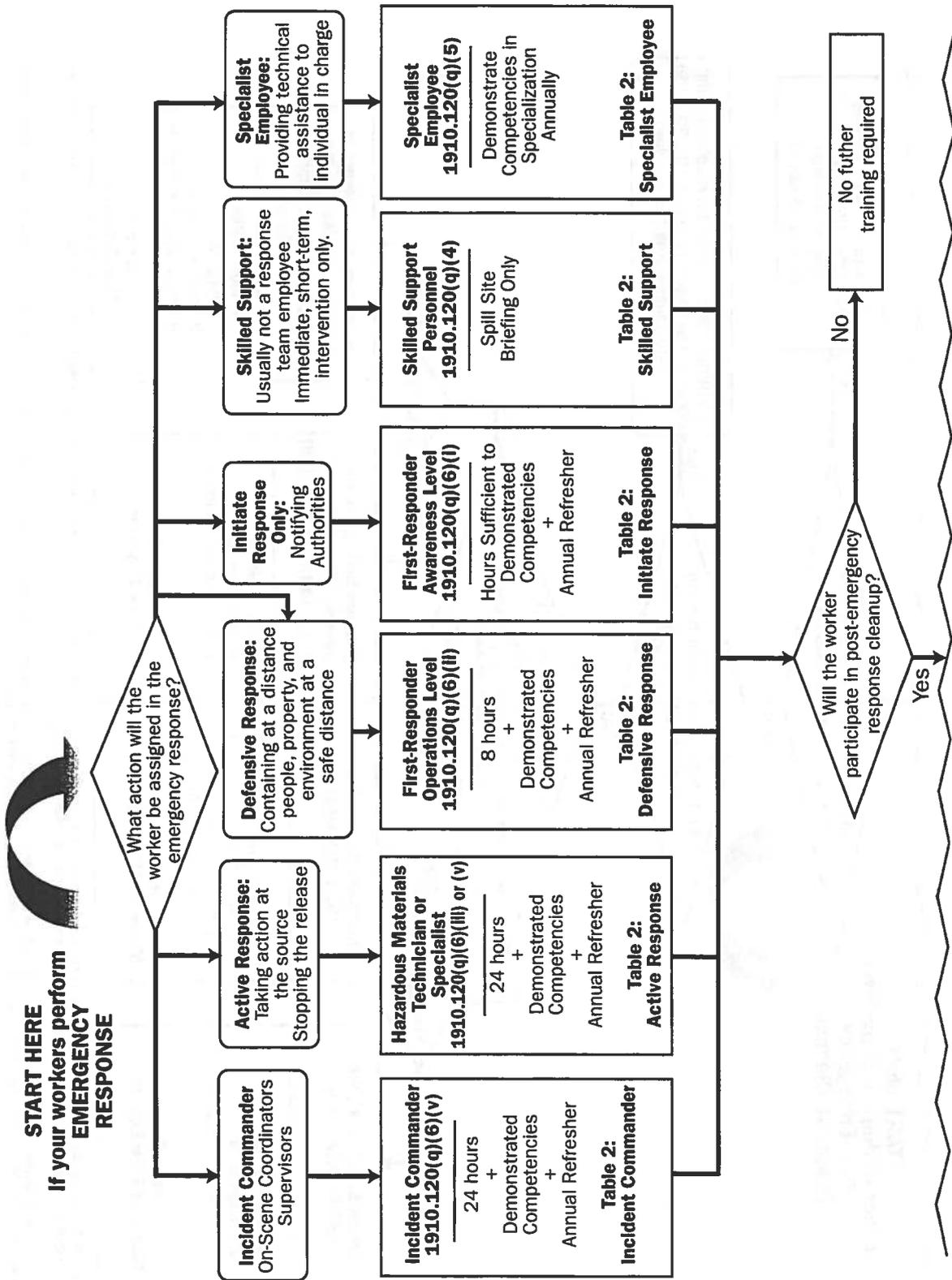
## Certifying and Updating Training

Workers who receive HAZWOPER training must receive a written certificate when they successfully complete the training. This is a requirement of paragraphs (e)(6) and (q)(6). Figure 2, Sample Certifications, illustrates

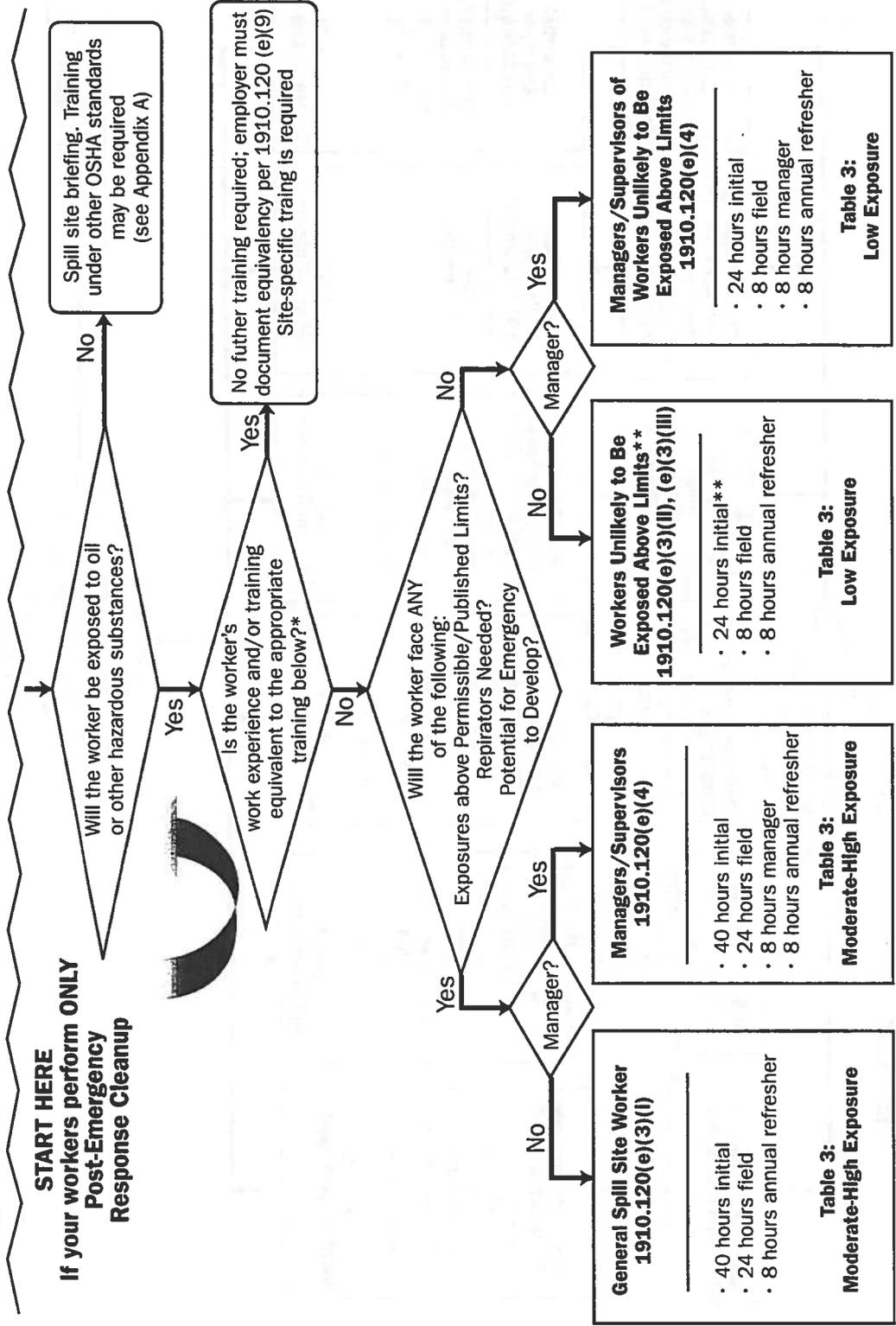
examples of training certification cards given to workers completing various levels of HAZWOPER training. You do not need to repeat the initial training if the worker goes to work at a new site. The worker must have additional training or site briefings, however, that are needed to work safely at the new spill incident or cleanup site. Every year, your emergency responders and cleanup workers must receive refresher training to maintain and demonstrate competency.

Note that Tables 2, 3, and 4 clarify HAZWOPER training requirements. You cannot use these tables as a substitute for the language of the regulation. Also, training required by other OSHA standards that may also apply to your employees is not discussed in this booklet.

**For information about the acceptability of various technology-based training formats, see OSHA letters of interpretation on OSHA's website at: <http://www.osha.gov>.**



**Figure 1. Training Decisions Flowchart for Emergency Response Workers**



\*Typically, First Responder Awareness Level training (1910.120 (q)(6)(i)) will NOT prepare a worker for cleanup operations because it addresses emergency notification procedures only. Workers who could have direct contact with or potential exposure to hazardous substances often need additional training.

\*\*If you need to train workers for a specific spill and for tasks that involve minimal exposure (e.g., beach cleanup workers) you may be able to use the reduced training provision OSHA describe in its compliance directive, CPL 2-2-51. This directive applies in limited circumstances. See the directive and Table 1B.

**Figure 2. Training Decisions Flowchart for Post-Emergency Response Cleanup Workers**

**Table 2. Training for Workers Who Perform Emergency Response**

Job functions are examples only. Workers should be trained to the highest level of responsibility you would assign them. See Table 4 for descriptions of training topics and competency areas.

Job Function Examples		Minimum Training & Experience
Incident Commander	<ul style="list-style-type: none"> <li>- On-Scene Coordinators</li> <li>- On-Scene Coordinator Representatives</li> <li>- On-Scene Industry Representatives</li> <li>- ICS Operations Section Chief</li> <li>- ICS Site Safety Enforcement Personnel</li> <li>- Work close to flammable/combustible liquids such as in a pumping operation</li> <li>- Work in confined or enclosed spaces containing volatile oil</li> <li>- Underwater free-floating oil removal</li> <li>- Soil/ sand subsurface oil assessment</li> <li>- Plugging holes/emergency repairs to source</li> <li>- Diving operations close to source</li> <li>- Work adjacent to volatile fuel during initial spill hours (boat operations, etc.)</li> <li>- Site characterization of chemical exposures, air monitoring/sampling</li> <li>- Soil investigation/sampling</li> <li>- Dispersant application and monitoring operations</li> <li>- In-situ burn and monitoring operations</li> <li>- Application of herding agents/emulsion breakers</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• 24 hours initial emergency response training covering areas 25-36 <b>AND</b> competency in areas 1-6</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36 and 1-6</li> </ul>
Active Response	<ul style="list-style-type: none"> <li>- Supervisors/Managers</li> <li>- ICS Safety Officer</li> <li>- ICS Group Supervisors</li> <li>- Marine chemist activities</li> <li>- Salvage response</li> <li>- Booming operations at source</li> <li>- Vessel damage assessment</li> <li>- Accident investigation</li> <li>- Firefighting response</li> </ul>	<p><b>As shown on Figure 1</b></p> <p><b>Technician Level [(q)(6)(III)]:</b></p> <ul style="list-style-type: none"> <li>• 24 hours initial emergency response training covering areas 25-36 <b>AND</b> competency in areas 7-15</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36 and 7-15</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p><b>Specialist Level [(q)(6)(IV)]:</b></p> <ul style="list-style-type: none"> <li>• 24 hours initial emergency response training covering areas 7-15 and 25-36 <b>AND</b> competency in areas 16-24</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 7-36</li> </ul>
Defensive Response	<ul style="list-style-type: none"> <li>- Booming operations at a safe distance*</li> <li>- Surface level shoreline impact assessment</li> <li>- Manual pickup and removal of irritant oil and oily debris for oils that could be re-released into environment</li> <li>- Damming/diking at a safe distance</li> <li>- Loading of oil into receptacles at a safe distance</li> <li>- Emergency medical personnel (if working in contaminated areas)</li> <li>- Staging area managers</li> <li>- Vacuum truck operations at a safe distance</li> <li>- Security operations</li> <li>- Safety zone enforcement</li> <li>- Skimmer/boat operations at a safe distance</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• 8 hours initial emergency response training covering areas 31-36 <b>AND</b> competency in areas 25-30</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36</li> </ul>

**Table 2. Training for Workers Who Perform Emergency Response (Cont).**

	<b>Job Function Examples</b>	<b>Minimum Training &amp; Experience</b>
<b>Initiate Response</b>	<ul style="list-style-type: none"> <li>- Crew members who discover a release and alert the proper emergency response personnel</li> <li>- Industry and government watchstanders</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Sufficient hours to demonstrate competency in areas 31-36</li> <li>• Annual refresher training including demonstration of competency in areas 31-36</li> <li>• Additional training required for post-emergency cleanup activities unless there is no exposure to hazardous substances. See Figure 1 for guidance.</li> </ul>
<b>Skilled Support</b>	<ul style="list-style-type: none"> <li>- Immediate, short-term intervention of a specialized nature that cannot be performed by other workers</li> <li>- On-scene resource documentation</li> <li>- Operation of certain equipment, such as mechanized digging equipment, cranes, and other hoisting equipment</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Spill site briefing in areas 55-59</li> </ul>
<b>Specialist Employer</b>	<ul style="list-style-type: none"> <li>- Dispersion modeling personnel</li> <li>- Meteorologist</li> <li>- Analytical chemical/oil specialist</li> <li>- Professional engineer/spill recovery system or shipbuilding specialist</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Briefing covering areas 55-59</li> <li>• Training or demonstrated competency in area of specialization annually</li> </ul>

**NOTES:**

1. Tables 2, 3, and 4 are intended to clarify HAZWOPER (29 CFR 1910.120 or 1926.65) training requirements for marine oil spill response. The tables do not relieve employers from the requirements of HAZWOPER, nor do they specifically address training that may be required by other OSHA standards.
2. All employees should receive pre-entry site briefings covering, at a minimum, training areas 55-59 in Table 4.
3. Table 4 lists the training areas referenced throughout Tables 2 and 3. For example, an Incident Commander must receive 24 hours of initial training covering training areas 25-36 in Table 4.

\*Defensive personnel must be at a safe distance from the point of release, outside the hot zone or danger zone.

**Table 3. Training for Workers Who Perform Only Post-Emergency Response**

Job functions are examples only. Workers should be trained to the highest level of responsibility you would assign them.

Job/Site Characterization	Job Function Examples	Minimum Training & Experience
<p><b>Moderate-High (At/Above Exposure Limits)</b></p> <ul style="list-style-type: none"> <li>• Unknown oil or unknown hazardous substance mixed with oil</li> <li>• Exposures equal or exceed exposure limits or other published limits</li> <li>• Respiratory protection required</li> <li>• Concentrations at or above 10 percent of the Lower Explosive Limit (LEL)</li> <li>• Oxygen levels <math>\geq</math> 19.5 &lt;22 percent</li> <li>• Carcinogen: known or suspected</li> <li>• Situations in which oil is known but parameters above cannot be reasonably assessed</li> </ul>	<ul style="list-style-type: none"> <li>- Manual cleanup of stranded oil with potential skin carcinogens (e.g., benzo (a) pyrene)</li> <li>- Cleanup of stranded oil when toxic chemicals are persistent and above exposure limits</li> <li>- Wildlife capture and treatment depending on explosives</li> <li>- Load and transfer piled oil-saturated decaying plants and animals that provide a hydrogen sulfide risk</li> <li>- Cleanup of stranded oil in confined spaces</li> <li>- On land marsh burning operations</li> </ul>	<ul style="list-style-type: none"> <li>• 40 hours of initial training in areas 37-43 and 3 days supervised field experience, or equivalent training certification</li> <li>• At least 8 hours of annual refresher training</li> <li>• Supervisory/management personnel must also receive 8 hours of additional initial training covering at a minimum areas 51-54</li> </ul>
<p><b>Low (Below Exposure Limits)</b></p> <p><b>Routine spill cleanup workers [(e)(3)(III)]:</b></p> <ul style="list-style-type: none"> <li>• Oil and other hazards of spill constituents known</li> <li>• Exposures may cause irritation (skin, eye, respiratory) but are below permissible published limits</li> <li>• Oxygen levels <math>\geq</math> 19.5 &lt;22 percent</li> <li>• Concentrations less than 10 percent, but more than the LEL</li> <li>• Other significant hazards may be present: Physical, safety, ergonomic, thermal.</li> </ul> <p><b>[(e)(3)(II)]:</b></p> <ul style="list-style-type: none"> <li>• Oil and other hazards of spill constituents known</li> <li>• Exposures below permissible/published limits</li> </ul>	<ul style="list-style-type: none"> <li>- Pressure washing operations of stranded weathered oil</li> <li>- Cutting of contaminated live vegetation</li> <li>- Natural resource damage assessment</li> <li>- Bioremediation operations</li> <li>- Shoreline cleanup assessment</li> <li>- Vessel/equipment decontamination</li> <li>- Underwater stranded oil removal operations</li> <li>- Soil/sand substance oil removal</li> <li>- Containerized/packaged waste handling and disposal for transport operations</li> </ul>	<p><b>As shown in Figure 1</b></p> <ul style="list-style-type: none"> <li>• 24 hours of initial training in areas 44-50 and 1 day supervised field experience, or equivalent training</li> <li>• At least 8 hours of annual refresher training</li> <li>• Supervisory management personnel must also receive 8 hours of additional initial training covering at a minimum areas 51-54</li> </ul>

**Table 3. Training for Workers Who Perform Only Post-Emergency Response (Cont.)**

<b>Job/Site Characterization</b>	<b>Job Function Examples</b>	<b>Minimum Training &amp; Experience</b>
<p><b>Non-Recurring/Minimal Exposure</b></p> <ul style="list-style-type: none"> <li>• Oil and other spill constituents known</li> <li>• Exposures below permission/published limits</li> <li>• Respirators not required</li> <li>• Oxygen levels <math>\geq 19.5</math> &lt;22 percent</li> <li>• No potential for chemical emergency, explosion, or fire</li> <li>• Minimal irritants to respiratory system, eyes, or skin</li> <li>• No significant physical, safety, ergonomic, and thermal hazards</li> </ul>	<ul style="list-style-type: none"> <li>- Workers who do not participate in marine oil spill responses on a frequent recurring basis and who will have minimal exposure</li> <li>- Tarball shoreline cleanup</li> <li>- On scene cost documentation</li> <li>- Operators of large construction vehicles during stranded oil removal</li> </ul>	<p><b>As footnoted in Figure 1</b></p> <ul style="list-style-type: none"> <li>• If conditions described in CPL 2-2.51 are met, reduced initial training or equivalent training certification covering items 44-50</li> <li>• Up-to-date training consistent with 1910.38(a) and 1910.1200, and health and safety training associated with assigned tasks</li> </ul> <p><b>Supervisory/management personnel must receive:</b></p> <ul style="list-style-type: none"> <li>• At least 24 hours of initial training in areas 44-50 and 1 day of supervised field experience;</li> <li>• 8 hours of additional initial training covering at a minimum areas 51-54; and</li> <li>• 8 hours annual refresher training</li> </ul>
<p><b>No Exposure</b></p> <ul style="list-style-type: none"> <li>• Area characterized and stable with:</li> <li>• <b>No potential for exposure to hazardous waste or substances by any route (i.e., inhalation, skin absorption, ingestion)</b></li> <li>• <b>No safety hazards associated with hazardous waste or hazardous substances</b></li> </ul>	<ul style="list-style-type: none"> <li>- Aerial photo documentation - Historians</li> <li>- Command Post support - Press</li> <li>- Food service personnel</li> <li>- Legal representation</li> <li>- Over-flight assessment (if no potential for exposure)</li> <li>- Resource tracking (if no potential for exposure)</li> <li>- Financial services personnel</li> </ul>	<p><b>As shown in Figure 1</b></p> <ul style="list-style-type: none"> <li>• Briefing covering areas 55-59</li> </ul>

**NOTES:**

1. Tables 2, 3, and 4 are intended to clarify HAZWOPER (29 CFR 1910.120 or 1926.65) training requirements for marine oil spill response. The tables do not relieve employers from the requirements of HAZWOPER, nor do they specifically address training that may be required by other OSHA standards.
2. All employees should receive pre-entry site briefings covering, at a minimum, training areas 55-59 in Table 4.
3. Equivalent training must be documented or certified by the employer. The documentation or certification must show that an employee's work experience and/or training has resulted in training equivalent to the training required in paragraphs (e)(1) through (e)(4) of 1910.120. Equivalently trained employees must receive appropriate, site-specific training prior to site entry and have appropriate supervised experience at the new site. Equivalent training includes any academic training or the training that existing employees might have received from prior spill site experience. Certification or documentation as equivalently trained does not apply to refresher training requirements.
4. Table 4 lists the training areas referenced throughout Tables 2 and 3. For example, Supervisory/Management personnel in low exposure level conditions must receive 8 hours of additional initial training covering those training areas 51-54 in Table 4.
5. The oxygen concentration range used in these tables,  $\geq 19.5$  < 22 percent, is consistent with 29 CFR 1915 Subpart B, Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment.

**Table 4. Training Topics and Competency Areas (from Tables 2 and 3)**

<p><b>ON-SCENE COORDINATOR</b></p> <ol style="list-style-type: none"> <li>1) Know and be able to implement the employer's incident command system.</li> <li>2) Know how to implement the employer's emergency response plan.</li> <li>3) Know and understand the hazards and risks associated with employees working in personal protective clothing.</li> <li>4) Know how to implement the local emergency response plan.</li> <li>5) Know the state emergency response plan and the Federal Regional Response Team.</li> <li>6) Know and understand the importance of decontamination procedures.</li> </ol>	<ol style="list-style-type: none"> <li>22) Understand chemical, radiological, and toxicological terminology and behavior.</li> <li>23) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.</li> <li>24) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.</li> </ol> <p><b>DEFENSIVE RESPONSE</b></p> <ol style="list-style-type: none"> <li>25) Know basic hazard and risk assessment techniques.</li> <li>26) Know how to select and use proper personal protective equipment necessary for the first responder operation level.</li> </ol>	<ol style="list-style-type: none"> <li>41) Know the contents of the safety and health plan for the specific cleanup.</li> <li>42) Know and be able to recognize signs and symptoms of overexposure to hazards present.</li> <li>43) Know the medical surveillance requirements.</li> </ol>
<p><b>ACTIVE RESPONSE</b></p> <ol style="list-style-type: none"> <li>7) Know how to implement the employer's emergency response plan.</li> <li>8) Know how to use field survey instruments and equipment to classify, identify, and verify known and unknown materials.</li> <li>9) Be able to function within an assigned role in the Incident Command System.</li> <li>10) Know how to select and use proper specialized personal protective equipment provided to the hazardous materials technician.</li> <li>11) Understand and be able to apply hazard and risk assessment techniques.</li> </ol>	<ol style="list-style-type: none"> <li>27) Understand basic hazardous materials terms.</li> <li>28) Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and available personal protective equipment.</li> <li>29) Know how to implement basic decontamination procedures.</li> <li>30) Understand the relevant standard operating and termination procedures.</li> </ol> <p><b>INITIATE RESPONSE ONLY</b></p> <ol style="list-style-type: none"> <li>31) Understand the hazards of oil and the risks in a spill.</li> <li>32) Understand what happens during an emergency involving spilled oil.</li> <li>33) Recognize the presence of oil or related hazardous materials in an emergency.</li> <li>34) Identify hazardous substances, if possible (e.g., appearance, smell, monitoring equipment).</li> <li>35) Understand individual role in employer's emergency response plan.</li> <li>36) Recognize when help is needed and when to request assistance from the response team.</li> </ol>	<ol style="list-style-type: none"> <li>44) Know the name(s) of and how to contact site safety and health personnel for spill cleanup.</li> <li>45) Know the safety, health, and other hazards present during oil spill cleanup.</li> <li>46) Know safe cleanup work practices including decontamination procedures to minimize risks.</li> <li>47) Know how to use available controls and equipment, including contamination control and personal protective equipment, to minimize risks from hazards present.</li> <li>48) Know the contents of the safety and health plan prepared for the specific cleanup.</li> <li>49) Know and be able to recognize signs and symptoms of overexposure to hazards present.</li> <li>50) Know the medical surveillance requirements.</li> </ol>
<ol style="list-style-type: none"> <li>12) Be able to perform advanced control, containment, and/or confinement operations within the capabilities of the resources and available personal protective equipment.</li> <li>13) Understand and implement decontamination procedures.</li> <li>14) Understand termination procedures.</li> <li>15) Understand terminology and behavior of chemicals and their toxic effects.</li> <li>16) Know how to use advanced survey instruments and equipment to classify, identify, and verify known and unknown materials.</li> <li>17) Understand in-depth hazard and risk techniques.</li> <li>18) Be able to determine and implement decontamination procedures.</li> <li>19) Know how to implement the local emergency response plan.</li> <li>20) Know the state emergency response plan.</li> <li>21) Be able to develop a site safety and control plan.</li> </ol>	<ol style="list-style-type: none"> <li>37) Know the name(s) of and how to contact the site safety and health personnel for spill cleanup.</li> <li>38) Know the safety, health, and other hazards present during oil spill cleanup.</li> <li>39) Know safe cleanup work practices including decontamination procedures to minimize risks.</li> <li>40) Know how to use available controls and equipment, including contamination control procedures and personal protective equipment, to minimize risks.</li> </ol>	<ol style="list-style-type: none"> <li>51) Know and be able to implement effectively the employer's safety and health program.</li> <li>52) Know and be able to implement effectively the employer's personal protective equipment plan.</li> <li>53) Know and be able to implement effectively the employer's spill containment program.</li> <li>54) Know and be able to implement effectively health hazard monitoring procedure and techniques.</li> </ol> <p><b>BRIEFING TOPICS</b></p> <ol style="list-style-type: none"> <li>55) Purpose of visit or duties to be performed.</li> <li>56) Site personnel, chain-of-command, and communications procedures.</li> <li>57) Chemical/physical hazards involved, signs and symptoms of exposure.</li> <li>58) Emergency alarm system, escape routes, and places of refuge.</li> <li>59) Appropriate contamination control procedures, personal protective equipment, decontamination, and other control measures provided.</li> </ol>
	<p><b>POST-EMERGENCY CLEANUP—EXPOSURES ABOVE EXPOSURE LIMITS</b></p> <ol style="list-style-type: none"> <li>37) Know the name(s) of and how to contact the site safety and health personnel for spill cleanup.</li> <li>38) Know the safety, health, and other hazards present during oil spill cleanup.</li> <li>39) Know safe cleanup work practices including decontamination procedures to minimize risks.</li> <li>40) Know how to use available controls and equipment, including contamination control procedures and personal protective equipment, to minimize risks.</li> </ol>	<p><b>POST-EMERGENCY CLEANUP—EXPOSURES BELOW EXPOSURE LIMITS OR NON-RECURRING MINIMAL EXPOSURE</b></p> <ol style="list-style-type: none"> <li>41) Know the contents of the safety and health plan for the specific cleanup.</li> <li>42) Know and be able to recognize signs and symptoms of overexposure to hazards present.</li> <li>43) Know the medical surveillance requirements.</li> </ol>

**Figure 3. Sample Certifications**

<p>No. 00232</p>	<p>This is to certify that</p> <p><b>John Smith</b></p> <p>has satisfactorily completed</p> <p><b>40-Hour HAZWOPER Marine Oil Spill Training</b></p> <p>as described in 29 <i>CFR</i> 1910.120(e)</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

<p>No. 00233</p>	<p>This is to certify that</p> <p><b>Jane Smith</b></p> <p>has satisfactorily completed</p> <p><b>8-Hour HAZWOPER Marine Oil Spill</b></p> <p><b>Supervisor Training</b></p> <p>as described in 29 <i>CFR</i> 1910.120(e)(4)</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

<p>No. 00234</p>	<p>This is to certify that</p> <p><b>Joy Smith</b></p> <p>satisfactorily completed</p> <p><b>HAZWOPER Post-Emergency Response</b></p> <p><b>Cleanup Training for Minimal Exposure Conditions</b></p> <p><b>Only for (insert name of spill) Spill</b></p> <p>consistent with OSHA CPL 2-2.51</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

<p>No. 00235</p>	<p>This is to certify that</p> <p><b>James Smith</b></p> <p>has satisfactorily completed</p> <p><b>24-Hour Marine Oil Spill Training</b></p> <p><b>for Hazardous Materials Technicians</b></p> <p>and demonstrated the necessary competencies</p> <p>as described in 29 <i>CFR</i> 1910.120(q)(6)(iv)</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

<p>No. 00236</p>	<p>This is to certify that</p> <p><b>Julie Smith</b></p> <p>has satisfactorily completed</p> <p><b>8-Hour HAZWOPER Marine Refresher Training</b></p> <p><b>for Hazardous Waste Site Workers</b></p> <p>as described in 29 <i>CFR</i> 1910.120(e)(8)</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

<p>No. 00237</p>	<p>This is to certify that</p> <p><b>Joe Smith</b></p> <p>has satisfactorily demonstrated competency</p> <p>in lieu of annual refresher training for</p> <p><b>Marine Oil Spill First Responder Operations Level</b></p> <p>as described in 29 <i>CFR</i> 1910.120(q)(8)</p>	<p>Date</p>
<p><b>H.L. Teacher, Instructor</b></p> <p>SEA Training Institute</p> <p>Street, City, ST 00001</p>		<p>Date</p>

## Oil Spill Scenario

This scenario is not intended to represent a typical marine oil spill. It illustrates levels of training needed for several job functions and hazardous exposure levels. Information in parentheses refers to the training levels in the Figure 1 flowchart.

### Incident

A tugboat is pushing a barge loaded with a sour crude that contains sulfur, benzene, toluene, and xylene to an anchorage for lightering (See Figure 4). The anchorage is within sight of the local Coast Guard Marine Safety Office. Contractor resources also are located in the port within view of the anchorage. The tug pushing the barge miscalculates the turning radius, causing the barge to collide with the stern of a tank vessel. The vessels lock together. As a result, two of the barge's port cargo tanks are breached, releasing several thousand gallons of crude oil into the water. Prevailing winds and currents carry the oil away from the vessels. Some oil is trapped between the barge and the tank vessel.

It is midday on a sunny summer day. The wind is 5 knots. The water temperature is around 70 degrees Fahrenheit. Air temperature is around 84 degrees Fahrenheit.

### Discovery

Members of the tug crew immediately notify the Coast Guard of the incident (Figure 1: First Responder Awareness Level).

The tug and tank vessel crews remain with their vessels to ensure control of their ships. Vapors from the fresh oil begin to irritate the eyes of the captains and the crews. Both captains order crew members to remain upwind of the oil and avoid the area between the vessels where the oil is trapped.

### Initial Emergency Response

The owner of the barge is located across the country. According to the company's emergency response plan, the owner calls an Oil Spill Removal Organization (OSRO) to clean up the spill. The tug captain is designated by the owner to be the company's representative. Because the owner is not on-scene and does not participate in spill response activities, he is not required to have HAZWOPER training. The tug captain is on-scene making decisions in the response. Therefore, the tug captain must have Incident Commander training for emergency response (Figure 1: Incident Commander).

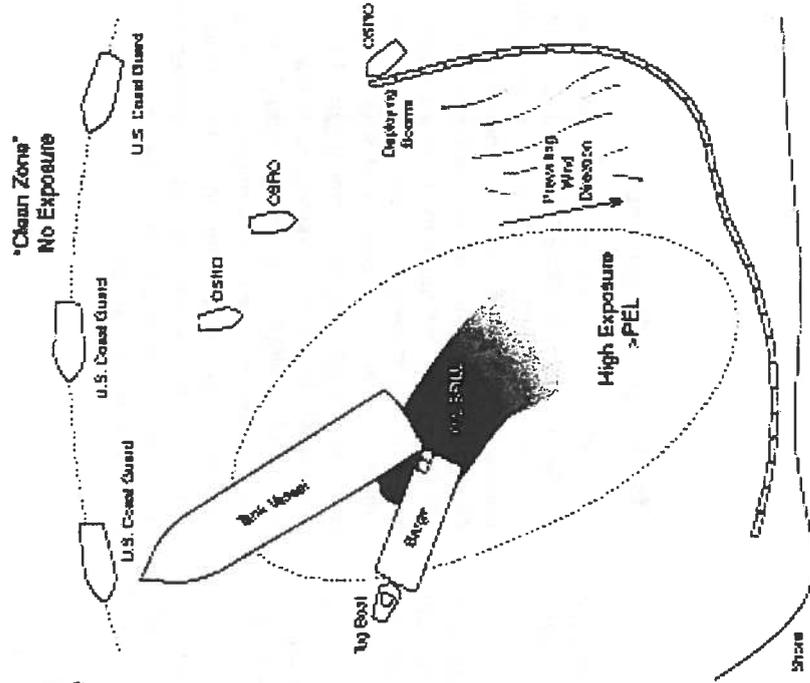


Figure 4. Illustration of Incident

The Coast Guard radios the tug captain to confirm the oil type, the same type listed on the cargo manifest faxed by the owner. The owner also faxes the cargo manifest to the OSRO. The Coast Guard uses references and advice from federal health professionals to estimate a safe distance from the spill.

After consultation with references, mathematical computer models, and federal health and safety professionals, the Coast Guard creates a safety zone around the spill and uses its boats to enforce it (Figure 1: First-Responder Operations Level).

The safety zone is conservatively large to maximize public safety. Support staff, news media, and other workers who will have no exposure to hazardous substances (Figure 1: Workers unlikely to be exposed over limits) will use the safety zone.

### **Initial Assessment**

An hour after the initial oil release, two OSRO boats approach the spill from downwind to characterize the plume and determine the release zone boundaries. Their crews will monitor exposure levels using air-monitoring equipment (Figure 1: Hazardous Materials Technician or Specialist). Because exposure to hydrogen sulfide and benzene is expected, these responders must wear self-contained breathing apparatus (SCBA) while confirming estimated exposures. They may be able to switch to air-purifying respirators after the assessment.

### **Mechanical Recovery**

Four hours have passed. Air measurements of hydrogen sulfide, benzene, toluene, and xylene, taken with colorimetric tubes, register well below permissible exposure limits near the leading edge of the slick. An industrial hygienist and a marine chemist conduct a more detailed site characterization using advanced air-monitoring equipment such as a portable infrared analyzer and portable gas chromatograph (Figure 1a: Hazardous Materials Technician/Specialist, or Specialist Employee, depending on job duties). They confirm that the air exposures from the oil slick are below permissible limits. Air concentrations are above permissible limits, however, near oil trapped between the vessels and oil remaining in the damaged tanks.

They continue monitoring as the OSRO boats approach the spill until reaching permissible exposure limits. The boats work around the spill area to identify the limits of the High Exposure zone caused by vapors escaping the oil. Colorimetric tubes confirm air concentrations of 0.5 ppm of benzene and 4 ppm hydrogen sulfide at 200 feet (61 meters) downwind of the slick and 100 feet (30 meters) across the widest part of the plume.

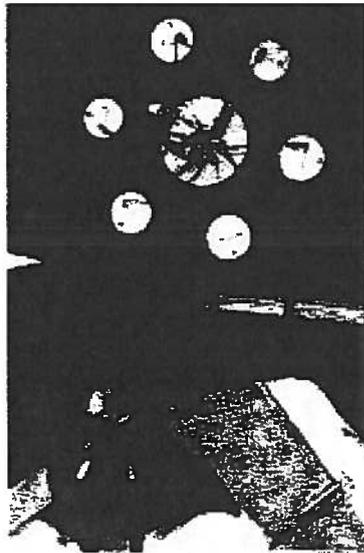
The responders complete site characterization in areas where oil could be trapped between vessels, beneath piers, and in dock corners and other bounded spaces.

Outside the high exposure zone (the hot zone), workers prepare deflection and exclusion booms to divert the oil to a recovery site (Figure 1: First-Responder Operations Level).

The response team sets up a command center to coordinate response and cleanup activities. This area supports the Incident Commander, (Figure 1: Incident Commander), supervisors of the clean-up crews (Figure 1: Managers/Supervisors) with hourly requirements dependent on exposure, and other personnel (training depends on duties and exposures).

Oil recovery skimmers arrive to skim free-floating oil. Containment boom and skimmer operators work from a boat. These operators wear goggles and protective clothing because the oil could irritate their skin and eyes. Because air concentrations are below permissible limits, operators are not required to wear respirators (Figure 1: First-Responder Operations Level).

The ships' support crews remain upwind of the spill (Figure 1: Skilled Support Personnel or Figure 1: Workers unlikely to be exposed over limits).



Tending an oil skimmer.

## Shoreline Cleanup

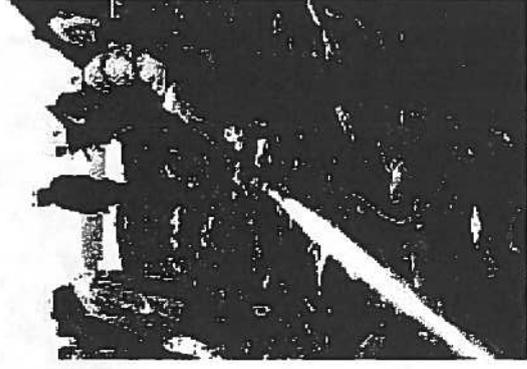
Six hours have passed. Oil reaches the shoreline. Skimmers near the shore remove oil that was deflected into recovery areas (Figure 1: First-Responder Operations Level, if these workers also participate in emergency response; or Figure 1: Workers unlikely to be exposed over limits, if these workers perform cleanup only).

The oil continues to irritate skin and eyes, so workers cleaning the shoreline wear chemical protective clothing, gloves, booties, and goggles. Because of the increased clothing requirements, site safety officer assistants begin monitoring for heat stress (Figure 1: Skilled Support Personnel or Figure 2: Workers unlikely to be exposed over limits, depending on the assistants' job duties).

Responders form decontamination lines at each shoreline cleanup area. Each worker decontaminates before a break period and at the end of the shift. Workers dispose of outer booties, wash or remove oiled clothing, dispose of outer gloves, wash goggles and remove inner gloves. To minimize the spread of contamination, workers conduct their own decontamination while a worker stands by to assist. The decontamination assistants take responsibility for maintaining and dismantling the decontamination line (Figure 2: Workers unlikely to be exposed over limits, if these workers perform cleanup operations only).

## Vessel

A skimming team recovers oil trapped between the vessels. Vessel personnel in SCBAs measure chemical and oxygen concentrations and the percentage of the lower explosive limit (LEL) for the space between the vessels (Figure 1: Hazardous Materials Technician/Specialist, or Specialist Employee, depending on job duties). Results of the monitoring indicate that workers conducting skimming operations must also be in SCBA. The workers decide to wait until exposure levels register below permissible limits before removing the oil.



Cleanup worker in Level C personal protective equipment.

Aboard the barge, a pumping team prepares to pump oil from the damaged cargo tanks into the tank vessel (Figure 1: Hazardous Materials Technician or Specialist). Explosion is a risk during pumping operations, so responders measure the LEL percentage and oxygen concentration throughout the operation. Before starting the pumping operations, workers in SCBAs put vapor recovery systems in place. Once the vapor recovery systems are in place, measured chemical concentration levels drop below permissible exposure limits and workers begin pumping.

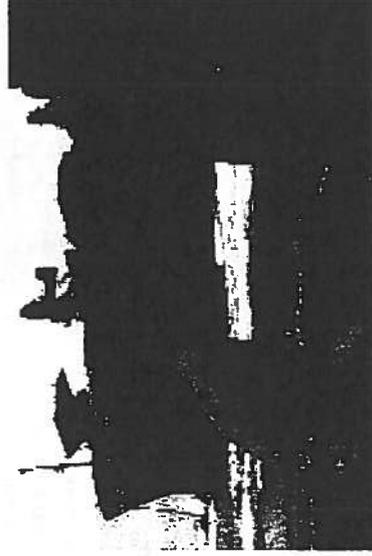
### **Final Stages**

Two days later, no free-floating oil remains. Pumping operations are completed. No hazardous chemicals are detected by air-monitoring equipment. The oil is weathered and is no longer an irritant; however, slip and trip hazards persist. Shoreline cleanup operations continue.

No repair facility is located within a reasonably safe distance for transport, so workers conduct initial, temporary repairs for safe sailing. They clean the damaged tanks inside and out before patching and welding them. There is a risk of explosion, oxygen deficiency, and overexposures to chemicals (Figure 1: General Spill Site Worker, if the workers perform cleanup only). Forced ventilation makes the holds safe, and a competent person tests them before the cleaning begins. A marine chemist tests and certifies the areas Safe for Hot Work before cutting and/or welding operations begin.

The company's site safety and health plan does not cover the disposal of waste containers. Because of this oversight, oiled debris and waste decay in the containers, releasing hydrogen sulfide. A hazardous materials response team removes the contaminated waste from the containers (Figure 1: General Spill Site Worker).

A week has passed. To speed removal of remaining debris on shore, training is offered to a team of local volunteers (Figure 2: Workers unlikely to be exposed above limits, and associated footnote). Trained supervisors (Figure 2: Managers/Supervisors of workers unlikely to be exposed above limits, with training level dependent on anticipated exposures) oversee the volunteers. As shoreline cleanup progresses, shoreline clean-up assessment teams begin to verify that shorelines are clean (Figure 2: Workers unlikely to be exposed above limits).



Shoreline cleanup operations during New Carlissa oil spill, March 2000.

## Other Sources of OSHA Assistance

### **Safety and Health Program Management Guidelines**

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their related costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended *Safety and Health Program Management Guidelines (Federal Register 54(16): 3904-3916, January 26, 1989)*. These voluntary guidelines apply to all places of employment covered by OSHA.

The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

- Management leadership and employee involvement,
- Worksite analysis,
- Hazard prevention and control, and
- Safety and health training.

The guidelines recommend specific actions, under each of these general elements, to achieve an effective safety and health program. The *Federal Register* notice containing the guidelines is available online at [www.osha.gov](http://www.osha.gov).

### **State Programs**

The *Occupational Safety and Health Act of 1970 (OSH Act)* encourages states to develop and operate their own job safety and health plans. OSHA approves and monitors these plans. There are currently 26 state plan states; 23 of these states administer plans covering both private and public (state and local government) employment; the other 3 states—Connecticut, New Jersey, and New York—cover the public sector only.

The 25 states and territories with their own OSHA-approved occupational safety and health plans must adopt standards identical to, or at least as effective as, the federal standards. Until a state standard is promulgated, OSHA will provide interim enforcement assistance, as appropriate, in these states. A listing of states with approved plans appears at the end of this booklet.

### **Consultation Services**

Consultation assistance is available on request to employers who want help in establishing and maintaining a safe and healthful workplace. Largely funded by OSHA, the service is provided at no cost to the employer. Primarily developed for smaller employers with more hazardous operations, the consultation service is delivered by state governments employing professional safety and health consultants. Comprehensive

assistance includes an appraisal of all mechanical systems, physical work practices, and occupational safety and health hazards of the workplace and all aspects of the employer's present job safety and health program. In addition, the service offers assistance to employers in developing and implementing an effective safety and health program. No penalties are proposed or citations issued for hazards identified by the consultant.

For more information concerning consultation assistance, see the list of consultation projects listed at the end of this publication, or visit OSHA's website at [www.osha.gov](http://www.osha.gov).

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## **Voluntary Protection Programs (VPPs)**

Voluntary Protection Programs and onsite consultation services, when coupled with an effective enforcement program, expand worker protection to help meet the goals of the OSH Act. The three VPPs—Star, Merit, and Demonstration—are designed to recognize outstanding achievements by companies that have successfully incorporated comprehensive safety and health programs into their total management system. The VPPs motivate others to achieve excellent safety and health results in the same outstanding way as they establish a cooperative relationship between employers, employees, and OSHA.

For additional information on VPPs and how to apply, contact the OSHA regional offices listed at the end of this publication.

## **Training and Education**

OSHA's area offices offer a variety of information services, such as publications, audiovisual aids, technical advice, and speakers for special engagements. OSHA's Training Institute in Des Plaines, IL, provides basic and advanced courses in safety and health for federal and state compliance officers, state consultants, federal agency personnel, and private sector employers, employees, and their representatives.

The OSHA Training Institute also has established OSHA Training Institute Education Centers to address the increased demand for its courses from the private sector and from other federal agencies. These centers are nonprofit colleges, universities, and other organizations that have been selected after a competition for participation in the program. They are located in various parts of the U.S.

OSHA also provides funds to nonprofit organizations, through grants, to conduct workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually. Grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, (847) 297-4810.

For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

## **Electronic Information**

Internet—OSHA standards, interpretations, directives, and additional information are now on the World Wide Web at <http://www.osha.gov>.

CD-ROM—A wide variety of OSHA materials, including standards, interpretations, directives, and more, can be purchased on CD-ROM from the U.S. Government Printing Office. To order, write to the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 or phone (202) 512-1800. Specify OSHA Regulations, Documents and Technical Information on CD-ROM (ORDT), GPO Order No. S/N 729-013-00000-5. The price is \$46 per year (\$57.50 foreign); \$17 per single copy (\$21.25 foreign).

## **Emergencies**

For life-threatening situations, call (800) 321-OSHA. The teletypewriter (TTY) number is (877) 889-5627. Complaints will go immediately to the nearest OSHA area or state office for help. For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

## Appendix A: Related OSHA Standards and Directives

OSHA standards, interpretations, and directives are available online at <http://www.osha.gov>

### Occupational Safety and Health Standards

1910 Subpart D - Walking-Working Surfaces  
1910 Subpart E - Means of Egress  
1910 Subpart F - Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms

1910 Subpart G - Occupational Health and Environmental Control

1910 Subpart H - Hazardous Materials

1910 Subpart I - Personal Protective Equipment

1910 Subpart J - General Environmental Controls

1910 Subpart K - Medical and First Aid

1910 Subpart L - Fire Protection

1910 Subpart M - Compressed Gas and Compressed Air Equipment

1910 Subpart N - Materials Handling

1910 Subpart O - Machinery and Machine Guarding

1910 Subpart P - Hand and Portable Powered Tools and Other Hand-Held Equipment

1910 Subpart Q - Welding, Cutting, and Brazing

1910 Subpart S - Electrical

1910 Subpart T - Commercial Diving Operations

1910 Subpart Z - Toxic and Hazardous Substances

### Occupational Safety and Health Standards for Shipyard Employment

1915 Subpart B Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment

1915 Subpart C - Surface Preparation and Preservation

1915 Subpart D - Welding, Cutting, and Heating

1915 Subpart E - Scaffolds, Ladders, and Other Working Surfaces

1915 Subpart F - General Working Conditions

1915 Subpart G - Gear and Equipment for Rigging and Materials Handling

1915 Subpart H - Tools and Related Equipment

1915 Subpart I - Personal Protective Equipment

1915 Subpart J - Ship's Machinery and Piping Systems

1915 Subpart L - Electrical Machinery

1915 Subpart Z - Toxic and Hazardous Substances

### Compliance Directives

Inspection Guidelines for Post-Emergency Response Operations Under 29 CFR 1910.120 - Directive Number: CPL 2-2.51

Inspection Procedures for the Hazardous Waste Operations and Emergency Response Standard, 29 CFR 1910.120 and 1926.65, Paragraph (q): Emergency Response to Hazardous Substance Releases - Directive Number: CPL 2-2.59A

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## **Appendix B: Related OSHA Publications**

Single copies of the following booklets can be obtained from the nearest OSHA area or regional office or the U.S. Department of Labor, OSHA/OSHA Publications, P.O. Box 37535, Washington, DC 20013-7535. Telephone (202) 693-1888 or fax (202) 693-2498. Please send a self-addressed mailing label with your request. Many copies are available online at <http://www.OSHA.gov>.

Chemical Hazard Communication - OSHA 3084  
Concepts & Techniques of Machine Safeguarding - OSHA 3067 (Available only online.)  
Control of Hazardous Energy (Lockout/Tagout) - OSHA 3120  
Controlling Electrical Hazards - OSHA 3075  
Ergonomics: The Study of Work - OSHA 3125  
Handbook for Small Businesses - OSHA 2209  
Hazardous Waste Operations and Emergency Response - OSHA 3114  
Hearing Conservation - OSHA 3074  
How to Prepare for Workplace Emergencies - OSHA 308  
Job Hazard Analysis - OSHA 3071  
Respiratory Protection - OSHA 3079  
Slings Safety - OSHA 3072  
Stairways and Ladders - OSHA 3124

## Appendix C. OSHA Offices Directory

### OSHA Regional Offices

#### REGION I

(CT,\* ME, MA, NH, RI, VT\*)  
JFK Federal Building, Room E340  
Boston, MA 02203  
(617) 565-9860

#### REGION II

(NJ,\* NY,\* PR,\* VI\*)  
201 Varick Street, Room 670  
New York, NY 10014  
(212) 337-2378

#### REGION III

(DE, DC, MD,\* PA,\* VA,\* WV)  
The Curtis Center  
170 S. Independence Mall West  
Suite 740 West  
Philadelphia, PA 19106-3309  
(215) 861-4900

#### REGION IV

(AL, FL, GA, KY,\* MS, NC,\* SC,\* TN\*)  
Atlanta Federal Center  
61 Forsyth Street, SW, Room 6T50  
Atlanta, GA 30303  
(404) 562-2300

#### REGION V

(IL, IN,\* MI,\* MN,\* OH, WI)  
230 South Dearborn Street, Room 3244  
Chicago, IL 60604  
(312) 353-2220

#### REGION VI

(AR, LA, NM,\* OK, TX)  
525 Griffin Street, Room 602  
Dallas, TX 75202  
(214) 767-4731 or 4736 x224

#### REGION VII

(IA,\* KS, MO, NE)  
City Center Square  
1100 Main Street, Suite 800  
Kansas City, MO 64105  
(816) 426-5861

#### REGION VIII

(CO, MT, ND, SD, UT,\* WY\*)  
1999 Broadway, Suite 1690  
Denver, CO 80202-5716  
(303) 844-1600

#### REGION IX

(American Samoa, AZ,\* CA,\* HI, NV\*)  
71 Stevenson Street, Room 420  
San Francisco, CA 94105  
(415) 975-4310

#### REGION X

(AK,\* ID, OR,\* WA\*)  
1111 Third Avenue, Suite 715  
Seattle, WA 98101-3212  
(206) 553-5930

\*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut, New Jersey, and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.

## OSHA Area Offices

Area	Telephone	Area	Telephone
Albany, NY	(518) 464-4338	Fairview Heights, IL	(618) 632-8612
Albuquerque, NM	(505) 248-5302	Fort Lauderdale, FL	(954) 424-0242
Allentown, PA	(610) 776-0592	Fort Worth, TX	(817) 428-2470
Anchorage, AK	(907) 271-5152	Frankfort, KY	(502) 227-7024
Appleton, WI	(920) 734-4521	Guaynabo, PR	(787) 277-1560
Austin, TX	(512) 916-5783	Harrisburg, PA	(717) 782-3902
Avenel, NJ	(908) 750-3270	Hartford, CT	(860) 240-3152
Bangor, ME	(207) 941-8179	Hasbrouck Heights, NJ	(201) 288-1700
Baton Rouge, LA	(225) 389-0474	Honolulu, HI	(808) 541-2685
Bayside, NY	(718) 279-9060	Houston, TX	(281) 286-0583
Bellevue, WA	(206) 553-7520	Houston, TX	(281) 591-2438
Billings, MT	(406) 247-7494	Indianapolis, IN	(317) 226-7290
Birmingham, AL	(205) 731-1534	Jackson, MS	(601) 965-4606
Bismarck, ND	(701) 250-4521	Jacksonville, FL	(904) 232-2895
Boise, ID	(208) 321-2960	Kansas City, MO	(816) 483-9531
Bowmansville, NY	(716) 684-3891	Linthicum, MD	(410) 865-2055
Braintree, MA	(617) 565-6924	Little Rock, AR	(501) 324-6291
Bridgeport, CT	(203) 579-5516	Lubbock, TX	(806) 472-7681
Calumet City, IL	(708) 891-3800	Madison, WI	(608) 441-5388
Carson City, NV	(702) 885-6963	Marlton, NJ	(609) 757-5181
Charleston, WV	(304) 347-5937	Methuen, MA	(617) 565-8110
Cincinnati, OH	(513) 841-4132	Milwaukee, WI	(414) 297-3315
Cleveland, OH	(216) 522-3818	Minneapolis, MN	(612) 664-5460
Columbia, SC	(803) 765-5904	Mobile, AL	(334) 441-6131
Columbus, OH	(614) 469-5582	Nashville, TN	(615) 781-5423
Concord, NH	(603) 225-1629	New York, NY	(212) 466-2482
Corpus Christi, TX	(512) 888-3420	Norfolk, VA	(757) 441-3820
Dallas, TX	(214) 320-2400	North Aurora, IL	(630) 896-8700
Denver, CO	(303) 844-5285	Oklahoma City, OK	(405) 231-5351
Des Plaines, IL	(847) 803-4800	Omaha, NE	(402) 221-3182
Des Moines, IA	(515) 284-4794	Parsippany, NJ	(201) 263-1003
Eau Claire, WI	(715) 832-9019	Peoria, IL	(309) 671-7033
El Paso, TX	(915) 534-6251	Philadelphia, PA	(215) 597-4955
Englewood, CO	(303) 843-4500	Phoenix, AZ	(602) 640-2007
Erie, PA	(814) 833-5758	Pittsburgh, PA	(412) 644-4903

<b>Area</b>	<b>Telephone</b>
Portland, ME .....	(207) 780-3178
Portland, OR .....	(503) 326-2251
Providence, RI .....	(401) 528-4663
Raleigh, NC .....	(919) 856-4770
Sacramento, CA .....	(916) 566-7470
Salt Lake City, UT .....	(801) 487-0680
San Diego, CA .....	(619) 557-2909
Savannah, GA .....	(912) 652-4393
Smyrna, GA .....	(770) 984-8700
Springfield, MA .....	(413) 785-0123
St. Louis, MO .....	(314) 425-4249
Syracuse, NY .....	(315) 451-0808
Tampa, FL .....	(813) 626-1177
Tarrytown, NY .....	(914) 524-7510
Toledo, OH .....	(419) 259-7542
Tucker, GA .....	(770) 493-6644
Westbury, NY .....	(516) 334-3344
Wichita, KS .....	(316) 269-6644
Wilkes-Barre, PA .....	(717) 826-6538
Wilmington, DE .....	(302) 573-6115

## **States with Approved Plans**

### **Commissioner**

Alaska Department of Labor  
1111 W. 8th Street, Room 306  
P.O. Box 21149  
Juneau, AK 99802-1149  
(907) 465-2700

### **Director**

Industrial Commission of Arizona  
800 W. Washington  
Phoenix, AZ 85007  
(602) 542-5795

### **Director**

California Department of Industrial Relations  
455 Golden Gate Avenue - 10th floor  
San Francisco, CA 94102  
(415) 703-5050

### **Commissioner**

Connecticut Department of Labor  
200 Folly Brook Boulevard  
Wethersfield, CT 06109  
(860) 566-5123

### **Director**

Hawaii Department of Labor and  
Industrial Relations  
830 Punchbowl Street  
Honolulu, HI 96831  
(808) 586-8844

### **Commissioner**

Indiana Department of Labor  
State Office Building  
402 West Washington Street - Room W195  
Indianapolis, ID 46204  
(317) 232-2378

### **Commissioner**

Iowa Division of Labor  
1000 E. Grand Avenue  
Des Moines, IA 50319  
(515) 281-3447

### **Commissioner**

Indiana Department of Labor  
State Office Building  
402 West Washington Street  
Room W195  
Indianapolis, IN 46204  
(317) 232-3325

### **Secretary**

Kentucky Labor Cabinet  
1047 U.S. Highway 127 South, Suite 4  
Frankfort, KY 40601  
(502) 564-3070

### **Commissioner**

Maryland Division of Labor and Industry  
Department of Labor Licensing and Regulation  
1100 N. Eutaw Street, Room 613  
Baltimore, MD 21201-2206  
(410) 767-2215

### **Director**

Michigan Department of Consumer  
and Industry Services  
P.O. Box 30004 - 4th Floor, Law Building  
Lansing, MI 48909  
(517) 373-7230

### **Commissioner**

Minnesota Department of Labor and Industry  
443 Lafayette Road  
St. Paul, MN 55155  
(651) 296-2342

### **Commissioner**

North Carolina Department of Labor  
4 West Edenton Street  
Raleigh, NC 27601-1092  
(919) 807-2900

### **Commissioner**

New Jersey Department of Labor  
John Fitch Plaza - Labor Building  
Market and Warren Streets  
P.O. Box 110  
Trenton, NJ 08625-0110  
(609) 292-2975

**Secretary**  
New Mexico Environment Department  
1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, NM 87502  
(505) 827-2850

**Commissioner**  
New York Department of Labor  
W. Averell Harriman State Office  
Building-12, Room 500  
Albany, NY 12240  
(518) 457-2741

**Administrator**  
Nevada Division of Industrial Relations  
400 West King Street  
Carson City, NV 89703  
(775) 687-3032

**Administrator**  
Oregon Department of Consumer and  
Business Services  
Occupational Safety and Health Division  
(OR-OSHA)  
350 Winter Street, N.E. Room 430  
Salem, OR 97310-0220  
(503) 378-3272

**Secretary**  
Puerto Rico Department of Labor and  
Human Resources  
Prudencio Rivera Martinez Building  
505 Munoz Rivera Avenue  
Hato Rey, PR 00918  
(787) 754-2119

**Director**  
South Carolina Department of Labor,  
Licensing and Regulation  
Koger Office Park, Kingstree Building  
110 Centerview Drive  
P.O. Box 11329  
Columbia, SC 29210  
(803) 896-4300

**Commissioner**  
Tennessee Department of Labor and  
Workforce Development  
710 James Robertson Parkway  
Nashville, TN 37243-0659  
(615) 741-2582

**Commissioner**  
Labor Commission of Utah  
160 East 300 Street, 3rd floor  
P.O. Box 146650  
Salt Lake City, UT 84114-6650  
(801) 530-6901

**Commissioner**  
Virginia Department of Labor and Industry  
Powers-Taylor Building  
13 South 13th Street  
Richmond, VA 23219  
(804) 786-2377

**Commissioner**  
Virgin Islands Department of Labor  
2203 Church Street  
Christiansted, St. Croix, VI 00820-4660  
(340) 773-1990

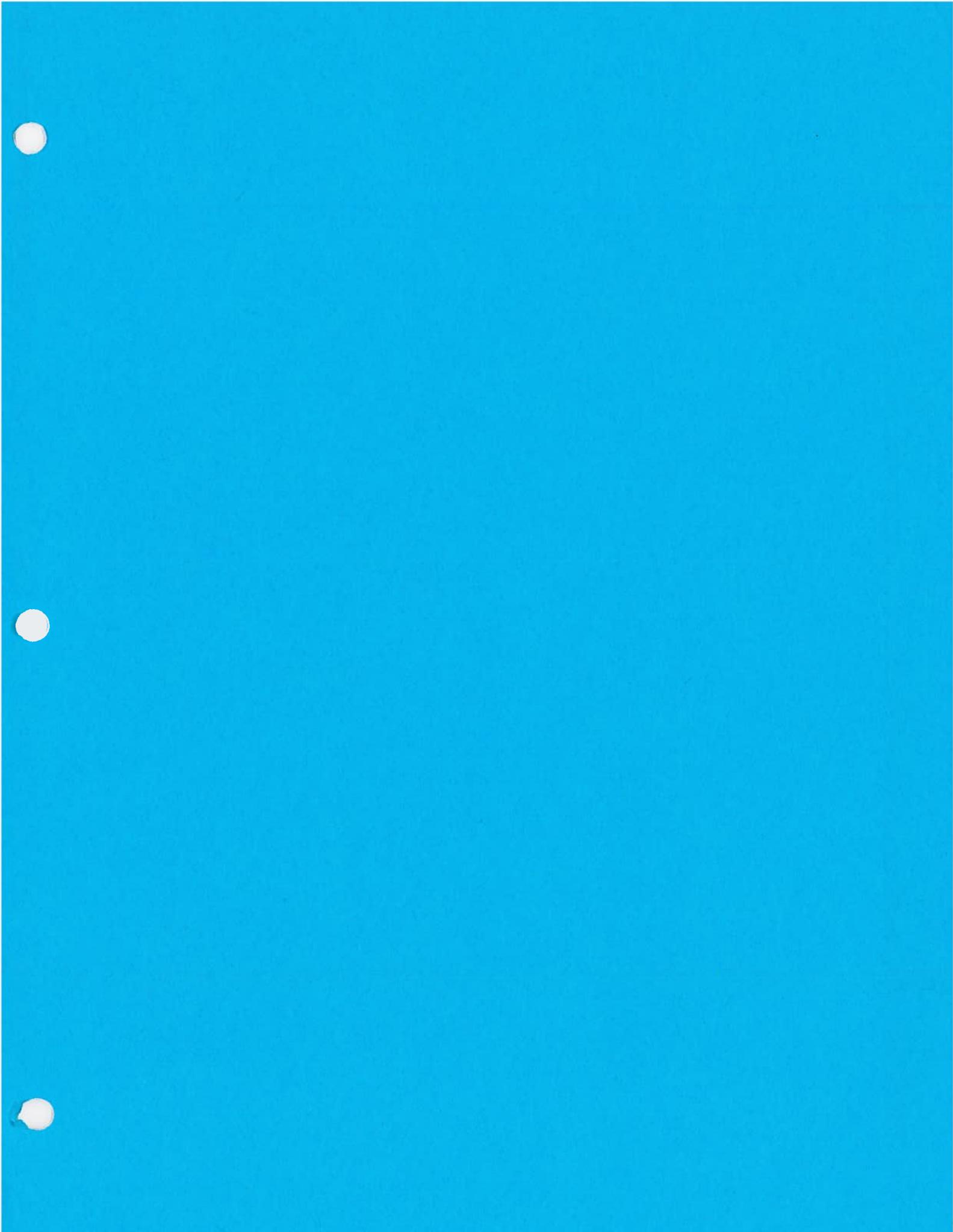
**Commissioner**  
Vermont Department of Labor  
and Industry  
National Life Building—Drawer 20  
120 State Street  
Montpelier VT 05620-3401  
(802) 828-2288

**Director**  
Washington Department of Labor  
and Industries  
P.O. Box 44001  
Olympia, WA 98504-4001  
(360) 902-4200  
(360) 902-5430

**Administrator**  
Worker's Safety and Compensation Division  
(WSC)  
Wyoming Department of Employment  
Herschler Building, 2nd Floor East  
122 West 25th Street  
Cheyenne, WY 82002  
(307) 777-7786

## OSHA Consultation Projects

Alabama.....	(205) 348-3033	Oklahoma.....	(405) 528-1500
Alaska.....	(907) 269-4957	Oregon.....	(503) 378-3272
Arkansas.....	(501) 682-4522	Pennsylvania.....	(724) 357-2396
Arizona.....	(602) 542-1695	Puerto Rico.....	(787) 754-2171
California.....	(916) 574-2555	Rhode Island.....	(401) 222-2438
Colorado.....	(970) 491-6151	South Carolina.....	(803) 734-9614
Connecticut.....	(860) 566-4550	South Dakota.....	(605) 688-4101
District of Columbia.....	(202) 541-3727	Tennessee.....	(615) 741-7036
Delaware.....	(302) 761-8219	Texas.....	(512) 804-4640
Florida.....	(813) 974-9962	Utah.....	(801) 530-6901
Georgia.....	(404) 894-2643	Vermont.....	(802) 828-2765
Guam.....	9-1-(671) 475-1101	Virginia.....	(804) 786-6359
Hawaii.....	(808) 586-9100	Virgin Islands.....	(809) 772-1315
Idaho.....	(208) 426-3283	Washington.....	(360) 902-5638
Illinois.....	(312) 814-2337	West Virginia.....	(304) 558-7890
Indiana.....	(317) 232-2688	Wisconsin.....	(608) 266-9383 (H)
Iowa.....	(515) 281-7629	Wyoming.....	(262) 523-3044 (S)
Kansas.....	(785) 296-7476		
Kentucky.....	(502) 564-6895		
Louisiana.....	(225) 342-9601	(H) - Health	
Maine.....	(207) 624-6460	(S) - Safety	
Maryland.....	(410) 880-4970		
Massachusetts.....	(617) 727-3982		
Michigan.....	(517) 322-1809		
Minnesota.....	(651) 297-2393		
Mississippi.....	(601) 987-3981		
Missouri.....	(573) 751-3403		
Montana.....	(406) 444-6418		
Nebraska.....	(402) 471-4717		
Nevada.....	(702) 486-9140		
New Hampshire.....	(603) 271-2024		
New Jersey.....	(609) 292-3923		
New Mexico.....	(505) 827-4230		
New York.....	(518) 457-2238		
North Carolina.....	(919) 807-2905		
North Dakota.....	(701) 328-5188		
Ohio.....	(614) 644-2631		



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses and income. The document further explains that proper record-keeping is essential for identifying trends, managing cash flow, and complying with tax regulations.

In addition, the document highlights the role of the accounting system in providing timely and reliable information to management. By analyzing the data, managers can make informed decisions about the company's operations and future growth. The document also touches upon the importance of internal controls to prevent errors and fraud, ensuring that the financial data is accurate and trustworthy.

Finally, the document concludes by stating that a strong foundation in accounting principles is crucial for the success of any business. It encourages the reader to continue learning and staying updated on the latest developments in the field of accounting.

## **Appendix F: Contents of Lummi Nation Spill Response Binder**



# LUMMI NATION SPILL RESPONSE BINDER

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WATER RESOURCES DIVISION  
NATURAL RESOURCES DEPARTMENT

October 2005







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**Lummi Indian  
Business Council**

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Spill Response  
Binder

**Immediate Response Actions and  
Forms**

**Contact Information**

**Response Equipment**

**Boat Access Points**

**North Puget Sound Geographic  
Response Plans**

**Seaponds Boom Deployment  
Schematics**

**OSHA Training**

**Industry Information**

**Shoreline Assessment and  
Countermeasures**

**ICS Structure**





10/10/2010

10/10/2010

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10/10/2010

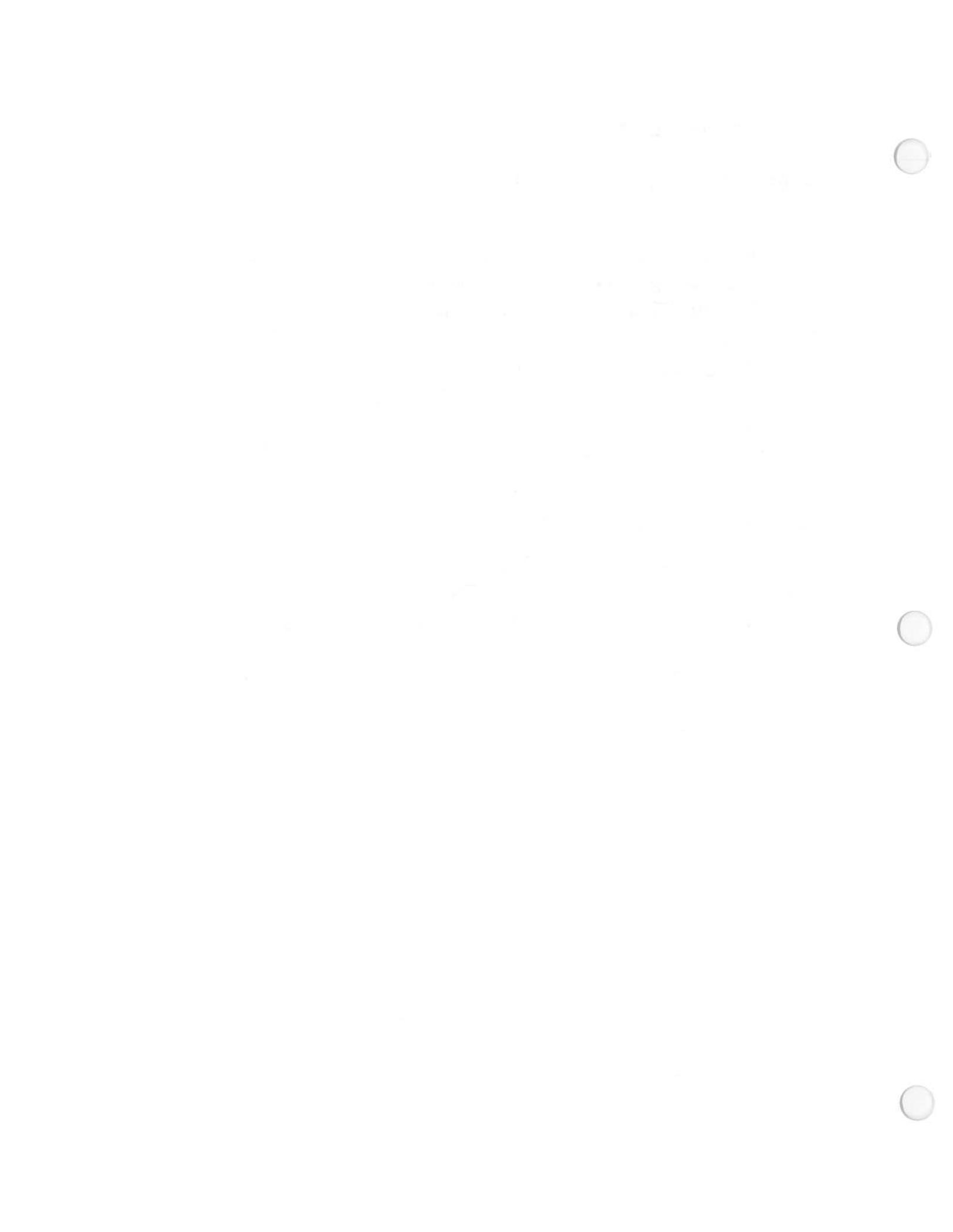
10/10/2010

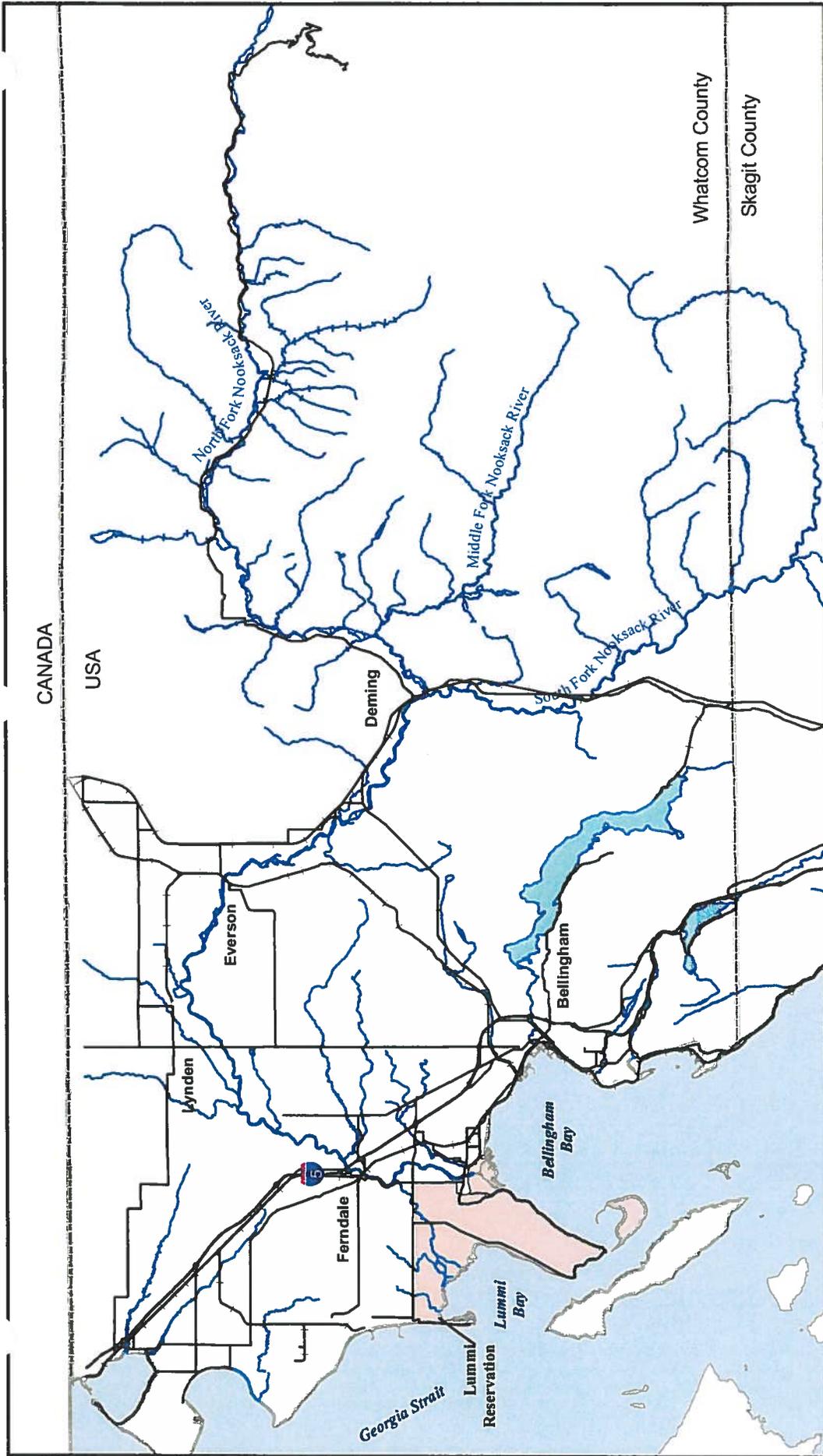
10/10/2010

10/10/2010

10/10/2010







For this map and all other maps in this document, Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from and against any damage, loss, or liability arising from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation. No part of this document may be reproduced without prior consent of the Lummi Nation.

Washington

Regional Location of the Lummi Indian Reservation



# Lummi Reservation Vicinity Map

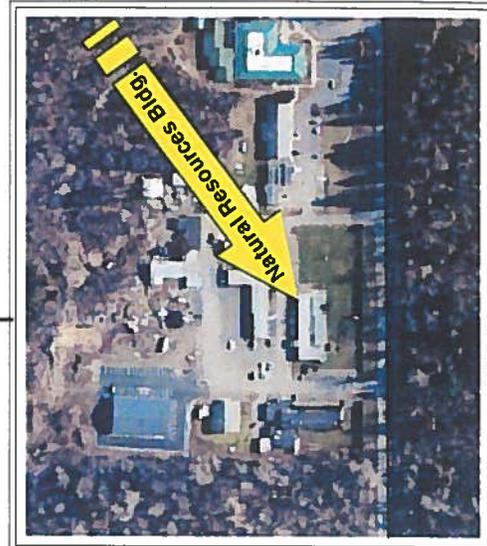
Directions to  
LIBC from  
Interstate 5



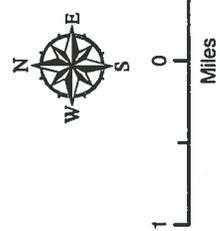
**Legend**

- Interstate 5
- Interstate Exit
- Roads
- Lummi Reservation

*Bellingham Bay*



Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this information does so at their own risk and agrees to hold the Lummi Nation harmless from and against any damage, loss or liability arising from any use of this data.



*Hale Passage*



## Immediate Response Actions

1.	Stop the product flow (if it can be done safely and the responder has the proper training (see Tab 7).	Act quickly! Secure pumps, close valves, etc.
2.	Warn/evacuate personnel.	Enforce safety and security measures
3.	Shut off ignition switches	Motors, electrical circuits, open flames, etc.
4.	Contain/ control spill (if it can be done safely and the responder has the proper training)	Use berms, boom, water hose, etc. <b>Note:</b> Unauthorized use of dispersants or detergents on navigable waters is <u>illegal</u> .
5.	Notify Lummi Law and Order and local emergency dispatch	911
6.	Notify state as appropriate	Washington EMD 1-800-258-5990 Washington DOE 1-253-512-7062
7.	Notify National Response Center (NRC) (will notify the USCG for water spills and USEPA for land spills)	1-800-424-8802
8.	Perform courtesy notifications	LNR call down list, Tab 2, LIBC departments, Tab 2

1. The first part of the document discusses the importance of maintaining accurate records.

2. It then goes on to describe the various methods used to collect and analyze data.

3. The next section details the results of the study and the conclusions drawn from them.

4. Finally, the document provides a summary of the findings and offers suggestions for future research.

5. The author concludes by emphasizing the need for continued research in this field.

6. This section discusses the implications of the study for practice and policy.

7. The author also addresses the limitations of the study and the need for further investigation.

8. In conclusion, the study highlights the significance of the research and its potential impact.

9. The document is organized into several sections, each focusing on a different aspect of the study.

10. The author provides a detailed account of the research process and the findings.

11. The study's contributions to the field are discussed, along with its limitations.

12. The document is a comprehensive overview of the research and its implications.

Unauthorized use of dispersants or  
detergents on navigable waters is  
illegal.

- USCG

What? All dispersants including dish  
detergents.

How? Through 40CFR110.4, Section 311(d)(2) of  
the Clean Water Act, and Section 4201(a) of the Oil  
Pollution Act of 1990.

Why? Dispersants work by breaking up surface oil  
slicks and facilitating the movement of oil particles  
into the water column. This dispersed oil may  
degrade more quickly than an undispersed slick over  
time, BUT unlike a slick, it cannot be recovered and  
removed from the environment. By dispersing spills  
with detergents you are trapping the oil in the water  
column where it is much more likely to impact the  
environment than if it was removed. Additionally,  
household dishwashing detergent is more toxic than  
the chemical dispersants approved for use in the U.S.  
by the EPA.

More information:

USCG

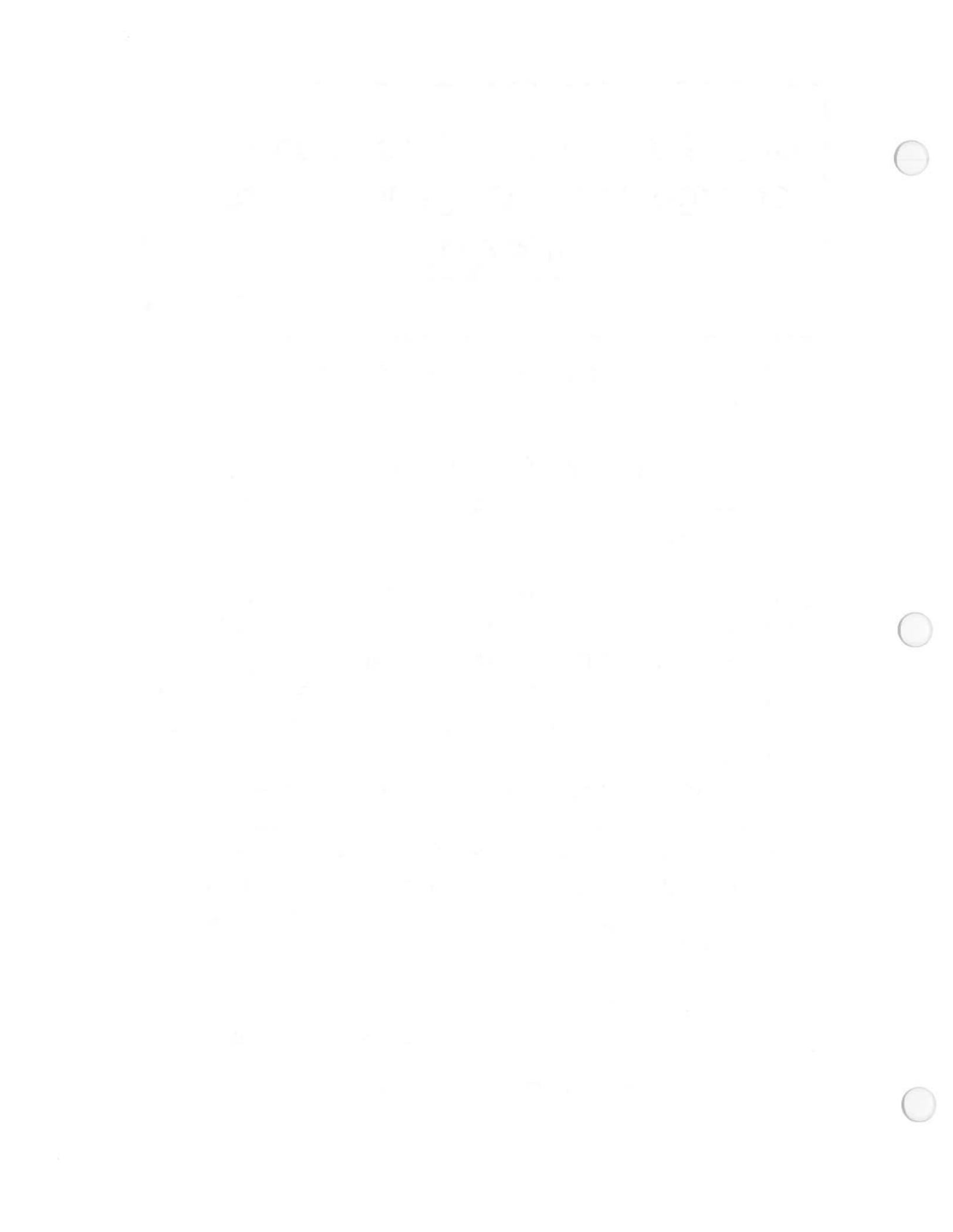
<http://www.uscg.mil/d1/staff/m/rrt/info/series.pdf>

EPA

<http://www.epa.gov/oilspill/ncp/>

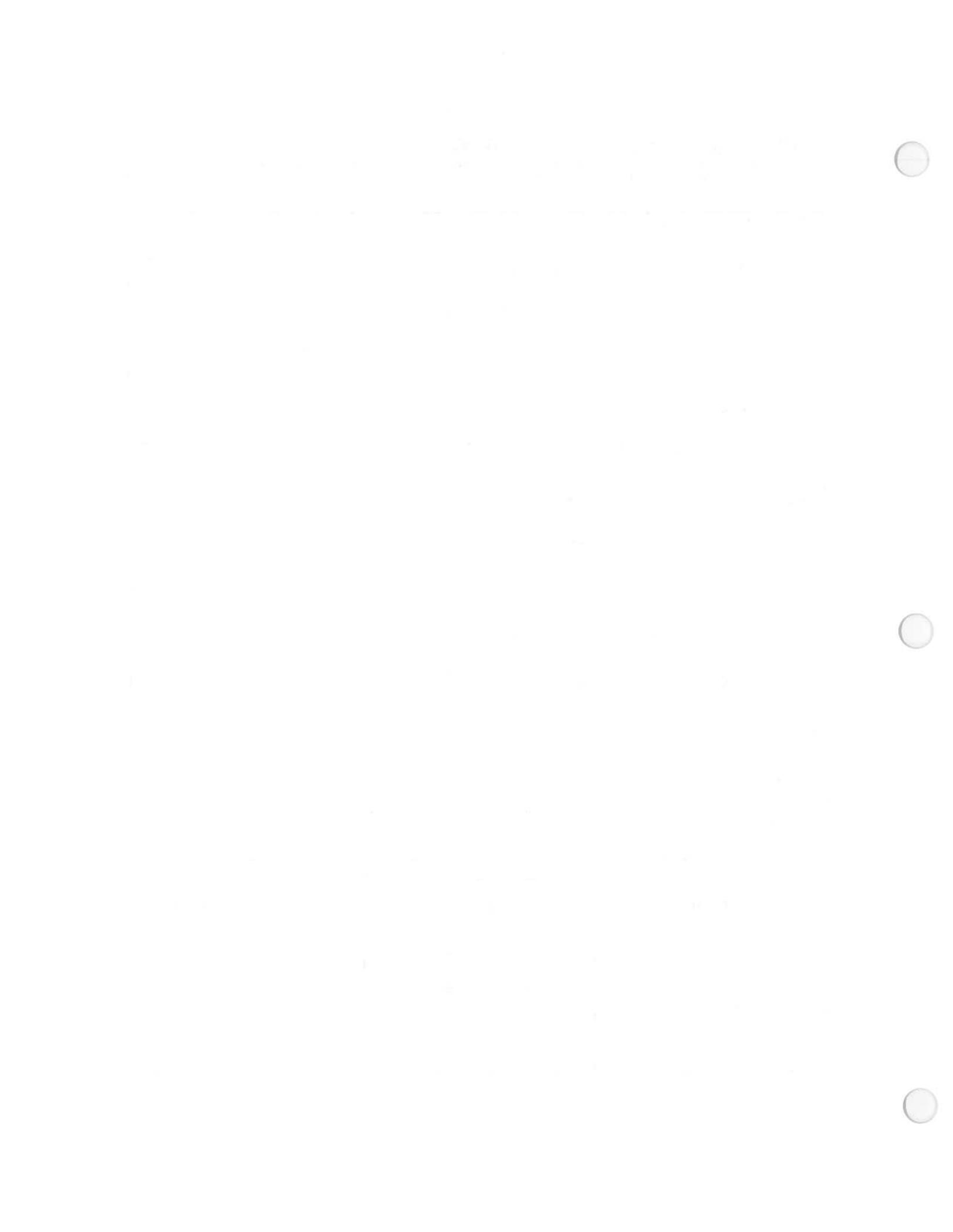
NOAA

<http://response.restoration.noaa.gov/faqs/dispers.html>

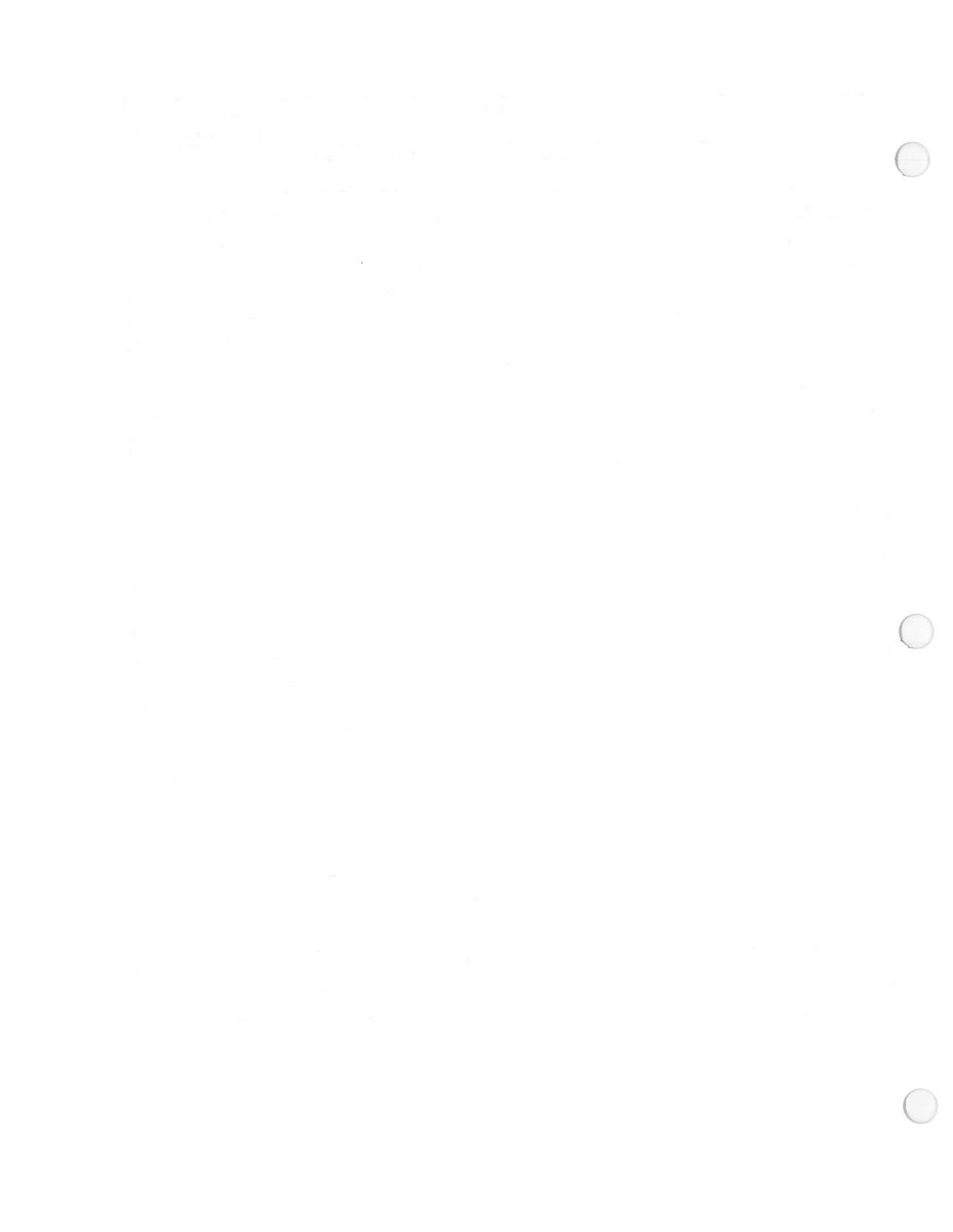


## Initial spill report (notification)

Reported by: (name, title, telephone number, monitored radio frequency)		
Name of facility or vessel:		
Container name and number (size, type, placard info, manifest, shipping papers, etc.)		
Date/time of spill	Date/time of report:	
Location of spill:		
Material spilled:		
Type and quantity of material spilled:		
Estimate threat of discharge, details of pollution or potential:		
Nature of incident and extent of defects/damage:		
Weather conditions on scene:		
Actions taken or planned by persons on scene:		
Current condition of container/vessel:		
Injuries or fatalities:		
ASSISTANCE REQUIRED:		
Other information:		
	<b><u>Notification completed</u></b>	
<b>Date/time:</b>	<b>Agency</b>	<b>To: (name and case #)</b>
	1. Lummi Law and Order	
	2. NRC 1-800-424-8802	
	3. WA EMD 1-800-258-5990	















## **REQUIRED NOTIFICATIONS**

All spills of oil or hazardous substance into navigable waters as defined by the Clean Water Act (CWA) and all spills of a reportable quantity of hazardous substances (40 CFR Part 302) must be immediately reported by the spiller to the National Response Center (NRC). The NRC will contact appropriate local US Coast Guard (USCG) or Environmental Protection Agency (EPA) offices. Notifying state offices does not relieve the spiller from federal requirements to notify the NRC nor vice versa.

**National Response Center (NRC)**  
**1-800-424-8802 Toll Free**  
**1-202-267-2675 Toll Call**

All spills of oil into Washington State waters must be immediately reported to the Washington State Emergency Management Division. Marine casualties, disabled vessels or near-miss incidents should also be reported.

**The Washington Emergency Management Division (EMD)**  
**24-hour Emergency Spill Response**  
**1-800-258-5990**

For spills of hazardous substances, the spiller is also required to notify the nearest regional office of Ecology.

**The Washington State Department of Ecology**  
**24-hour Emergency Spill Response**  
**Northwest Office, Bellevue: 1-425-649-7000**  
**Southwest Office, Olympia: 1-360-407-6300**  
**Central Office, Yakima: 1-509-575-2490**  
**Eastern Office, Spokane: 1-509-329-3400**

# THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. From the first settlers to the present day, the nation has evolved through various stages of development. The early years were marked by exploration and the establishment of colonies. The American Revolution led to the birth of a new nation, and the subsequent years saw the expansion of territory and the growth of industry.

The American Civil War was a pivotal moment in the nation's history, as it resolved the issue of slavery and preserved the Union. Following the war, the United States emerged as a global power, and its influence grew significantly. The industrial revolution transformed the economy, and the nation became a leader in technological innovation.

The 20th century was a period of great change and challenge. The United States played a central role in World War II, and its victory established it as a superpower. The Cold War era was characterized by a tense rivalry between the United States and the Soviet Union. The civil rights movement fought for equality and justice, and the Vietnam War raised questions about the limits of American power.

The end of the 20th century and the beginning of the 21st century have seen significant changes in the United States. The end of the Cold War led to a new era of international relations. The September 11 attacks in 2001 had a profound impact on the nation and the world. The current administration has focused on economic growth, healthcare, and environmental issues.

The future of the United States is uncertain, but the nation's history suggests that it will continue to evolve and adapt to the challenges of the world. The values of freedom, democracy, and justice remain central to the American identity, and these values will continue to guide the nation's path forward.

The history of the United States is a testament to the resilience and ingenuity of the American people. It is a story of a nation that has overcome many challenges and emerged as a global leader. The future is bright, and the United States is well-positioned to continue to make a positive impact on the world.

*Northwest Area Contingency Plan*

All spills of a reportable quantity\* oil or hazardous substances in Oregon must be reported by the spiller to:

**The Oregon Emergency Response System (OERS)  
24-hour Emergency Spill Response  
1-800-452-0311 or 1-800-OILS-911 (in Oregon)**

**\*Reportable Quantity in the State of Oregon:**

For oil: If spilled into waters of the state, or escape into waters of the state is likely, any quantity of oil that would produce a visible oily slick, oily solids, or coat aquatic life, habitat or property with oil, but excluding normal discharges from properly operating marine engines; if spilled on the surface of the land, any quantity of oil over one barrel (42 gallons).

For hazardous substances see OAR 340-142-0050.

The party responsible for a spill of oil or hazardous materials in Idaho State is required by Idaho State law to notify the following:

**Idaho Bureau of Hazardous Materials (BHM)/  
Idaho Emergency Medical Services (EMS)  
24-hour Emergency Notification  
1-800-632-8000 or 911 (in Idaho)  
1-208-846-7610 (outside Idaho)**

In addition to contacting the NRC, spillers may contact the nearest USCG or EPA office. For spills in coastal navigable waters of Puget Sound, Strait of Juan de Fuca, and the Washington Coast north of the Queets River contact:

**USCG Marine Safety Office Puget Sound  
1-206-217-6232**

The first part of the course covers the basic concepts of algebra and geometry. This includes the study of linear equations, quadratic functions, and the properties of triangles and circles. The second part of the course focuses on calculus, introducing the concepts of limits, derivatives, and integrals. The final part of the course deals with probability and statistics, covering topics such as probability distributions, hypothesis testing, and regression analysis.

### Mathematics 102

This course continues the study of calculus and introduces more advanced topics. It covers the theory of differential equations, vector calculus, and the geometry of surfaces. The course also includes a detailed study of the properties of functions and the theory of optimization. The final part of the course deals with the applications of calculus in physics and engineering.

***Northwest Area Contingency Plan***

**For spills occurring in coastal navigable waters of the Columbia River, the Oregon Coast, and the Washington Coast south of the Queets River contact:**

**USCG Marine Safety Office Portland  
1-503-240-9301**

**For spills occurring in inland waters of Washington, Oregon, Idaho contact:**

**U.S. Environmental Protection Agency, Seattle  
1-206-553-1263**

**If the Seattle EPA office is not reachable by telephone, notifications may be made to:**

**U.S. Environmental Protection Agency, San Francisco  
1-800-300-2193  
U.S. Environmental Protection Agency, Denver  
1-303-293-1788**

**Spills into water shared by two states must be reported to both.**

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail. The records should be kept up-to-date and should be easily accessible to all relevant parties.

2. The second part of the document outlines the various methods used to collect and analyze data. These methods include direct observation, interviews, and the use of specialized software. Each method has its own strengths and weaknesses, and it is important to choose the most appropriate one for the specific situation.

3. The third part of the document describes the process of data analysis. This involves identifying patterns and trends in the data, and then using statistical techniques to test hypotheses. The results of the analysis should be presented in a clear and concise manner, and should be supported by appropriate evidence.

4. The fourth part of the document discusses the importance of communication in the research process. This involves keeping all relevant parties informed of the progress of the research, and being open to feedback and suggestions. Communication is also important for ensuring that the research is conducted in an ethical and transparent manner.

5. The fifth part of the document outlines the various challenges that researchers may face during the course of their work. These challenges include limited resources, time constraints, and the need to deal with complex and often conflicting data. It is important to be aware of these challenges and to develop strategies to overcome them.

6. The sixth part of the document describes the various methods used to ensure the reliability and validity of the research. These methods include the use of standardized procedures, the use of multiple sources of data, and the use of statistical techniques to test for bias and error.

7. The seventh part of the document discusses the importance of documentation in the research process. This involves keeping a detailed record of all steps taken during the research, and of all data collected and analyzed. This documentation is essential for ensuring the transparency and reproducibility of the research.

8. The eighth part of the document outlines the various methods used to disseminate the results of the research. These methods include the publication of research papers, the presentation of research at conferences, and the use of social media to reach a wider audience. It is important to choose the most appropriate method for the specific situation.

9. The ninth part of the document discusses the importance of ethics in the research process. This involves ensuring that the research is conducted in a way that respects the rights and privacy of all participants, and that it is free from any conflicts of interest. It is important to be aware of the ethical implications of the research and to take steps to minimize any potential harm.

10. The tenth part of the document outlines the various methods used to evaluate the quality of the research. These methods include the use of peer review, the use of external audits, and the use of statistical techniques to test for bias and error. It is important to be aware of these methods and to use them to ensure the quality of the research.

## ***Northwest Area Contingency Plan***

### **FIRST RESPONDER GUIDELINES!**

**REMAIN UPWIND, UPHILL OR UPSTREAM OF THE INCIDENT. FROM A SAFE DISTANCE, assess the situation. Use binoculars, if available, to view the scene. Attempt to determine if radiological materials or hazardous substances are present. Observe and note the following:**

- Effects on people, animals, and the environment;
- Container types, markings, placards and labels. If available, use the DOT Emergency Response Guidebook for reference;
- Signs of any released or discharged substances and any unusual or pungent odors (move farther away or upwind if you detect an odor and are not positive it is safe);
- Wind direction and prevailing weather;
- Distance and direction of nearby dwellings; and
- Distance and direction of any nearby surface water.

**The initial responder shall then make notifications as listed in the preceding pages. The initial responder shall not enter an area where the responder may become a victim, *even to rescue another.***

**Until help arrives, the initial responder should:**

- Cordon off the incident area and establish a safe zone. If chemical vapors or flammable/explosive materials are involved, evacuate all persons from the immediate area and remain upwind of the incident area; if sources of radiation or radioactive materials are suspected to be involved, use the principles of time, distance and shielding to reduce potential exposure;
- Enter the incident area only if properly trained and equipped with appropriate protective clothing and equipment;
- Render first aid to victims; be sure to notify medical personnel if radiation exposure or contamination is suspected;
- Serve as an on-scene communication point;
- Brief the response team leader or incident commander upon arrival.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text notes that without reliable records, it would be difficult to track the flow of funds and identify any irregularities.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes how different types of information are gathered from various sources and how this data is then processed to identify trends and patterns. The text highlights the importance of using advanced analytical tools to ensure that the data is interpreted correctly and that any potential risks are identified early on.

3. The third part of the document focuses on the implementation of control measures to prevent and detect fraud. It discusses the role of internal controls, such as segregation of duties and regular audits, in ensuring the accuracy of financial reporting. The text also mentions the importance of having a strong corporate culture that encourages ethical behavior and transparency.

4. The fourth part of the document addresses the challenges faced by organizations in maintaining effective fraud prevention and detection systems. It notes that as the complexity of financial transactions increases, it becomes more difficult to monitor all activities. The text suggests that organizations should invest in technology and training to stay ahead of emerging fraud risks.

5. The fifth part of the document provides a summary of the key findings and recommendations. It reiterates the importance of a comprehensive approach to fraud prevention and detection, one that involves multiple layers of controls and a commitment to ethical conduct. The text concludes by stating that while fraud cannot be completely eliminated, it can be significantly reduced through the implementation of these measures.

## ***Northwest Area Contingency Plan***

### **Initial Assessment/ Information Check-off List**

The following information should be provided by the spiller or reporting agency:

Time of call -

Caller Name, Address, & Phone Number -

#### **Vessel/Facility Information:**

1. Name
2. Name of Vessel, Railcar/Truck Number or other identifying information
3. Type and size of vessel/facility
4. Nationality (Vessel Only)
5. Location of Incident (Specific)
6. Date & Time of Incident (or when discovered)
7. Type of Incident (Explosion, Grounding, etc.)
8. Pollutants/Substances Released
9. Source of Material Released
10. Estimated Amount Spilled
11. Total Potential Quantity
12. Total Already Released

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## ***Northwest Area Contingency Plan***

13. Spill/released Into Air, Ground, Water or Subsurface
14. Weather/Sea Conditions
15. Point of Contact (Responsible Party Name, Phone & Address)
16. Vessel/Facility Agent(s) (Name & Phone)
17. Name of Carrier
18. Number & Type of Injuries or Fatalities
19. Who is on-scene
20. What response activities are being done or have been completed
21. Whether Evacuations have occurred
22. Estimated Dollar amount of Property Damage
23. Other Agencies Notified

Change 7  
February 28, 2005

xii



## *Northwest Area Contingency Plan*

### **First Federal Official On Scene**

The first federal official affiliated with a National Response Team (NRT) member agency to arrive at the scene of a discharge should coordinate activities under the National Contingency Plan (NCP); and is authorized to initiate, in consultation with the pre-designated Federal On Scene Coordinator (OSC), any necessary actions normally carried out by the FOSC until the arrival of the pre-designated FOSC. This official may initiate federal fund-financed actions only as authorized by the pre-designated FOSC.



## **RESPONSIBILITIES**

### **Responsibilities of First Person On-Scene**

For the purposes of this section, the first person on-scene is the initial person, with Awareness Level training (see Tab K), to arrive at or discover the scene of a hazardous materials incident. Personal and public life safety shall be the first priority of the first person on-scene.

**IMMEDIATELY RETREAT TO A SAFE LOCATION.** A strict DEFENSIVE posture will be assumed by the first person on-scene. When life safety issues permit, it shall be the responsibility of the first person on-scene to:

Identify the hazard, make appropriate notification and deny entry into the area.

1. By using placard numbers; container size, shape, color; names or available shipping papers (or interviews with responsible individuals), determine possible type of hazardous material and estimate quantity of material released, and notify appropriate authorities.
2. Make efforts to restrict or deny entry to the possibly contaminated area.

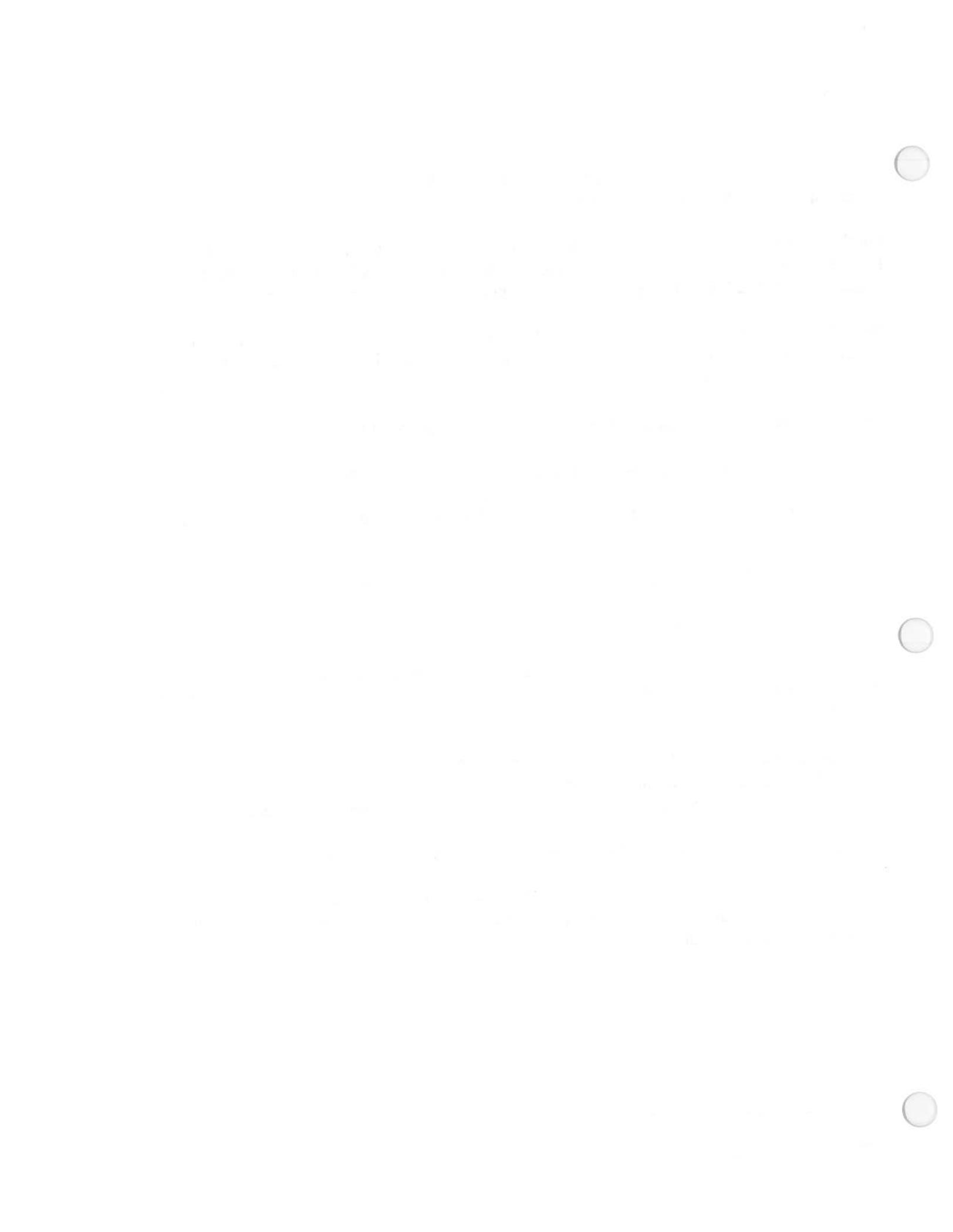
### **First Responder Responsibilities**

For the purposes of this section, the first responder is that initial person or responsible industry official, with minimum Operation Level training (see Tab K), to arrive at or discover the scene of a hazardous materials incident.

Under the Incident Command System (ICS), the first on-scene responder shall assume the role of Incident Commander until that role has been affirmatively transferred to a ranking officer, the designated Hazardous Materials Incident Commander or until the incident is terminated.

Personal and public life safety shall be the first priority of the first responder.

**IMMEDIATELY RETREAT TO A SAFE LOCATION.** The first responder assumes a strictly DEFENSIVE posture until appropriate resources have arrived. When life safety issues permit, it shall be the responsibility of the first person on-scene to:



Identify and assess the hazard and make determinations for an appropriate response and public warning.

1. By using placard numbers; container size, shape, color, names or other identifying markers; and/or available shipping papers or interviews with responsible individuals, determine possible types of hazardous materials and estimate quantities of materials spilled or released and communicate findings to responding agencies.
2. Communicate observable weather in the vicinity of the incident, with particular attention to wind direction and estimated speed.
3. Make assessments of hazard to life, property, and environment by consulting the *2000 Emergency Response Guidebook*.
4. Provide evacuation recommendations.

Manage the hazard scene by establishing perimeters and denying access.

Notify the required agencies and request assistance, if needed.

If possible take appropriate defensive steps to minimize the effect of a hazardous condition on life, property and the environment.

## LOCAL RESPONSIBILITIES

### Whatcom County Sheriff's Office Division of Emergency Management (DEM)

DEM is a division of the Whatcom County Sheriff's Office and provides emergency management resource coordination to Whatcom County, the incorporated cities in Whatcom County and the Port of Bellingham. DEM is responsible for:

1. Preparing the basic hazardous materials response plan for the Whatcom County LEPC in cooperation and coordination with other agencies.
2. Assisting other agencies as appropriate in the preparation of agency Suggested Operating Guidelines (SOGs) for hazardous materials response.
3. Making recommendations of policy, procedures and regulations to agencies and elected officials.
4. Coordinating and securing needed outside resources as requested and Implementation of the Comprehensive Emergency Management Plan (CEMP) and Emergency Operation Center (EOC) activation when requested by Incident Command, other authorized official or as otherwise appropriate.
5. Receiving, collecting and maintaining hazardous materials risk and resource data in accordance with SARA Title III and to distribute that information to emergency response agencies and the public upon request.
6. Notification of state and federal authorities of hazardous material incidents as required, and as directed by Incident Command requesting appropriate assistance for response and cleanup.
7. Assist Incident Command in the provision of warning and emergency information to the public and governmental officials.
8. Assist Incident Command in the providing for the emergency welfare and shelter needs of citizens affected by a hazardous materials event.
9. Encouraging, facilitating and coordinating Mutual Aid Agreements among emergency response agencies on all levels of government.
10. Implementation of the SARA Title III Local Emergency Planning Committee (LEPC) Program.
11. Serving as the Local On-Scene Coordinator (LOSC) within Unified Command structures as appropriate.

## **Fire Agencies**

Whatcom County Fire Agencies that have retained the Hazardous Materials Incident Command will assume that role upon their on-scene arrival. In jurisdictions where the Washington State Patrol provides Incident Command, Fire Agencies will assume Incident Command until relieved by a qualified Incident Commander from the Washington State Patrol and will respond to provide defensive services as required. Once relieved of Incident Command, Fire Agencies shall be prepared to fulfill the responsibilities of the Operation Section or other ICS positions as requested by Incident Command. In situations where a hazardous materials incident is discovered by responding units, Fire Agencies will fulfill the duties outlined under First Responder Responsibilities. In situations involving a known hazardous materials incident, Fire Agencies will:

1. Manage the hazard scene by establishing perimeters and denying access.
2. Take appropriate defensive steps to minimize the effect of a hazardous condition on life, property and the environment.
3. Assist with evacuation/notification when necessary.
4. Provide appropriate representative to the EOC, if requested.

## **Law Enforcement**

Local Law Enforcement agencies will:

1. Coordinate with Operations and provide assistance as required.
2. Assist with evacuation/notification when necessary.
3. Secure scene perimeter and maintain security.
4. Provide appropriate representative to the EOC, if requested.

## **Public Works**

Public Works (PW) Departments are responsible for development of plans and operating procedures in coordination with other response agencies for the purpose of supporting response and cleanup of hazardous materials incidents.

1. Mobilize and manage Public Works equipment and needed materials.
2. Take necessary action should hazardous materials enter the storm sewer system.
3. Designate an appropriate representative to the ICS on-scene. Provide a representative to the EOC, if requested.
4. Provide other responding agencies with technical information on the Public Works systems.
5. Inform responding agencies of plans, policies and regulations PW systems.
6. Effect clean up on jurisdiction property, not covered by the DOE.

## **Prospect Dispatch Center**

Upon receipt of a report of a hazardous materials incident, the Prospect Dispatch Center will notify the fire department within whose jurisdiction the incident has occurred and follow the protocol outlined in the Hazmat Notification Contact Guidelines (Tab G.).

1. Coordinate the incident with the What-Comm Dispatch Center.
2. Assist in issuing warnings via the Emergency Alert System (EAS) as requested.
3. Manage tactical communications.

## **What-Comm Dispatch Center**

1. Receive 911 reports of hazardous material incidents and transfer reports to the Prospect Dispatch Center for processing.
2. Notify appropriate law enforcement agencies.
3. Manage tactical communications.

## **Health Department**

1. Determine immediate actions to protect the public health and water supplies.
2. Issue public health warnings or advice via broadcast media.
3. Conduct sample collection and direct samples to appropriate laboratories. Make recommendation testing of exposed personnel.
4. Monitor food service operations for emergency response personnel and evacuees.
5. The County Health Officer will declare health emergencies as necessary.
6. Work with responding agencies to share information concerning public water supply data, if hazardous materials have the potential to enter these mediums.
7. Participate in the Incident Command System, as requested. Provide representative to the EOC, if requested.

## **Fire Marshall**

1. Ensure all storage facilities for hazardous materials conform to Uniform Building and Fire Codes.
2. Investigate hazardous material incidents to determine if code violations occurred and take actions to ensure corrections are performed.
3. Notify DEM and the fire jurisdiction of code violations and actions taken to correct the violations.

## **Emergency Medical Services**

1. Provide medical aid and patient transportation.
2. Participate in the Incident Command System as requested. Provide representative to the EOC, if requested.
3. Implement mass casualty protocol as needed.

## **American Red Cross**

The American Red Cross will provide rehabilitation / mass care support of emergency workers during response to a disaster or emergency situation. The American Red Cross will also provide temporary housing, mass care shelter and feeding facilities, emergency first aid , welfare inquiries, information services and financial assistance for essentials based on the need at the time of the emergency.

## **Salvation Army**

The Salvation Army will assist the American Red Cross with canteen services, provide clothing, provide bedding, essential furnishings and counseling for displaced individuals during an emergency situation.

## **Local Emergency Planning Committee (LEPC)**

1. Fulfill SARA Title III requirements for record keeping, compliance, hazard analysis, training, public education, and planning. (completed by DEM)
2. Fulfill State and Federal ARight to Know ≡ provisions.
3. Perform an annual review of the Whatcom County Hazardous Materials Plan and revise as needed. (completed by DEM)
4. Act as a liaison between industry, the public, the response community and the DEM.

## **Northwest Air Pollution Authority (NWAPA)**

1. Continuous monitoring of air for carbon monoxide, sulfur dioxide and particulate matter.
2. Surveillance and inspection of air emission sources.
3. Responsible for the issuance of permits for air emission sources in their jurisdiction.
4. Investigation of reported releases to the air.
5. In conjunction with DOE and the EPA, investigate incidents.

6. Fulfill required regulatory role to ensure any required corrective actions are taken.
7. Participate in the Incident Command System, as requested. Provide representative to the EOC, if requested.
8. Provide technical advice for incidents relating to asbestos.

**Whatcom Transportation Authority (WTA)**

1. Assist with evacuation procedures.
2. Procedures to be followed Mon.-Sat. 0600-1900 hrs
  - a. Office will provide coach and driver availability status.
  - b. Office will radio instructions to fleet.
  - c. If necessary, reserve buses will be readied.
  - d. Office will maintain its function as a dispatch relay station until relieved by the Incident Commander.
3. Hours other than listed above.
  - a. WTA personnel are notified as required.
  - b. Office personnel will initiate pyramid alert and report to the office.
  - c. Contact will be established with the Incident Commander.
  - d. Coaches will be readied for service as needed.
  - e. Office will commence operation as directed by Incident Commander.

**Private Industry RESPONSIBILITIES:**

Each facility that is subject to the requirements of SARA Title III and/or the Clean Air Act Section 112(r) shall be responsible for:

1. Notifying the LEPC of the facility representative who will participate in the emergency planning process as a facility emergency coordinator.
2. The facility owner/operator will promptly inform the LEPC of any relevant changes occurring at the facility.
3. Upon request of the LEPC, the facility owner/operator shall provide information that is necessary for development and implementation of the emergency plan.
4. Determination of the occurrence of a release of Title III substances is a statutory responsibility and it shall be incumbent upon the Emergency Coordinator(s) of such facilities to establish appropriate internal procedures for detecting a release, and for making timely notification pursuant to this plan.

5. Operators of SARA Title III / Clean Air Act Section 112(r) facilities shall offer cooperation to the IC when a release threatens life, property or the environment.

#### REPORTING REQUIREMENTS OF SARA TITLE III:

SARA Title III requires owners and/or operators of certain facilities to submit a list of hazardous chemicals present at their facilities. The Local Emergency Planning Committee requires this list be submitted annually on a Tier II form. Reports must be filed with the State Emergency Response Commission, Whatcom County LEPC and the fire service agency in which the reporting facility is located by March first of each year. Compliance with these requirements is the responsibility of the individual facilities.

#### CHEMICALS INCLUDED IN THE REPORTING REQUIREMENT:

The following chemicals are required to be reported if they fall within the threshold planning quantities:

1. Chemicals listed as "Extremely Hazardous Substances" (EHS) under SARA Title II, Section 302.
2. Any chemical stored in a quantity of 10,000 pounds or more for which a Material Safety Data Sheet (MSDS) is required under the Occupational Safety and Health Act.

## STATE AGENCY RESPONSIBILITIES

### Washington State Emergency Response Commission (SERC)

1. Carry out the mandate of the Emergency Planning and Community Right-to-Know (EPCRA) provisions of SARA Title III.
2. Improve state and local emergency response capabilities.
3. Coordinate hazardous materials issues and initiatives.
4. Advise the State Emergency Management Council on all matters pertaining to EPCRA and hazardous materials matters within the state of Washington.

### Washington State Emergency Management Division (EMD)

The State EMD shall provide a single point of notification and coordination for state level hazardous materials response through the Division's 24-hour duty officer capability at 1-800-258-5990.

1. Is contacted in accordance with Hazmat Levels II and III.
2. Develops and maintains ESF 10 Hazardous Materials of the State Comprehensive Emergency Management plan.
3. Maintains 24-hour duty officer system to receive notification of incidents and requests for assistance and initial notification to local, state, provincial and federal response agencies.
4. Coordinates the procurement of state resources for use by the Incident Commander or as requested by DEM or other designated local response agency or state response agencies.
5. Activates and manages the state EOC to provide communications and support to assist in hazardous materials incidents when necessary.
6. Issues mission numbers as part of the state emergency worker volunteer registration system under RCW 38.52 and WAC 118.

### **Washington State Patrol (WSP)**

1. Is designated Incident Command for all jurisdictions in Whatcom County, with the exception of the City of Bellingham, and Fire Protection District #2 Geneva/Sudden Valley. Also acts as Incident Command for all state and interstate highways unless, by mutual agreement, that role has been assumed by another designated incident command agency.
2. Assists local incident command agencies with communications, law enforcement, and technical resource information.

### **State Department of Transportation (DOT)**

1. Will respond when state roadway or facility is involved, coordinate with Incident Commander and provide available resources and personnel.
2. Coordinates activation of DOT personnel and equipment needed to establish traffic control and cleanup activities on state roads and interstate highways. Activation of DOT personnel may be initiated by the WSP.
3. Appropriately trained DOT personnel will initially establish traffic control and notify the WSP when a hazardous materials incident is discovered on state roads and interstate highways.

### **State Department of Ecology (DOE)**

1. Notified by the state EMD Duty Officer whenever an incident has possible environmental consequences.
2. Lead agency for environmental cleanup. Provides on-scene coordination, technical information on containment, cleanup, disposal and recovery; environmental damage assessment; laboratory analysis and evidence collection for enforcement actions.
3. Maintains resource list of cleanup contractors, equipment and technical/scientific personnel for hazardous material incidents.
4. Serves as the State On-Scene Coordinator under the Federal National Contingency Plan.
5. Works with responsible party for cleanup of environmentally threatening hazardous materials incidents.
6. Coordinates litigation for recovery of costs incurred during response and cleanup.

7. Coordinates damage assessments of moderate and major spills by implementing the Marine Resource Damage Assessment Program involving local, state, federal and private agencies.

#### **Department of Fish and Wildlife (DFW)**

1. Notified via WSP or by the state EMD Duty Officer when fresh water or marine habitats are potentially involved or if an incident has the potential to affect wildlife habitat.
2. Assists DOE upon request in determining and assessing fisheries habitat recovery cost and compensation.
3. Provides coordination and resource information on potential or actual wildlife or wildlife habitat damage and cleanup
4. Participates in Marine Resource Damage Assessment Program when requested.

#### **Department of Social and Health Services (DSHS)**

1. Coordinates with local Health Department for needed resources and information.
2. Acts as the lead agency for incidents involving radioactive materials.

#### **Department of Agriculture (DOA)**

1. Notified of incidents that may impact farmlands.
2. Provides technical assistance, laboratory testing and sampling, and estimates on recovery costs for incidents involving pesticides/herbicides.

#### **State Fire Marshall**

1. Provides assistance in damage assessments, investigations, and coordination with local fire officials.
2. Authority for incidents involving common or special fireworks (Class B and C explosives).

## **State Department of Labor and Industries**

1. Mandates training requirements for hazardous materials emergency response and cleanup.
2. Enforces safety and health standards whenever employees are exposed to hazardous chemicals.
3. Provides technical assistance and information concerning worker exposure to hazardous chemicals, including information on procedures, protective equipment and specific chemical properties and hazards of substances.

## **State Utilities and Transportation Commission (UTC)**

1. Investigates highway and rail accidents involving hazardous materials in conjunction with the WSP.
2. Assists first responders by providing supportive data on shippers and haulers of hazardous materials statewide.

## FEDERAL AGENCY RESPONSIBILITIES

### United States Coast Guard (USCG)

1. Notified whenever spill or release has potential to affect navigable waters.
2. Has primary jurisdiction for navigation control and warning, law enforcement, search and rescue, fire fighting and hazardous materials response in coastal waterways contiguous to Whatcom County.
3. Serves as the Federal On-Scene Coordinator under the Federal National Contingency Plan.
4. Operates National Response Center (NRC) which receives reports of incident and serves as a focal point for notification of federal authorities when a pollution incident occurs. Provides advice and assistance to users off the system by accessing computer data files that list hazardous substance characteristics.

### Federal Aviation Administration (FAA)

1. Notified if aircraft involved or incident may affect the airway and request Notice to Airmen (NOTAM) for a Temporary Flight Restriction (TFR) to provide a safe air traffic environment as needed.

### Environmental Protection Agency (EPA)

1. Contact in accordance with Hazmat Level III and/or international cross-border response plans.
2. Responds with advice and technical resources to protect the environment from all types of hazardous substances.
3. In conjunction with state DOE, will coordinate cleanup of major incidents.
4. Acts as the Federal On-Scene Coordinator for incidents involving inland waters.
5. Contracts for emergency response services of the Region X Strike Team which provides on-site surveys of actions, documentation of cleanup contractor, and reports findings to Incident Command.

## **National Weather Service**

Provides responding agencies with current weather and forecast information, as needed.

## **NOAA Weather Radio**

A service of the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Department of Commerce and can preempt routine weather broadcasts and activate specially designed warning receivers.

## **Occupational Safety and Health Administration (OSHA)**

1. Mandates training requirements for hazardous materials emergency response and cleanup.
2. Enforces safety/health standards when employees are exposed to chemicals.
2. Provides technical assistance and information concerning worker exposure to hazardous chemicals, including information on procedures, protective equipment and specific chemical properties and hazards of substances.

**TAB J**

**RADIO FREQUENCY ASSIGNMENTS**

(receive only frequencies for monitoring)

45.20	Whatcom Co. DEM	45.36	Wash. State EMD
45.48	Wash. State EMD	47.02	Wash. State DOT
47.46	Expiorer SAR	47.66	Bellingham Schools
47.660	Blaine Schools		
<hr/>			
150.995	Whatcom Co. Public Works	151.100	City of Ferndale
151.250	Wash. State Parks	151.850	Mt. Baker Recreation
153.830	RED NET		
154.220	Fire 2	154.325	Fire 4
154.340	Fire 3	154.430	Fire 1
154.755	WSP		
155.070	Bellingham Police		
155.160	Search and Rescue		
155.340	H.E.A.R.		
155.370	L.E.R.N.	155.475	N.L.E.E.C.
155.610	Whatcom Co. S.O.		
156.135	O.S.C.C.R.		
156.180	Whatcom Co. Roads		
156.800	U.S.G.C. Ch. 16	157.050	U.S.G.C. Ch. 21A
157.100	U.S.G.C. Ch. 22A		
159.240	Dept. of Natural Resources		
162.425	NOAA Wx (Jefferson Co.)	162.550	NOAA Wx (Aldergrove)
163.625	Border Patrol		
163.725	Port of Entry		
166.750	National Parks		
<hr/>			
450.350	EOC / KGMI		
453.225	Bellingham Police		
453.325	Whatcom Co. Sheriff's Office		
453.425	Whatcom Trans. Authority		
453.750	Bellingham Public Works		
458.875	Port of Bellingham		
463.025	Med 2	463.075	Med 4
463.125	Med 6	463.175	Med 8
450.0625	EAS (Whatcom County Repeater)		

INCIDENT RADIO COMMUNICATIONS PLAN		1. Incident Name HazMat Incident (NON - WMD)		2. Date/Time Prepared		3. Operational Period Date/Time	
Radio Type/Cache	Channel	Function	Frequency/Tone	Assignment	Remarks		
VHF	FIRE 2	Command	154.220	Incident Command	Telephone backup to the EOC		
	OSCCR		156.135		OSCCR and LERN back up frequencies		
	LERN		155.370				
VHF	RED NET	Operations	153.830	Incident Command			
VHF	FIRE 4	Logistics	154.325	Incident Command			
VHF	LERN	Law Enforcement	155.370	Incident Command			
6. Prepared by (Communications Unit)							



Date \_\_\_\_\_  
Time \_\_\_\_\_

## Lummi Nation Site Safety and Health Plan

### Site Information

Site name: \_\_\_\_\_

Site location: \_\_\_\_\_

Site description: \_\_\_\_\_

Material spilled: \_\_\_\_\_ Quantity \_\_\_\_\_

Is the site active or inactive? \_\_\_\_\_

Describe the work to be performed at this location: \_\_\_\_\_

Expected duration of project? \_\_\_\_\_

### On-Site Organization and Coordination

Channel \_\_\_\_\_ has been designated as the radio frequency for personnel in the Exclusion zone. All other onsite communication will use Channel \_\_\_\_\_.

Circle or enter the personnel designated to carry out the stated job functions onsite.  
(Note- one person may carry out more than one job function.)

<b>Incident Commander:</b>	<u>Merle Jefferson, Sr.</u>	<u>Leroy Deardorff,</u>	<u>Randy Kinley</u>
	<u>Harlan James</u>	<u>Terry Hillaire</u>	<u>Gary James</u>

<b>Command Staff:</b>	<i>Safety Officer</i>	<u>Cheryl Johnson</u>	
	<i>Information Officer</i>	_____	
	<i>Liaison Officer</i>	<u>Leroy Deardorff</u>	<u>Harlan James</u>

<b>Operations Section Chief</b>	<u>Randy Kinley</u>	<u>Harlan James</u>	<u>Terry Hillaire</u>
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<b>On-water Recovery Group Supervisor</b>	<u>Adam Pfundt</u>	<u>Gregg Dunphy</u>
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<b>On-water Recovery Group</b>	<u>Cliff Cultee</u>	<u>Merle Jefferson, Jr.</u>	<u>Mann Lewis</u>
	<u>Tom Morris</u>	_____	





Date \_\_\_\_\_  
Time \_\_\_\_\_

**On-shore Recovery Group Supervisor** Adam Pfundt Gregg Dunphy

**On-shore Recovery Group** Wayne Watne Zach Dewees Amy Sattler Andre Revey  
Isaac Jefferson Frank Lawrence Mike McKay  
Mike Williams Bill Revey Charles Jefferson

**Decontamination Group** Lee First Amy Sattler

**Law Enforcement Group Supervisor** Gary James

**Planning Section Chief** Leroy Deardorff Jeremy Freimund

**Environmental Unit Leader** Alan Chapman Craig Dolphin

**Environmental Unit** Linda Delgado Bob Hall Amy Sattler  
Melissa Brown Michael Maudlin Victor Johnson

**Trajectory Analyst** Ann Stark Gerry Gabrisch

**Documentation Unit Leader** Stacy Fawell Amy Sattler

**Logistics Section Chief** Stacy Fawell Amy Sattler

**Finance/ Admin Section Chief** Yvonne Cagey

**Finance/ Admin Section** Teresa Lawrence

**Federal Agency Representatives** \_\_\_\_\_

**State Agency Representatives** \_\_\_\_\_

**Local Agency Representatives** \_\_\_\_\_

**Contractors** \_\_\_\_\_





Date \_\_\_\_\_

Time \_\_\_\_\_

## Site Description

What type of substance(s) are known or suspected to be on-site? \_\_\_\_\_

Please circle characterization exposure levels and complete comment section where applicable.

Site Characterization	Exposure Levels			Comments
• Industrial	Low	Med	High	
• Residential	Low	Med	High	
• Rural	Low	Med	High	
• Military	Low	Med	High	
• Agriculture	Low	Med	High	
• Natural	Low	Med	High	
• Other	Low	Med	High	
Topography Characterization	Exposure Levels			Comments
• Flat	Low	Med	High	
• Hilly	Low	Med	High	
• Near water	Low	Med	High	
• Open water	Low	Med	High	
• Marshes	Low	Med	High	
• Woodland	Low	Med	High	
• Other	Low	Med	High	
Hazard Characterization	Exposure Levels			Comments
• Fire	Low	Med	High	
• Toxic	Low	Med	High	
• Biological	Low	Med	High	
• Noise	Low	Med	High	
• Traffic	Low	Med	High	
• Electrical	Low	Med	High	
• Mechanical	Low	Med	High	
• Flying objects	Low	Med	High	
• Falling objects	Low	Med	High	
• Slips, trips, falls	Low	Med	High	
• Wildlife	Low	Med	High	
• Other	Low	Med	High	





Date \_\_\_\_\_  
Time \_\_\_\_\_

## Site Control Plan

Please use the area below to illustrate project site and /or attach a photograph

What is the approximate size of our work area? \_\_\_\_\_

The work area exclusion zone is how many feet from the work area?





Date \_\_\_\_\_

Time \_\_\_\_\_

## Personal Protective Equipment

Based on evaluation of potential hazards, the following levels of PPE have been designated for the applicable work areas or tasks. Please circle the applicable personal protective clothing levels as required by zone.

### Exclusion Zone

Personnel Classification	PPE Level Requirements				
Administrative Level Personnel	A	B	C	D	Other
Support Level Personnel	A	B	C	D	Other
Awareness Level Personnel	A	B	C	D	Other
Operational Level Personnel	A	B	C	D	Other
Technician Level Personnel	A	B	C	D	Other
Supervisory Level Personnel	A	B	C	D	Other

### Contamination Reduction Zone

Personnel Classification	PPE Level Requirements				
Administrative Level Personnel	A	B	C	D	Other
Support Level Personnel	A	B	C	D	Other
Awareness Level Personnel	A	B	C	D	Other
Operational Level Personnel	A	B	C	D	Other
Technician Level Personnel	A	B	C	D	Other
Supervisory Level Personnel	A	B	C	D	Other

### Support Zone

Personnel Classification	PPE Level Requirements				
Administrative Level Personnel	A	B	C	D	Other
Support Level Personnel	A	B	C	D	Other
Awareness Level Personnel	A	B	C	D	Other
Operational Level Personnel	A	B	C	D	Other
Technician Level Personnel	A	B	C	D	Other
Supervisory Level Personnel	A	B	C	D	Other

Comments \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_





Date \_\_\_\_\_  
 Time \_\_\_\_\_

**Spill Containment Procedures Required**

Please check all applicable spill containment procedures as required

Identified Project Area	Containment Boom	Sorbent Boom	Sorbent Pads	Plug & Dike	Berms	Scuppers/ Drains	Other
Open Water							
Land							
Drainage Areas							
Storm Sewers							
Marshes/Swamps							
Woodland							

**Additional Procedures (as necessary)**

Type of Procedure	Requirement Identified?		Appendix Attachment Number
	Yes	No	
Confined space entry	Yes	No	
Confined space rescue	Yes	No	
Confined space non-entry rescue	Yes	No	
Lockout/Tag out	Yes	No	
Trenching/shoring	Yes	No	
MSDS sheets as applicable	Yes	No	
Shipping papers	Yes	No	
Safety meeting	Yes	No	

If any procedures listed above are required, a separate plan describing those procedures must be attached as an appendix to this SSHP.





Date \_\_\_\_\_

Time \_\_\_\_\_

## Employee Training Requirements

Please check applicable training level requirements.

Personnel Classifications	8-hr Awareness Level	16 hour Operational Level	24 hr Technician Level	40 hr Hazwoper Level	ICS Supervisory Level
Administrative Level Personnel					
Support Level Personnel					
Awareness Level Personnel					
Operational Level Personnel					
Technical Level Personnel					
Supervisory Level Personnel					

## Air Monitoring

Company/ person in charge of air monitoring: \_\_\_\_\_

Type of air monitoring equipment and calibration:

Type of Equipment	Calibration date	Frequency of recalibration		
		Hourly	Daily	Weekly

Type of air monitoring equipment and frequency required:

Instrumentation type	Continuous	Hourly	Daily	Other
Combustible gas				
Oxygen				
H2S				
Benzene				
CO				
Other				





Date \_\_\_\_\_  
Time \_\_\_\_\_

## Air Monitoring

**Emergency:** 911

**Responsible Party/Client:**

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

**Insurance Company:**

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

**Project Manager:**

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

**Safety Officer:**

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

Contact name: \_\_\_\_\_  
Office Phone: \_\_\_\_\_  
Cell Phone: \_\_\_\_\_  
Pager: \_\_\_\_\_  
Fax: \_\_\_\_\_

**VHF Marine Radio**

Channel: \_\_\_\_\_  
Channel: \_\_\_\_\_

Use: \_\_\_\_\_  
Use: \_\_\_\_\_

**UHF Motorola Radio**

Channel: \_\_\_\_\_  
Channel: \_\_\_\_\_

Use: \_\_\_\_\_  
Use: \_\_\_\_\_



## Lummi Tribal Sewer and Water District

**IN CASE OF  
SEWER OVERFLOW / SPILL / UPSET****IMMEDIATELY:**

1. STOP THE FLOW
2. STOP THE SPILL FROM SPREADING, ESPECIALLY TO RECEIVING WATERS
3. PROTECT THE INNOCENT keep civilians, especially children, and animals away from spill
4. **CALL** Bill Home: 380-3262                      Cell: 815-6092
5. DISINFECT ALL AFFECTED SURFACES

**AS SOON AS POSSIBLE, ALWAYS WITHIN 24 HOURS :**

6. **CALL** Lummi Natural Resources
  - a. Call the LNR call-down list (attached)
  - b. LNR's main concern is whether or not the spill can possibly reach shellfish beds
7. **CALL** EPA HOTLINE : 1-206-553-1846 OR **24 Hour** # 1-206-553-1263
  - a. Leave NAME
  - b. PHONE 360/758-7167
  - c. Lummi Tribal Sewer District
  - d. PERMIT # WA-0025666 for Gooseberry area OR
  - e. PERMIT # WA-0025658 for Sandy Point area
  - f. TYPE OF SPILL (usually raw sewage)
  - g. ESTIMATED AMOUNT IN GALLONS
8. **CALL** WA DEPARTMENT OF HEALTH SHELLFISH PROTECTION OFFICE
  - a. Frank Meriwether 360/236-3321 (during business hours) OR
  - b. HOTLINE 360/236-3330 (business hours); pager 360/786-4183 & leave your telephone # for message
  - c. DOH's main concern is whether or not the spill can possibly reach shellfish beds
9. IF TRAFFIC IS SERIOUSLY AFFECTED, CALL LUMMI LAW & ORDER @ 911

Treat each occurrence as if it was a spill of highly toxic, disease carrying poison in your own front yard.

**BECAUSE IT IS !**

# Project Overview

2023

Project Name: [Faint text]

Date: [Faint text]

[Faint paragraph of text]

[Faint text]

## Contact Information and Public Information Sources

Organization	Notes and Contact Names	Phone Number
<b>Government Agencies – Spill Response</b>		
Local Emergency Dispatch	Public telephone	911
	Public telephone	360-676-6814
	If no phone, contact fire station	n/a
Federal National Response Center	24 hour	800-424-8802
EPA, Region 10	Inland OSC, 24 hours	206-553-1263
	Office, daytime	206-553-1200
U.S. Coast Guard	Coastal OSC, 24 hours	206-220-7015
	Marine Safety Office, Seattle	206-217-6232 or 206-220-7001
Lummi Law & Order	Emergency, After Hours, On Duty Officer	911
	Office, daytime	360-384-2266
LIBC Chairman's office	Evelyn Jefferson, LIBC Chairwoman	360 -384-2229
	Mobile	360-410-0412
Lummi Natural Resources (see LNR Environmental Emergency Call-Down List for full contact information, SPRP Appendix E)	Merle Jefferson, Executive Director	360-384-2225
	Mobile	360-410-1706
	Home	360-647-1577
	Leroy Deardorff, Environmental Program Director	360-384-2272
	Mobile	360-410-1705
	Home	360-758-7181
	Jeremy Freimund, Water Resources Manager	360-384-2212
	Mobile	360-410-1775
	Home	360-671-1314
	Front Desk	360-384-2267
Lummi Safety Office	Cheryl Johnson	360-384-2394
WA Emergency Management Division	Oil spills, Hazmat, 24 hours	800-258-5990 or 800-OILS-911
WA Dept. of Ecology	All Other Materials (NW Region Office)	425-649-7000
	Bellingham Office	360-676-2198
WA State Patrol	Bellingham Office	360-676-2076
Whatcom County Division of Emergency Management	Emergency Operations Center (EOC) and Office (during daytime hours)	360-676-6681
	24 hour on-duty officer	360-714-3507
	Incident Hotline	360-738-4551
British Columbia Provincial Emergency Program (PEP)	24-hour contact	800-663-3456
	Vancouver Zone	604-660-3723

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for ensuring the integrity and reliability of financial data. This section also outlines the various methods and tools used to collect and analyze financial information.

2. The second part of the document focuses on the role of internal controls in preventing fraud and errors. It details the key components of an effective internal control system, including segregation of duties, authorization procedures, and regular monitoring. The text also provides examples of common control weaknesses and how they can be addressed.

3. The third part of the document addresses the challenges of managing financial risk. It explores the different types of risks, such as market risk, credit risk, and operational risk, and discusses strategies for identifying, measuring, and mitigating these risks. The importance of a risk appetite statement is also highlighted.

4. The fourth part of the document discusses the impact of technology on financial reporting and analysis. It examines how digital tools and automation have transformed the way financial data is processed and presented. The text also touches on the importance of data security and privacy in the digital age.

5. The final part of the document provides a summary of the key findings and offers recommendations for improving financial management practices. It stresses the need for continuous learning and adaptation in a rapidly changing business environment.



Organization	Notes and Contact Names	Phone Number
<b>On-Reservation Sources</b>		
Lummi Tribal Sewer and Water District	Business	360-758-7167
	Bill McCourt, Manager	360-815-6095 (mobile)
Fisherman's Cove gas station, mini-mart, and pier	Business line, 7 am to 10 pm	360-758-2448
	Office	360-758-7502
	Darrell Roberts, Operations Manager, office	360-384-7132
	Mobile	360-303-9445
Lummi Shell gas station, mini-mart	24-hour Business line	360-380-2049
	Geraldine Cordero, Manager	360-380-1354
Sandy Point Improvement Co. Marina	SPIC Office	360-384-3921
	Marina	360-384-4373
<b>Pipeline Companies</b>		
BP Olympic Pipe Line Co.	Emergencies Only	888-271-8880
	Non-emergency questions	800-564-7758
	Mike Condon, Environmental Coordinator	425-235-7736
	Local Office	360-371-1744
Cascade Natural Gas Williams Gas Pipeline Northwest Pipeline Corp.	24-hour Emergency	800-552-0615
	Office	360-733-5980
	24-hour Emergency	800-972-7733 800-453-3810
	Sumas District office	360-988-2261
Terasen Pipeline Co.	24-hour Emergency	888-876-6711
	Patrick Davis, Supervisor Bellingham District Office	360-398-1541
One-Call Before You Dig	Locates all utilities	800-424-5555
<b>Industrial Sources, Off-Reservation</b>		
Alcoa-Intalco Works Aluminum Smelter	24-hour Emergency (Guard Station)	360-384-7301
	Dave Ringwald, Environmental Manager	360-384-7533
	Business line	360-384-7061
BP Cherry Point Refinery	24-hour Security Office	360-371-1301
	Greg Rust, Safety and Security Superintendent and Incident Commander	360-371-1937
	Business line	360-371-1500
Burlington Northern Railroad CHEMCO, Inc.	24-hour Seattle office	206-625-6111
	Bellingham Train Master	360-734-8317
	Business line	360-366-3500
	24-hour Emergency	360-354-4807
ConocoPhillips Refinery	24-hour Security	360-384-8351
	Dan Whittaker, Health & Safety Team Leader	360-384-8416

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<b>Organization</b>	<b>Notes and Contact Names</b>	<b>Phone Number</b>
	Rosanne (Sandy) Paris, Environmental Supervisor	360-384-8375
	Business	360-384-1011
Praxair, Inc.	24-hour Emergency	800-772-9247
	Cleve Guessford, Manager Ron Laplante, Plant Operator	360-371-2900
Puget Sound Energy Whitehorn Generating Station	24-hour Emergency, Customer Service	888-225-5773
	Brian Lind, Technician	360-371-2822
Shell Oil Refinery (Anacortes)	Office	360-293-9147
	24 hour	360-293-0800
Sound Refining		206-272-9348
Tenaska Washington Cogeneration Facility	Tim Miller, Plant Manager Brian Alexander, Operations Manager (24-hour phone, dial "0" to reach on-duty staff)	360-380-2119
Texaco Refinery (Anacortes)	Office	360-293-0858
<b>Municipal Facilities</b>		
Everson Wastewater Treatment Plant	Dennis Shaw (cell phone)	360-961-3347
	Sewage Treatment Plant	360-966-0282
	Office (City Hall)	360-966-3411
Ferndale Water and Wastewater Treatment Plant	Office/Jerry Leuenberger, Manager	360-384-4607 360-384-5169
	Public Works Department	360-384-4006 360-752-4130
Lynden Wastewater Treatment Plant	Water Plant Office	360-354-4217 360-319-0545
	Tammy Adams	360-354-0633
	Public Works Department	360-354-3446 360-398-1208
<b>Spill Response Organizations/ Hazardous Material Contractors</b>		
Marine Spill Response Corporation (MSRC)	Everett office and 24-hour response	425-783-0908
	Bellingham office/boat	360-671-2371
NRC Environmental Services	Seattle Office	206-546-7150
	24-hour Emergency Response	800-337-7455
Philips Service Group	(formerly CPS)	206-734-5155
Robert Welch, Inc.	Office in Mt. Vernon	360-336-9578
Western Refinery Services	Ferndale office	360-366-3303
WA State Maritime Coop.	Seattle office, 24-hour number	206-448-7557
Whatcom Hazmat Team (SERP)	Prospect Fire Dispatch	360-676-6814
WSDOT Incident Response Truck	Wash. State Patrol Dispatch	360-676-2076



Organization	Notes and Contact Names	Phone Number
<b>Additional Contacts/Resources</b>		
Absorption Corporation	Bellingham	360-734-7415
Cascade Sorbent	Bellingham	360-734-2551
CHEMTREC	24 hour	800-424-9300
Disposal of Toxics Program, Whatcom County	Household Hazardous Waste Disposal	360-676-6850
Northwest Air Pollution Authority	Mt. Vernon office	360-428-1617
	From Island and Whatcom Counties	800-622-4627
Poison Control Center	Seattle Office	800-732-6985
Red Cross	Local Office (after hours call WCDEM)	360-733-3290
	24-hour Duty Officer	360-714-3556
Sardis Wildlife Center	Office	360-366-3863
Whatcom County Health Department	Office	360-676-6724
	After-hours Emergency	911
Whatcom County Public Works Department	Office	360-676-6759
	After-hours Emergency	911

In addition to the organizations listed above, the Whatcom County Hazardous Materials Plan lists hazardous materials response teams from federal and local agencies in Washington State, including contact information and whether the team is available for state-wide response.

#### Public Information Sources

Source	Contact Information
WCDEM Incident Hotline	360-738-4551
KGMI radio	AM 790
KISM radio	FM 92.9
KPUG radio	AM 1170

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## Lummi Natural Resources Notification List

Table 1 is the Lummi Natural Resources Department call-down list for environmental emergencies. When notified of an emergency, start at the cell phone numbers at the top of the list and continue down the list, leaving voice mail as possible, but do not stop until one of the individuals is reached in person. Table 2 lists other important environmental emergency telephone numbers. The area code is 360 unless otherwise noted.

Table 1. Lummi Natural Resources Department Environmental Emergency Call-Down List

Order	Name	Title	Work Phone	Home Phone	Cell Phone
1	Merle Jefferson	Executive Director	384-2225	647-1577	410-1706
2	Leroy Deardorff	Environmental Program Director	384-2272	758-7181	410-1705
3	Jeremy Freimund	Water Resources Manager	384-2212	671-1314	410-1775
4	Alan Chapman	Harvest Manager	384-2202	398-8290	410-1778
5	Randy Kinley, Sr.	ESA Coordinator	384-2223	734-8929	410-1764
6	Wayne Watne	Resource Protection Manager	384-2247	(360) 416-4988	410-7359
7	Mike MacKay	Senior Fisheries Biologist	384-2230	715-8806	410-1777
8	Gregg Dunphy	Habitat Biologist	384-2318	733-5890	410-1743
9	Linda Delgado	Enhancement Program Manager	384-2346	758-2409	410-1954 (cell) 752-4126 (pager)
10	Robert Hall	Seaponds Hatchery Manager	384-2221	734-5804	410-1953 (cell) 752-4125 (pager)

Table 2. Other Important Environmental Emergency Contacts

Name	Title	Work Phone	Home Phone	Cell Phone and/or Pager
Cheryl Johnson	LIBC Safety Officer	384-2394	-----	410-1986
Gary James	Lummi Chief of Police	384-2266	911	815-3298
Lena Tso	Lummi Tribal Historic Preservation Office	384-2259 x2662	-----	

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYS 439

LECTURE 1

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Gary James	Lummi Chief of Police	384-2266	911	815-3298
	Lummi Tribal Historic Preservation Office	384-2298	-----	
Tom Edwards	Lummi Schelangen (Cultural) Dept.	384-2365	-----	410-0261
Don Boyd	Whatcom County DEM	676-6681	398-1310	Fax 738-2518
U.S. EPA	24-Hour Spill Response	1-206-553-1263		
U.S. Coast Guard	National Spill Response Center	1-800-424-8802		
DOH-Shellfish		360-236-3330; (24-hour beeper) 360-786-4183		
Washington Department of Ecology		1-800-258-5990		
Northwest Air Pollution Authority		1-360-428-1617		
Stranded Marine Mammals		1-800-562-8832		

Updated September 28, 2005

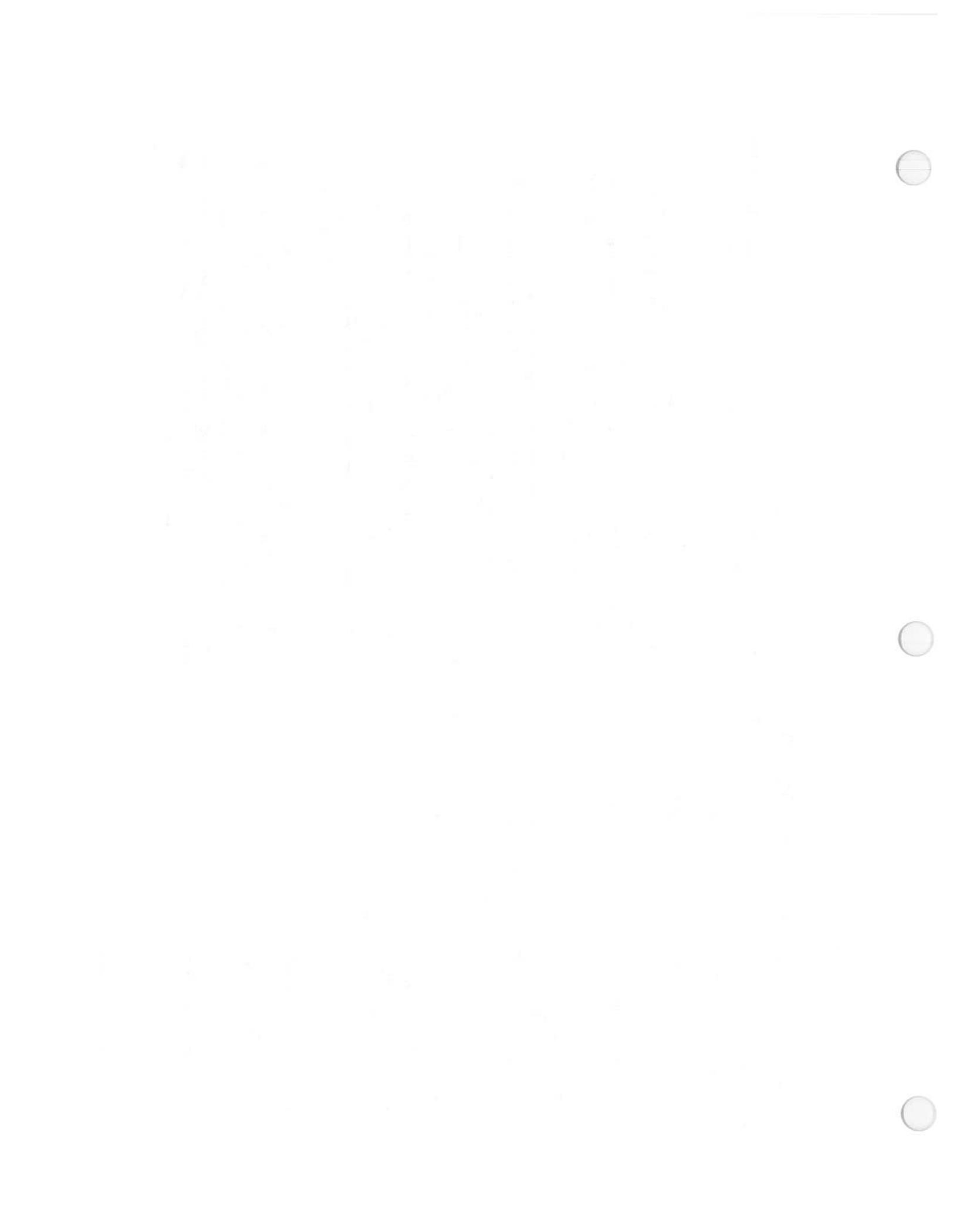
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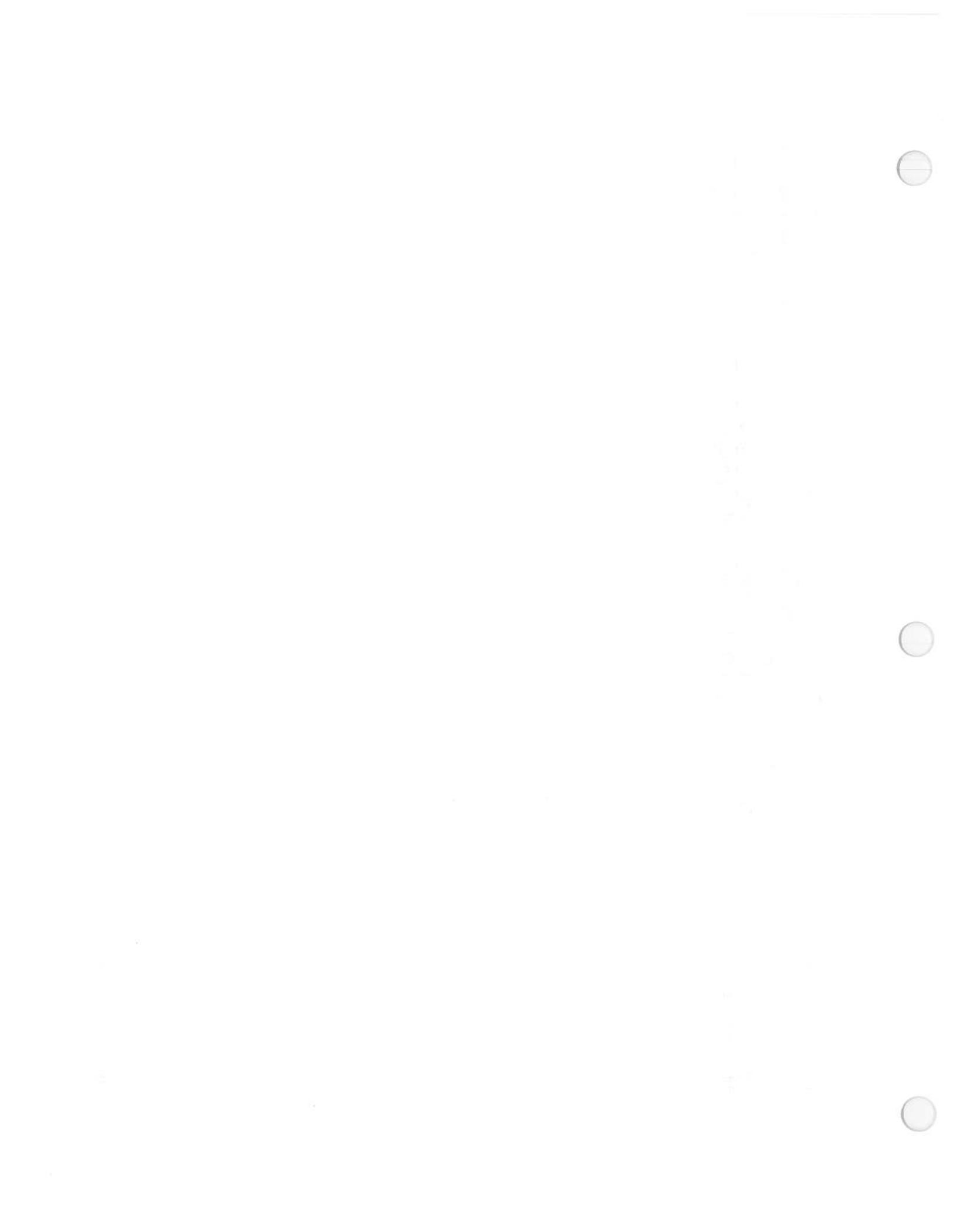
## Inventory of Lummi Nation Spill Response Equipment

All Lummi Nation spill response equipment is stored in an 8 foot wide, 8 foot tall, 20 foot long shipping container located behind the Lummi Oyster Hatchery at 3801 Haxton Way. The container is secured with a padlock which is keyed to the LT2 key made by Accurate Lock Service, Inc. in Bellingham.

Item	Unit	Quantity	Use
Containment Boom	100 feet	13	For the exclusion, containment, deflection, or collection of hazardous substances.
Containment Boom	50 feet	2	
Tow bridle with bullet float	Each	6	Two to pull each end of one length of boom at Fisherman's Cove. Four for Lummi Bay: one each for the two large tidegates and two extra for other potential boom deployments.
Boom repair kit	Each	1	To repair holes in boom fabric
Anchor system – 22 lb Danforth	Each	4	To form a square deployment at Fisherman's Cove.
Anchor system – 40 lb Danforth	Each	5	For Lummi Bay: three for the two large tidegates and two extra for other potential boom deployments.
Spill kit, oil-only, 20 gallon	Each	1	To cleanup small spills at the aquaculture facility
Spill kit, oil-only, 30 gallon	Each	2	To cleanup small spills at construction sites
Spill kit, oil-only, 30 gallon	Each	2	To cleanup small spills at the two sewer treatment plants
Spill kit, oil-only, 55 gallon	Each	1	To cleanup small spills at the Fisherman's Cove warehouse
Spill kit, universal, 20 gallon	Each	1	To cleanup small spills at the aquaculture facility
Spill kit, universal, 30 gallon	Each	2	To cleanup small spills at construction sites
Oil-sweep, 19"x100 feet	Each	10	A 100 foot long string of sorbent pads to absorb small spills or residual oil from the water surface. Sweep is more efficient and easier to retrieve than individual pads.
Oil snare, 30 on 50 foot rope	Each	10	Pom-poms of oleophilic fibers strung on a rope that adsorb heavier oil. To be used along the shoreline and inside the tidegate runways.
Sorbent boom, 5"x10'	4/bale	5	A five inch diameter boom of absorbent material. Use to absorb small spills, residual oil, or oil that escapes containment boom and to provide an extra line of defense in the tidegate runways or Seapond.
Sorbent pads, 16"x20"	200/bale	5	Square pads of absorbent material to absorb small spills or residual oil from water or ground surface.

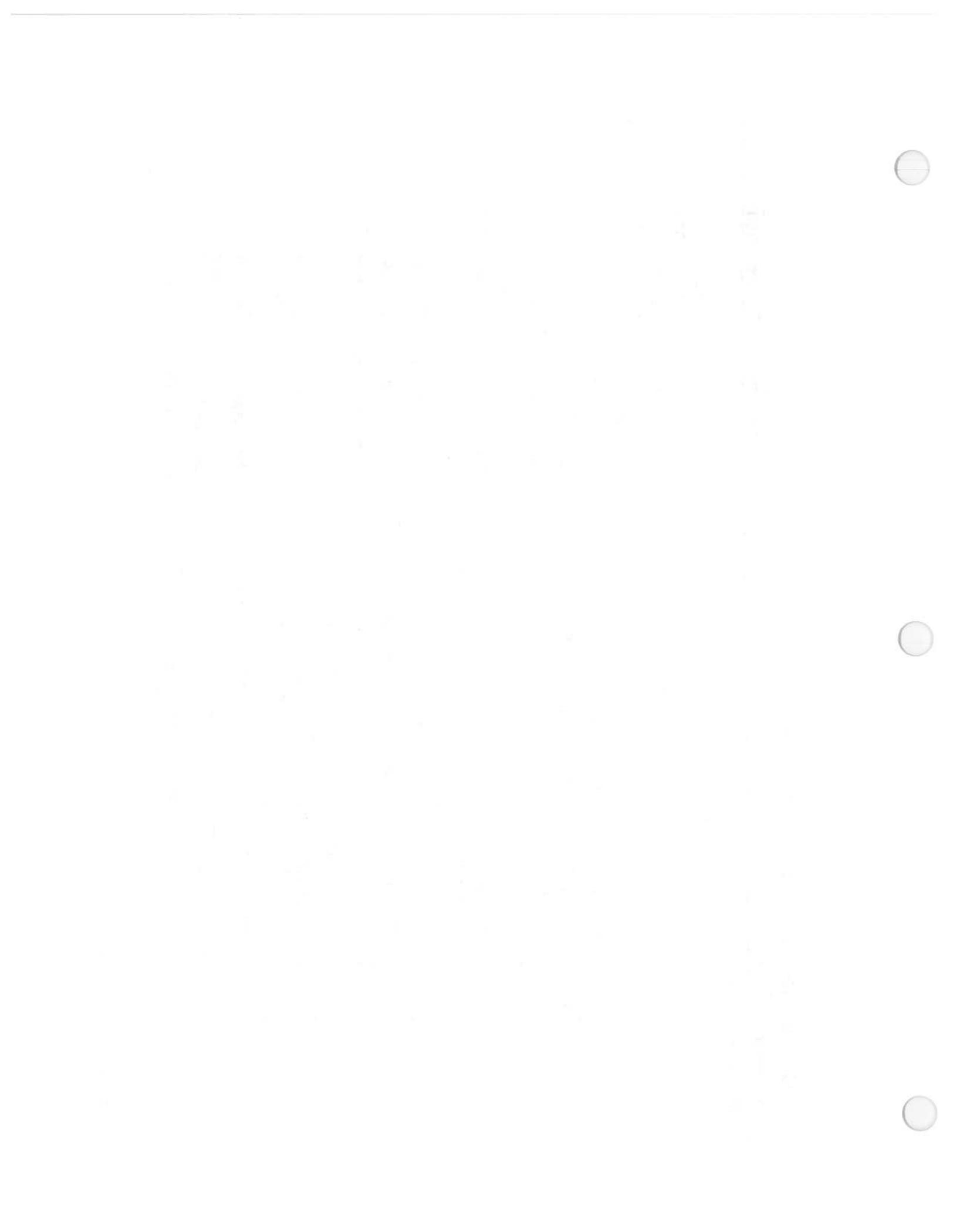


Screened pitchforks	Each	4	Tools to collect soiled pads.
Disposal bags	50/box	4	Six millimeter thick clear, plastic bags for disposal of soiled response equipment.
Raingear	20/case	1	For the protection of responders
Rubber gloves	72/case	1	For the protection of responders

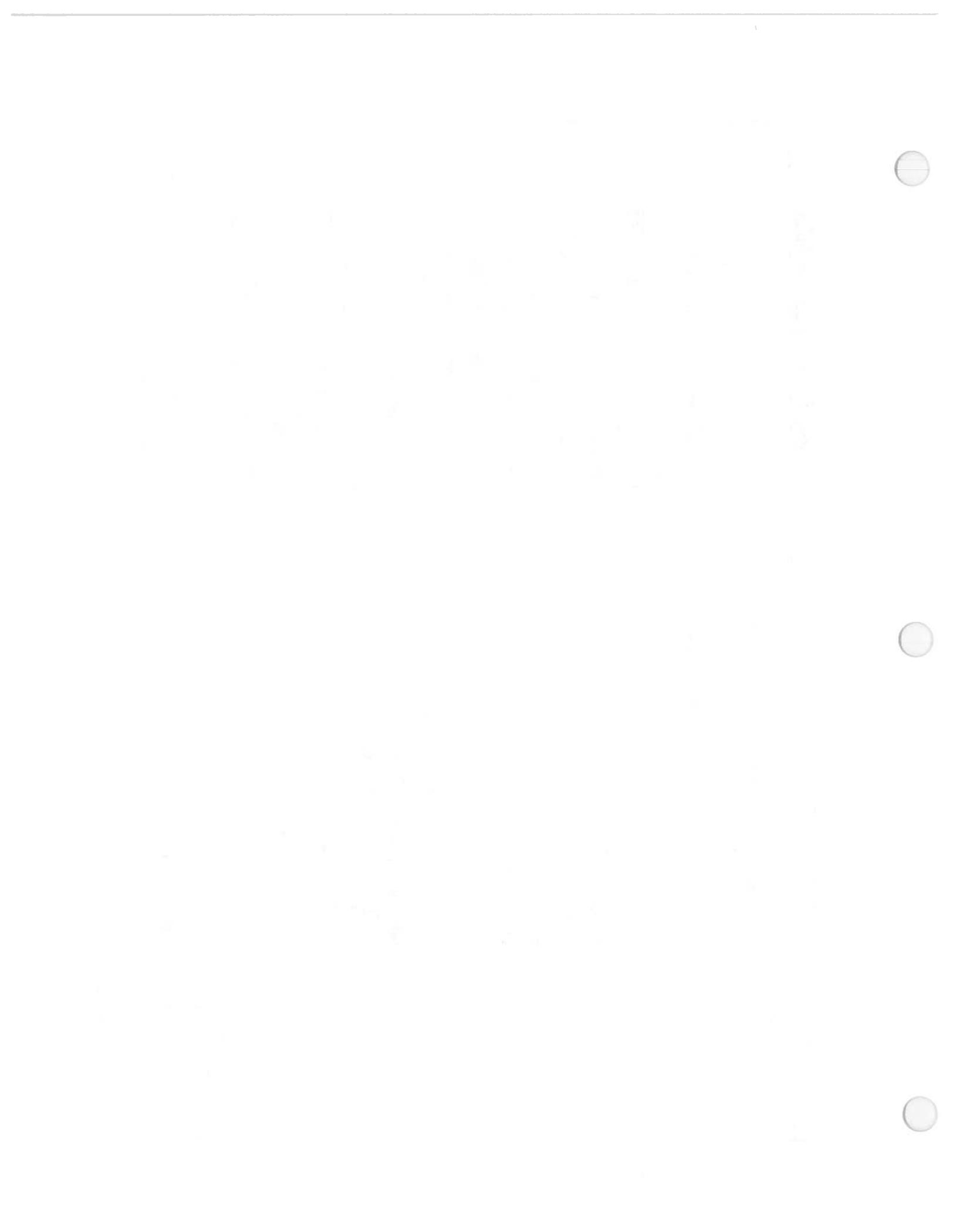


## LIBC Spill Response Inventory List

Department	#	Item	Contact Name	Contact Phone
<b>Natural Resources</b>				
	1	2003 Chevrolet Trailblazer Lic # G6213578, GSA	Mann Lewis	384-2358 739-2864 (cell)
	1	2002 Ford Expedition, Lic # G6213576, GSA	Wayne Watne	384-2247 410-7935 (cell)
	1	2004 Chevrolet Silverado 2500 Lic #G63-0590A, GSA	Mike MacKay	384-2230
	1	2002 Chevrolet Blazer Lic. # G61-09898, GSA	Gregg Dunphy	384-2318
	1	1996 Ford Flatbed F600 G82-04886, GSA	Robert Hall	384-2221
	1	1999 Chevrolet Suburban Lic. # G63-02575, GSA	Alan Chapman	384-2202
	1	1999 Chevrolet Astro 4WD Lic. #G61-04548, GSA	Gregg Dunphy	384-2318
	1	Spill Response Equipment container, located behind Shellfish Hatchery, see list in Spill Response Binder, Container locked with LT-2 key	Stacy Fawell	384-2396
	1	Pump – located at Shellfish Hatchery	Ralph Solomon	384-2303
	1	5 HP 2" pump, Honda engine, located in Pole Building	Stacy Fawell	384-2396
	1	5.5 HP spray pump, 1.5", Honda engine	Zachary Dewees	384-2228
	1	Inlet and outlet hose for pumps, 2", Pole building	Stacy Fawell	384-2396
	1	16-foot Harbercraft aluminum skiff w/ 30 HP Honda 4-stroke motor, 2 HP Honda 4-stroke motor and dedicated trailer Location: Tribal Center	Mann Lewis	384-2358 739-2864 (cell)
	1	Spare motor for Water Resources skiff, 2 HP Honda 4	Mann Lewis	384-2358 739-2864 (cell)
	1	Fisheries skiff	Mike MacKay	384-2230
	1	14-foot Lund johnboat w/ dedicated trailer, 8 HP 2-stroke	Gregg Dunphy	384-2318



Department	#	Item	Contact Name	Contact Phone
		gas motor, oars		
	1	10-foot Gamefisher johnboat w/oars, no trailer	Gregg Dunphy	384-2318
	1	8-foot, small, utility trailer w/ wood sides	Gregg Dunphy	384-2318
		PPE – raingear, boots, waders, etc. as issued to staff	Gregg Dunphy	384-2318
		Hand tools	Gregg Dunphy	384-2318
		Cell phones as issued to staff	Gregg Dunphy/ Stacy Fawell	384-2318/ 2396
	5	Laptop computers	Stacy Fawell	384-2396
	2	26" chainsaws	Zachary Dewees	384-2228
	1	44" chainsaw	Zachary Dewees	384-2228
	3	Splitting mauls	Zachary Dewees	384-2228
	2	Axes	Zachary Dewees	384-2228
	2	Shovels	Zachary Dewees	384-2228
	2	20 foot lengths of chain with hooks	Zachary Dewees	384-2228
	1	3000 gallon propane tank w/ outlet Location: Shellfish hatchery	Ralph Solomon	384-2303
	3	Chainsaws	Zachary Dewees	384-2228
	1	Portable generator 5 kw	Linda Delgado/ Bob Hall	384-2346
	2	Nextel cellular phones	Bob Hall	384-2221
	1	Boom truck	Bob Hall	384-2221
<b>Law and Order</b>				
	1	Mobile Command Post, Lic. # I02843	Gary James	384-2266
	1	1999 Ford Expedition, Lic.#I001796 Location: Tribal Center	Gary James	384-2266



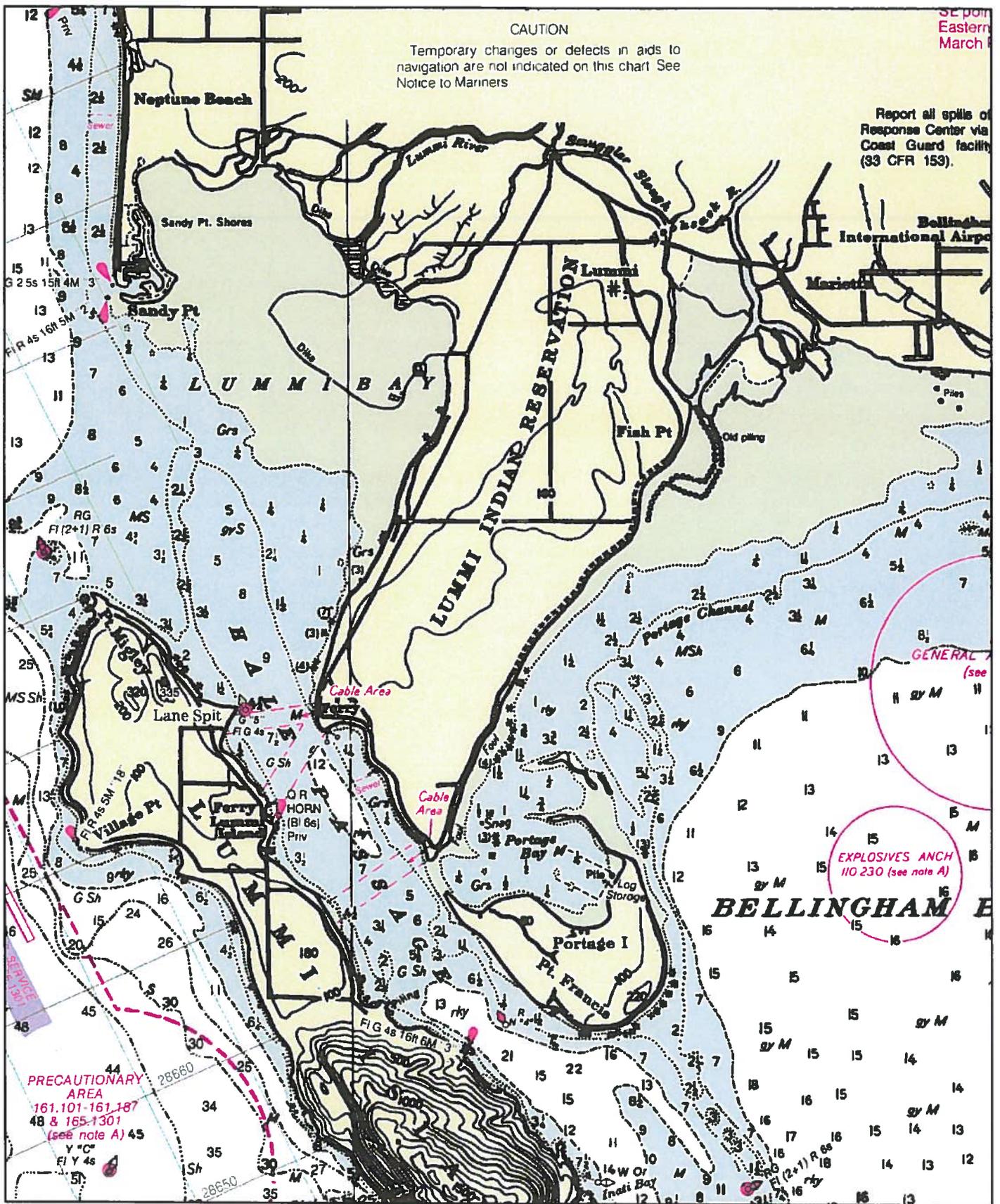
Department	#	Item	Contact Name	Contact Phone
	1	2000 Ford Crown Victoria, Lic. #1001930 Location: Tribal Center	Gary James	384-2266
	1	2001 Chevy Impala, Lic. # 102368	Gary James	384-2266
	1	2001 Chevy Impala, Lic. # 102369	Gary James	384-2266
	1	2000 Ford Crown Victoria, Lic. # 2198	Gary James	384-2266
	1	2000 Ford Crown Victoria, Lic. # 2199	Gary James	384-2266
	1	2000 Chevy Impala, Lic. # 2353	Gary James	384-2266
	1	2001 Ford Crown Victoria, Lic.#102372	Gary James	384-2266
	1	2003 Chevy Impala, Lic. # 102666	Gary James	384-2266
	1	2003 Crown Victoria, Lic. # 102836	Gary James	384-2266
	1	2004 Ford Crown Victoria, Lic. #102964	Gary James	384-2266
	1	2003 Ford Expedition, Lic. # 102663	Gary James	384-2266
	1	2001 Dodge Extended Cab Pick-up, Lic.# 2396	Gary James	384-2266
	1	2001 Dodge Ram Pick-up, Lic. #2354	Gary James	384-2266
	1	1994 Roughneck Boat Trailer, Lic. # 1223	Gary James	384-2266
	1	1991 EZ Loader Boat Trailer, Lic.#0450	Gary James	384-2266
	1	1997 Multi Utility Trailer, Lic. #1731	Gary James	384-2266
	1	2003 King KRT 4000 Trailer	Gary James	384-2266
	1	Roughneck 16 foot boat w/ 35 HP Evinrude outboard motor	Gary James	384-2266
	1	Unknown make, 22 foot boat w/100 HP Suzuki outboard motor	Gary James	384-2266
	1	1997 Honda TRX250 ATV	Gary James	384-2266
	1	1999 Honda TRX250 ATV	Gary James	384-2266



Department	#	Item	Contact Name	Contact Phone
	1	36 foot patrol boat, unknown make	Gary James	384-2266
	1	22 foot Sea Raider	Gary James	384-2266
	1	Honda 200 HP Motor	Gary James	384-2266
<b>Planning/ Maintenance</b>				
	1	Kobota Tractor	David James	384-2211
	1	One-ton truck	David James	384-2211
	1	¾ ton pick-up truck	David James	384-2211
	1	½ ton pick-up truck	David James	384-2211
	1	12 seat passenger van	David James	384-2211
	3	7 seat passenger van	David James	384-2211
	3	4 door passenger van	David James	384-2211
	1	500 gallon Water Buffalo tank	David James	384-2211
<b>Lummi Tribal Sewer and Water District</b>				
	1	Back hoe	Victor Solomon	815-6102
	1	Tank truck	Bill McCourt	815-6092
	1	Portable generator	Bill McCourt	815-6092
	1	Chevy 4x4	Bill McCourt	815-6092
	4	Small pick-up trucks	Bill McCourt	815-6092
	8	Cellular phones	Victor Solomon	815-6102
	1	Portable pump, 200 gpm	Bill McCourt	815-6092
	1	Chainsaw	Victor Solomon	815-6102

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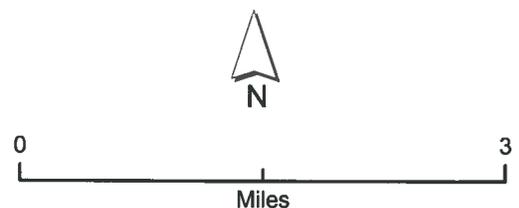




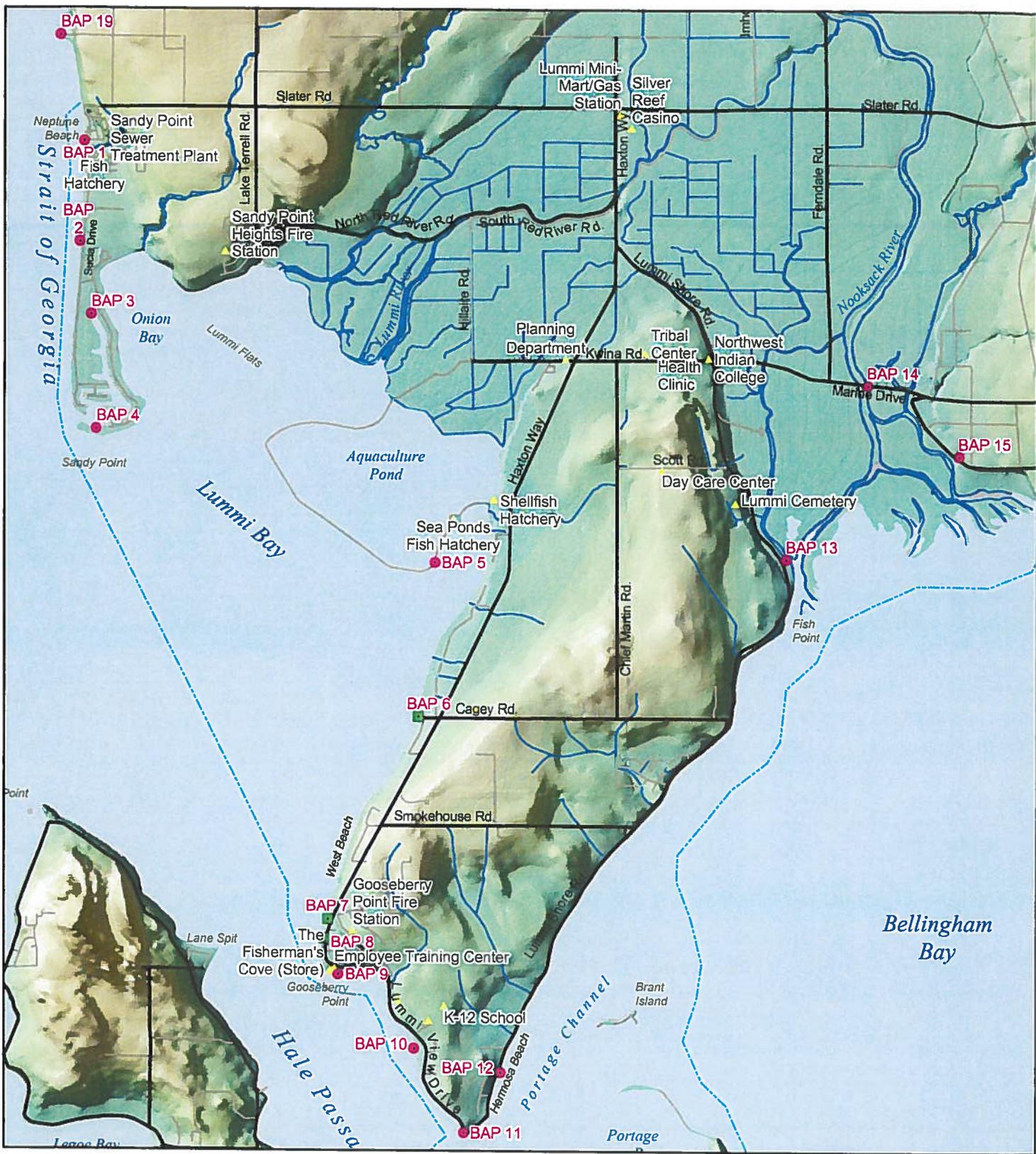
### Water Depths near Lummi Peninsula

Background image is NOAA nautical Chart (#18421)  
 Depths are in fathoms. One fathom = 6 feet.

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation.

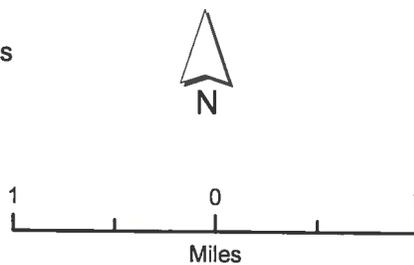






Beach/Boat Access Points, Topography, Surface Water Drainages, Place Names, and Roads of the Lummi Reservation

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**Legend**

- Beach/Boat Access
- Beach Access Only
- ★ Landmarks
- ~ Tidelands
- Roads (Major)
- Roads (Other)
- ~ Streams and Ditches



## Beach/ Boat Access Points On the Reservation

ID Code	Location	Directions	Notes <sup>1</sup>
BAP 1	Neptune Beach	I-5 Exit 260, Slater Road west to end of Beach Way S.	Narrow access, soft substrate; only skiff or boom on trailer during higher tides, access affected by W winds, access at any tide with four-wheel drive vehicle.
BAP 2	Joe Finkbonner's vacant lot	Slater Road to Beach Way to Sucia Drive, south to lot just south of 4517 Sucia Drive	Beach access, up to ~30-foot boats at higher tides, smaller boats (and harder to take boats out) at lower tides, access at any tide with four-wheel drive vehicle. Often blocked by logs/debris, access affected by W winds.
BAP 3	Sandy Point Marina, north end	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	Private boat ramp, usable for most trailers; entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.
BAP 4	Sandy Point, South Cape	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	End of road on private property, entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.
BAP 5	Lummi Bay Hatchery facility	Slater Road to Haxton Way to west on Sea Pond Access South	Steep and narrow ramp, skiffs and small trailers only; accessible at tides $\geq$ 6-feet, access at any tide with four-wheel drive vehicle.
BAP 6	Lummi Peninsula	Slater Road to Haxton Way to west at Cagey Road.	Beach access only, no boat access because of shallow depth.
BAP 7	Lummi Peninsula	Slater Road to Haxton Way. Between 2651 and 2637 Haxton	Beach access only, no boat access because of shallow depth.
BAP 8	Gooseberry Point	Slater Road to Haxton Way, on west side of Haxton Way across from Emma Road	Beach access only, no boat access because of shallow depth
BAP 9	Fisherman's Cove at Gooseberry Point	Slater Road to Haxton Way, south to Lummi View Drive	Public boat ramp, up to ~28-foot boats at $\geq$ 4 foot (soft substrate at $<$ 4 foot high tides). Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)

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### Beach/ Boat Access Points On the Reservation

ID Code	Location	Directions	Notes <sup>1</sup>
			Beach access, up to ~28-foot (possibly larger) boats at any tide). Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.
			Crane on Lummi dock, boats up to 10,000 pounds at any tide
BAP 10	Stommish Ground	Slater Road to Haxton Way to Lummi View Drive, east and south to Stommish Ground	Public boat ramp, up to ~28-foot boats; no access at tides < 5 feet.
BAP 11	The Portage (spit connecting to Portage Island)	Slater Road to Haxton Way, south to Lummi View Drive and southern end of peninsula	Beach access, up to ~28-foot boats at tides ≥ 5 feet, smaller boats at tides < 5 feet. Access affected by SE and SW winds.
BAP 12	Hermosa Beach	Slater Road to Haxton Way to Lummi Shore Road, south to Hermosa Beach area	Beach access, limited to smaller boats at tides ≥ 6 feet; limited by debris on beach.
BAP 13	Fish Point area	Slater Road to Haxton Way to Lummi Shore Road, south to Native American Shellfish Co.	Skiffs only, with access limited by shallow river channel, periodic debris, and low tides. Accessible at tides ≥ 6 feet.
BAP 14	Marine Drive Bridge over the Nooksack River	Slater Road, south on Ferndale Road, east on Marine Drive to east bank of river	Skiffs only, limited by steep and narrow bank access, shallow river channel, and periodic debris. Accessible at tides ≥ 6 feet.
BAP 15	Marietta Slough	Slater Road, south on Ferndale Road, east on Marine Drive, south on Old Marine Drive	Skiffs only, limited by shallow river channel and periodic debris. Accessible at tides ≥ 6 feet.

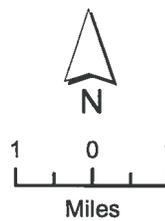
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**Beach/Boat Access Points, Topography, and Surface Water Drainages of Western Whatcom County**

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from and against any damage loss of liability arising from any use of this data.



**Legend**

- Beach/Boat Access
- Beach Access Only
- Roads (Major)
- Roads (Others)
- Rivers



### Beach/ Boat Access Points Off the Reservation

ID Code	Location	Directions	Notes
BAP 16	Birch Bay Village	I-5 Exit 270, Birch Bay-Lynden Road west to Birch Bay Drive, west on Birch Point Road to Birch Bay Village	Private boat ramp, usable for most trailers; BP has access for spill response. Access affected by W, SE, and SW winds.
BAP 17	BP Cherry Point Refinery dock	I-5 Exit 266, Grandview Road west to Jackson Road, south to security gate	Only small skiffs at high tide because of 4-ft drop-off; just north of pier; access affected by W, SE, and SW winds. BP also has boat launch on their pier.
BAP 18	Gulf Road	I-5 Exit 266, Grandview Road west to Kickerville Road, south to Alder, Lonseth, or Henry Road, west to Gulf Road, south to beach	Beach access, up to ~20-foot (possibly larger) boats; access limited by debris. Access affected by W, SE, and SW winds, access at any tide with four-wheel drive vehicle.
BAP 19	ConocoPhillips Refinery dock	I-5 Exit 260, Slater Road west to Lake Terrell Road, north to Unick Road, west to facility	Boat launch, no ramp; must access through refinery gate. Access affected by W, SE, and SW winds.
BAP 20	Ferndale/Hovander Park Public Boat Ramp (Nooksack River)	I-5 Exit 262, west on Main Street to just past railroad overpass, south on Hovander Road, follow signs west to river	Public boat ramp, usable for most trailers
BAP 21	Squalicum Harbor Marina	I-5 Exit 256, Meridian Street south to Squalicum Way and Roeder Avenue, southeast to marina just before T.J. Glenn Drive	Public boat ramps, usable for most trailers
BAP 22	Fairhaven Public Boat Ramp	I-5 Exit 250, Old Fairhaven Parkway west, north on 10 <sup>th</sup> Street, west on Harris Avenue to waterfront	Public boat ramp, usable for most trailers
BAP 23	Larrabee State Park, Teddy Bear or Wildcat Cove	I-5 Exit 250, Old Fairhaven Parkway west, south on Chuckanut Drive, west and then south on Cove Road	Public beach ramp/access, perhaps limited at low tides

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection practices and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the role of technology in data management and analysis. It discusses how modern software solutions can streamline data collection, storage, and analysis processes, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and privacy. It provides strategies to mitigate these risks and ensure that the data remains reliable and secure throughout its lifecycle.

5. The fifth part of the document concludes by summarizing the key findings and recommendations. It stresses the importance of ongoing monitoring and evaluation to ensure that the data management processes remain effective and aligned with the organization's goals.





ID Code	Location	Directions	Notes <sup>1</sup>
BAP 1	Neptune Beach	I-5 Exit 260, Slater Road west to end of Beach Way S.	Narrow access, soft substrate; only skiff or boom on trailer during higher tides, access affected by W winds, access at any tide with four-wheel drive vehicle.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 2	Joe Finkbonner's vacant lot	Slater Road to Beach Way to Sucia Drive, south to lot just south of 4517 Sucia Drive	Beach access, up to ~30-foot boats at higher tides, smaller boats (and harder to take boats out) at lower tides, access at any tide with four-wheel drive vehicle. Often blocked by logs/debris, access affected by W winds.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



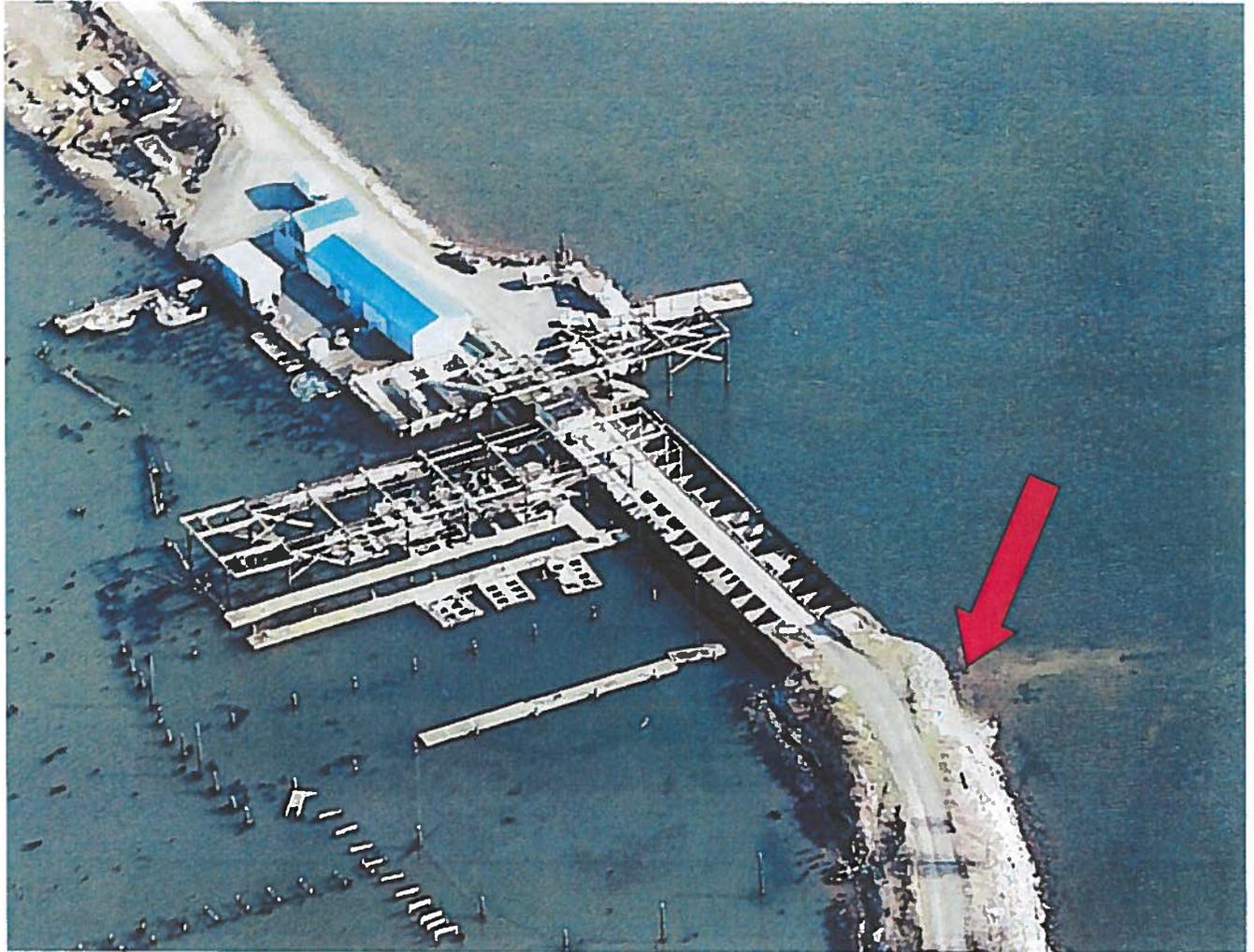
ID Code	Location	Directions	Notes <sup>1</sup>
BAP 3	Sandy Point Marina, north end	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	Private boat ramp, usable for most trailers; entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 4	Sandy Point, South Cape	Slater Road to Sucia Drive to Thetis Way to Saltspring Drive	End of road on private property, entrance channel shallow or exposed at lowest tides, ramp accessible at any tide with a four-wheel drive vehicle.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 5	Lummi Bay Hatchery facility	Slater Road to Haxton Way to west on Sea Pond Access South	Steep and narrow ramp, skiffs and small trailers only; accessible at tides $\geq$ 6-feet, access at any tide with four-wheel drive vehicle.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 6	Lummi Peninsula	Slater Road to Haxton Way to west at Cagey Road.	Beach access only, no boat access because of shallow depth.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 7	Lummi Peninsula	Slater Road to Haxton Way. Between 2651 and 2637 Haxton	Beach access only, no boat access because of shallow depth.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 8	Gooseberry Point	Slater Road to Haxton Way, on west side of Haxton Way across from Emma Road	Beach access only, no boat access because of shallow depth

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 9	Fisherman's Cove at Gooseberry Point	Slater Road to Haxton Way, south to Lummi View Drive	Public boat ramp, up to ~28-foot boats at $\geq 4$ foot (soft substrate at $< 4$ foot high tides). Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.
			Beach access, up to ~28-foot (possibly larger) boats at any tide). Access affected by S, SE, and SW winds. Access at any tide with four-wheel drive vehicle.
			Crane on Lummi dock, boats up to 10,000 pounds at any tide

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 10	Stommish Ground	Slater Road to Haxton Way to Lummi View Drive, east and south to Stommish Ground	Public boat ramp, up to ~28-foot boats; no access at tides < 5 feet.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 11	The Portage (spit connecting to Portage Island)	Slater Road to Haxton Way, south to Lummi View Drive and southern end of peninsula	Beach access, up to ~28-foot boats at tides $\geq$ 5 feet, smaller boats at tides < 5 feet. Access affected by SE and SW winds.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 12	Hermosa Beach	Slater Road to Haxton Way to Lummi Shore Road, south to Hermosa Beach area	Beach access, limited to smaller boats at tides $\geq 6$ feet; limited by debris on beach.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 13	Fish Point area	Slater Road to Haxton Way to Lummi Shore Road, south to Native American Shellfish Co.	Skiffs only, with access limited by shallow river channel, periodic debris, and low tides. Accessible at tides $\geq$ 6 feet.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 14	Marine Drive Bridge over the Nooksack River	Slater Road, south on Ferndale Road, east on Marine Drive to east bank of river	Skiffs only, limited by steep and narrow bank access, shallow river channel, and periodic debris. Accessible at tides $\geq 6$ feet.

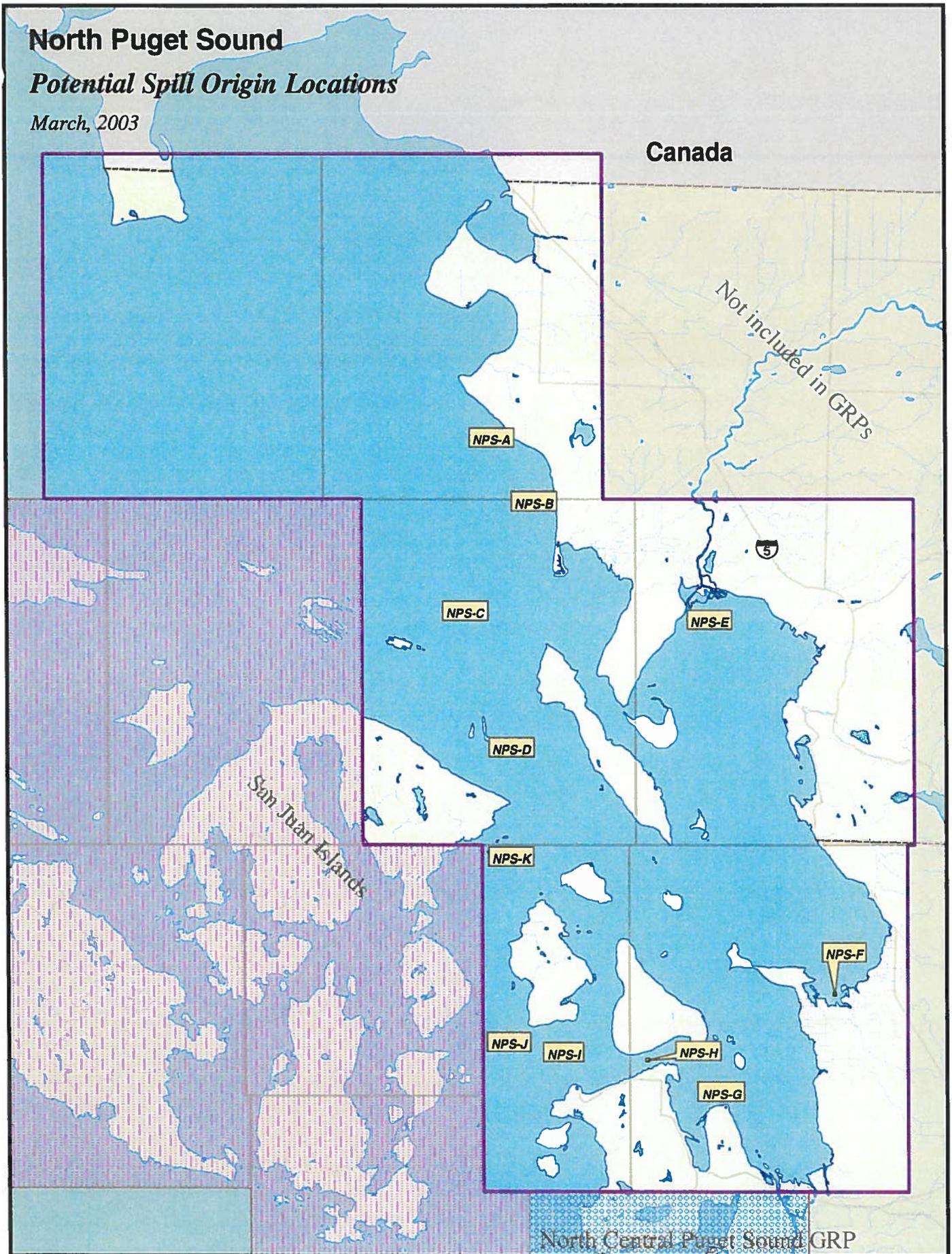
<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)



ID Code	Location	Directions	Notes <sup>1</sup>
BAP 15	Marietta Slough	Slater Road, south on Ferndale Road, east on Marine Drive, south on Old Marine Drive	Skiffs only, limited by shallow river channel and periodic debris. Accessible at tides $\geq 6$ feet.

<sup>1</sup> All tide heights are given in feet above Mean Lower Low Water (MLLW)







4.2.2.2 North Puget Sound Booming Strategy Priority Tables

Table 4-2-1

<b>Potential Spill Origin: NPS-A - Cherry Point – BP Facility</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-16	4-57	Tide dependent
2	NPS-17	4-57	Tide dependent
3	NPS-11	4-56	
4	NPS-10	4-56	
5	NPS-9	4-56	
6	NPS-7	4-56	
7	NPS-8	4-56	
8	NPS-14	4-57	
9	NPS-15	4-57	
10	NPS-26	4-57	
11	NPS-18	4-57	
12	NPS-27	4-57	

Table 4-2-2

<b>Potential Spill Origin: NPS-B Ferndale Refinery</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-16	4-57	Tide dependent
2	NPS-17	4-57	Tide dependent
3	NPS-12	4-56	
4	NPS-13	4-56	
5	NPS-14	4-57	
6	NPS-15	4-57	
7	NPS-26	4-57	
8	NPS-18	4-57	
9	NPS-27	4-57	
10	NPS-28	4-57	
11	NPS-29	4-57	
12	NPS-11	4-56	
13	NPS-10	4-56	
14	NPS-9	4-56	
15	NPS-23	4-57	
16	NPS-24	4-57	

Table 4-2-3

<b>Potential Spill Origin: NPS- C North of Matia/Lummi Islands</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-23	4-57	
2	NPS-24	4-57	
3	NPS-76	4-60	
4	NPS-75	4-60	
5	NPS-16	4-57	
6	NPS-17	4-57	
7	NPS-26	4-57	
8	NPS-18	4-57	

Table 4-2-4

<b>Potential Spill Origin: NPS-D Clark Island, SE corner</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-76	4-60	
2	NPS-23	4-57	
3	NPS-24	4-57	
4	NPS-25	4-57	
5	NPS-16	4-57	
6	NPS-17	4-57	
7	NPS-33	4-58	

Table 4-2-5

<b>Potential Spill Origin: NPS-E Nooksack River mouth</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-34	4-58	
2	NPS-21	4-58	
3	NPS-22	4-58	
4	NPS-19	4-57	
5	NPS-28	4-57	
6	NPS-29	4-57	
7	NPS-20	4-58	
8	NPS-30	4-58	
9	NPS-31	4-58	
10	NPS-32	4-58	

Table 4-2-6

<b>Potential Spill Origin: NPS-F Samish River mouth</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-46	4-59	
2	NPS-47	4-59	
3	NPS-48	4-59	
4	NPS-45	4-59	
5	NPS-44	4-59	

Table 4-2-7

<b>Potential Spill Origin: NPS-G March Point Refineries</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-62	4-59	
2	NPS-61	4-59	
3	NPS-65	4-59	
4	NPS-66	4-59	
5	NPS-64	4-59	
6	NPS-63	4-59	
7	NPS-67	4-59	
8	NPS-68	4-59	
9	NPS-69	4-59	
10	NPS-70	4-59	
11	NPS-71	4-60	
12	NPS-72	4-60	
13	NPS-73	4-60	
14	NPS-74	4-60	
15	NPS-54	4-59	
16	NPS-53	4-59	
17	NPS-52	4-59	
18	NPS-51	4-59	
19	NPS-50	4-59	

Table 4-2-8

<b>Potential Spill Origin: NPS-H Guemes Channel</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-65	4-59	
2	NPS-66	4-59	
3	NPS-64	4-59	
4	NPS-63	4-59	
5	NPS-68	4-59	
6	NPS-71	4-60	
7	NPS-72	4-60	
8	NPS-73	4-60	
9	NPS-62	4-59	
10	NPS-61	4-59	
11	NPS-70	4-59	
12	NPS-69	4-59	
13	NPS-74	4-60	
14	NPS-75	4-60	
15	NPS-76	4-60	

Table 4-2-9

<b>Potential Spill Origin: NPS-I Guemes Channel mouth</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	NPS-72	4-60	
2	NPS-73	4-60	
3	NPS-71	4-60	
4	NPS-74	4-60	
5	NPS-75	4-60	
6	NPS-76	4-60	
7	NC-1	4-5	Refer to North Central Puget Sound GRP for NC strategies
8	NC-2	4-5	
9	NC-3	4-5	
10	NC-4	4-5	
11	NPS-70	4-59	
12	NPS-69	4-59	
13	NPS-33	4-58	
14	NPS-54	4-59	
15	NPS-53	4-59	

Table 4-2-10

<b>Potential Spill Origin: NPS-J - James Island</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
<b>FALL AND WINTER</b>			
1	JAM-54	4-19	Refer to San Juan Islands GRP for JAM and LOP strategies
2	JAM-53	4-19	
3	LOP-41	4-20	
4	NPS-72	4-60	
5	NPS-73	4-60	
6	NPS-74	4-60	
7	LOP-42	4-20	
8	LOP-43	4-20	
9	LOP-44	4-20	
<b>SPRING AND SUMMER</b>			
1	JAM-54	4-19	Refer to San Juan Islands GRP for JAM and LOP strategies
2	JAM-53	4-19	
3	NPS-72	4-60	
4	NPS-73	4-60	
5	NPS-74	4-60	
6	NC-1	4-5	Refer to North Central Puget Sound GRP for NC strategies
7	NC-2	4-5	
8	NC-3	4-5	
9	NC-4	4-5	
10	NPS-76	4-60	
11	NPS-75	4-60	
12	LOP-36	4-19	

Table 4-2-11

<b>Potential Spill Origin: NPS-K Cypress Island, NW corner</b>			
<b>BOOMING PRIORITY</b>	<b>STRATEGY NUMBER</b>	<b>MAP PAGE NUMBER</b>	<b>COMMENTS</b>
1	JAM-54	4-19	Refer to San Juan Islands GRP for JAM and ORC strategies
2	JAM-53	4-19	
3	ORC-28	4-19	
4	NPS-23	4-57	
5	NPS-24	4-57	
6	NPS-75	4-60	
7	NPS-76	4-60	

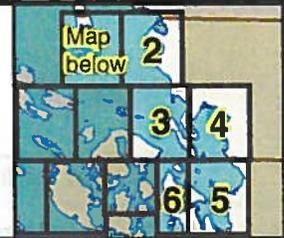
# POINT ROBERTS

## *Proposed Booming Strategies*

March, 2003

### North Puget Sound GRP

#### MAP # 1



Area not included in GRPs

Canada

Point Roberts

Boundary Bay

Area not included in GRPs

Blaine - North Puget Sound GRP - Map # 2

#### Legend

- Public Lands
- Tribal Lands
- Military Installations
- Potential Spill Origin

Stuart Island - San Juan Islands GRP  
Map # 2

Waldron Island - San Juan Islands GRP - Map # 1

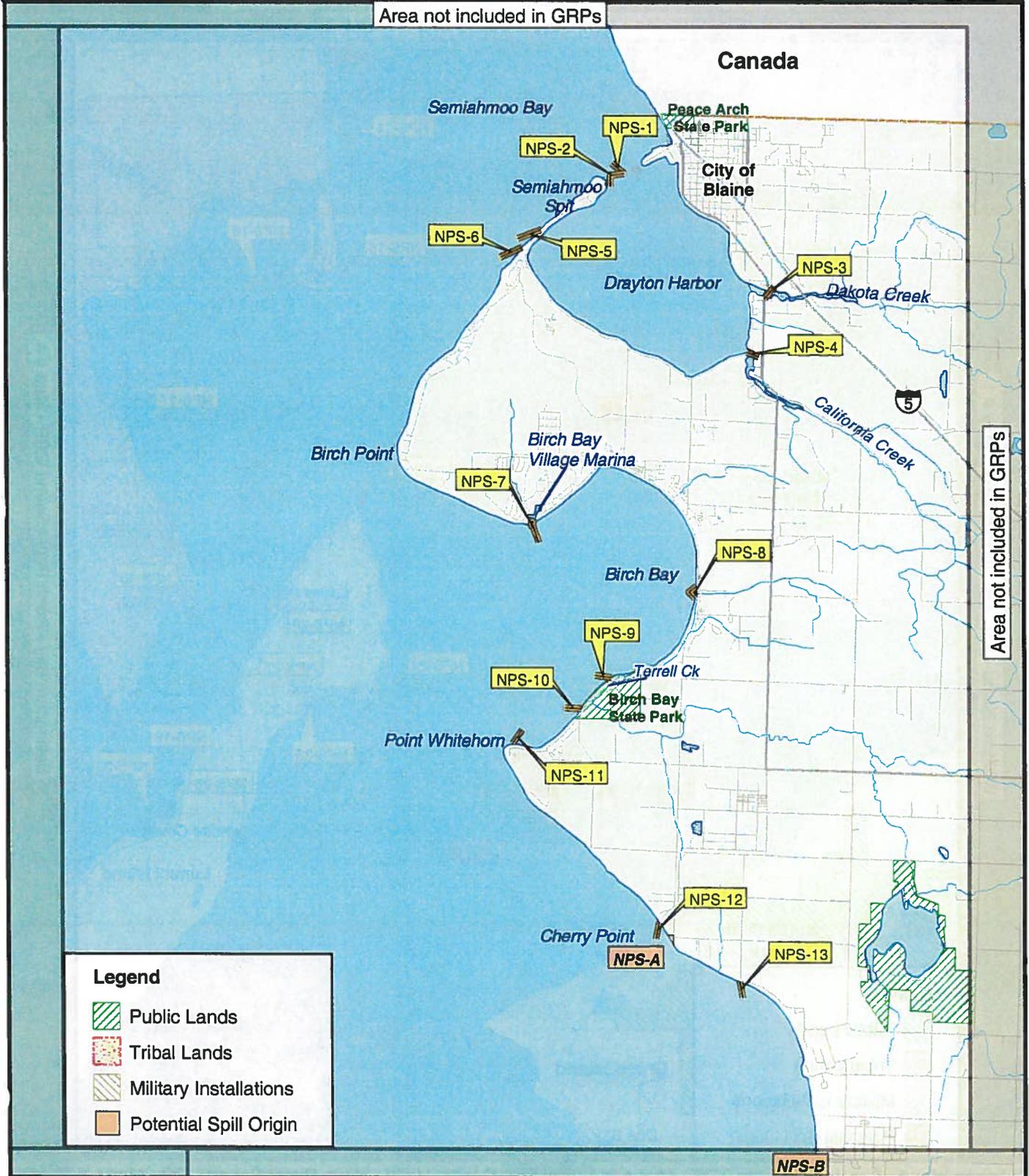
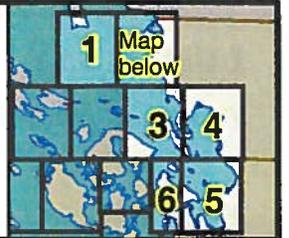
# BLAINE

## Proposed Booming Strategies

March, 2003

### North Puget Sound GRP

#### MAP # 2



# LUMMI BAY

## Proposed Booming Strategies

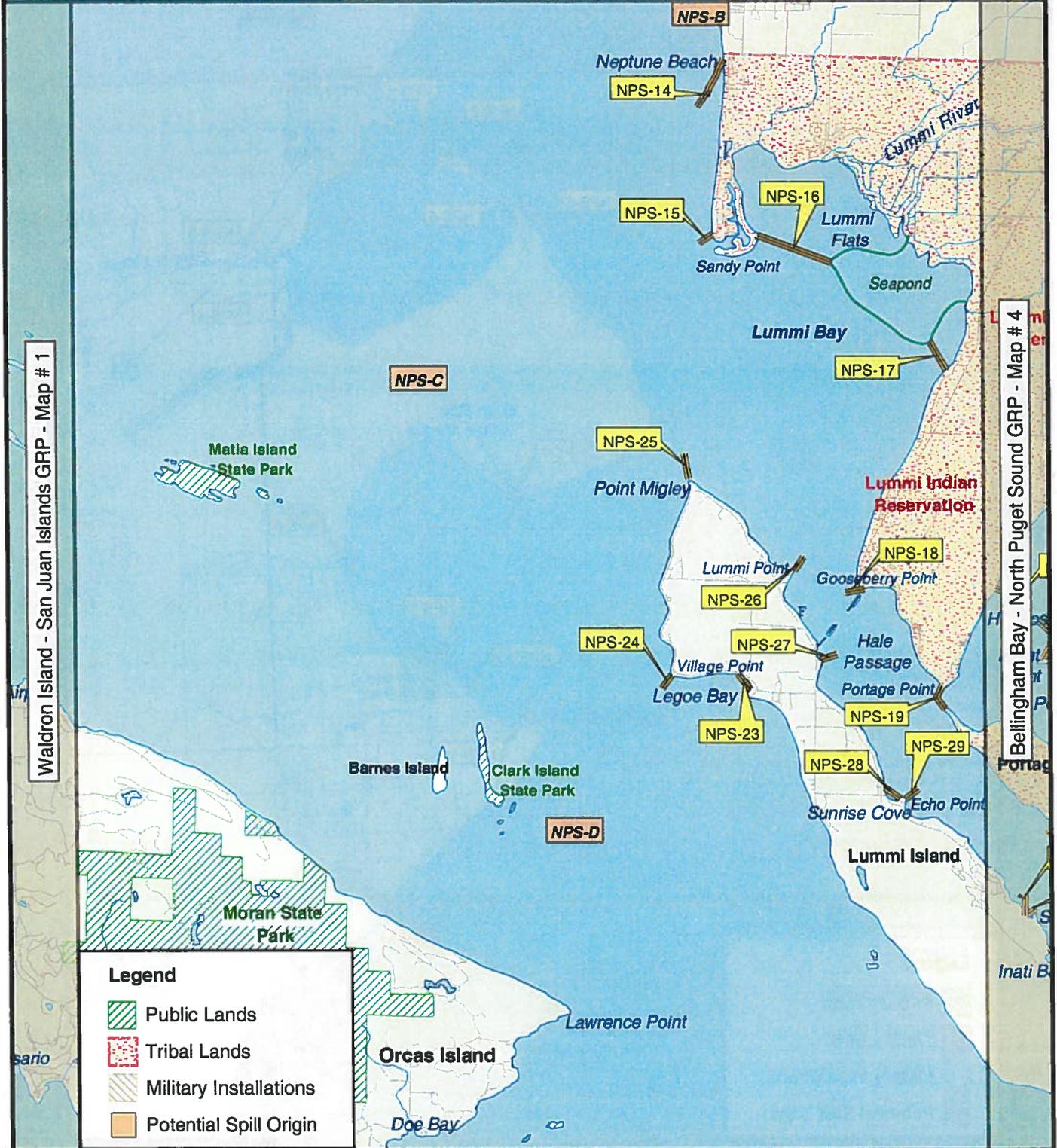
March, 2003

### North Puget Sound GRP

#### MAP # 3



Blaine - North Puget Sound GRP - Map # 2



**Legend**

- Public Lands
- Tribal Lands
- Military Installations
- Potential Spill Origin

N Lopez Island - San Juan Islands GRP - Map # 5

Fidalgo Head - North Puget Sound GRP - Map # 6

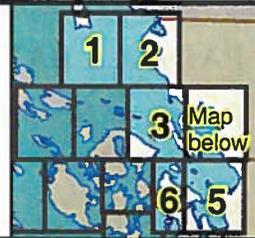
# BELLINGHAM BAY

## Proposed Booming Strategies

March, 2003

### North Puget Sound GRP

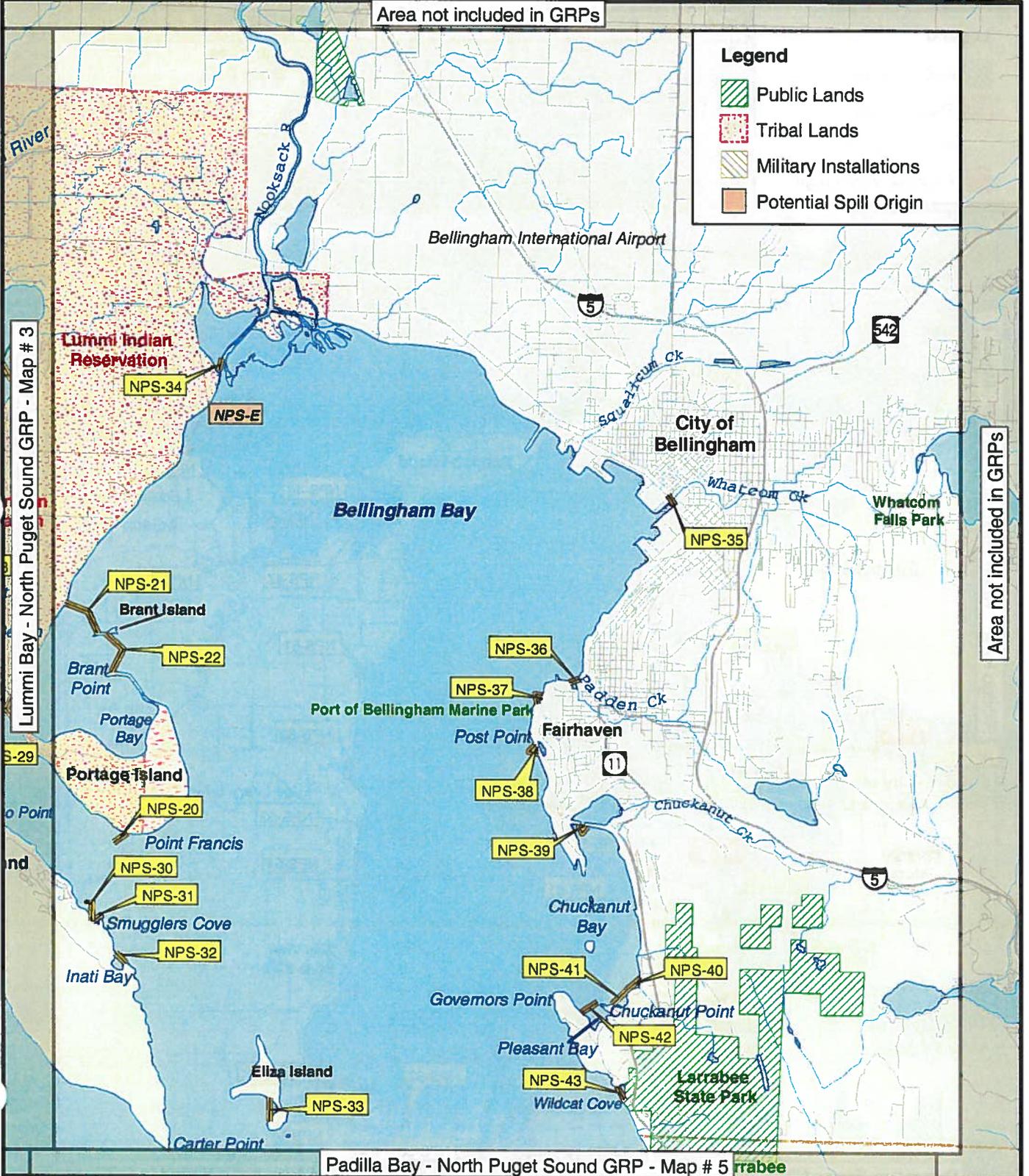
#### MAP # 4



Area not included in GRPs

#### Legend

- Public Lands
- Tribal Lands
- Military Installations
- Potential Spill Origin



Area not included in GRPs

Lummi Bay - North Puget Sound GRP - Map # 3

Padilla Bay - North Puget Sound GRP - Map # 5

# PADILLA BAY

## Proposed Booming Strategies

### North Puget Sound GRP

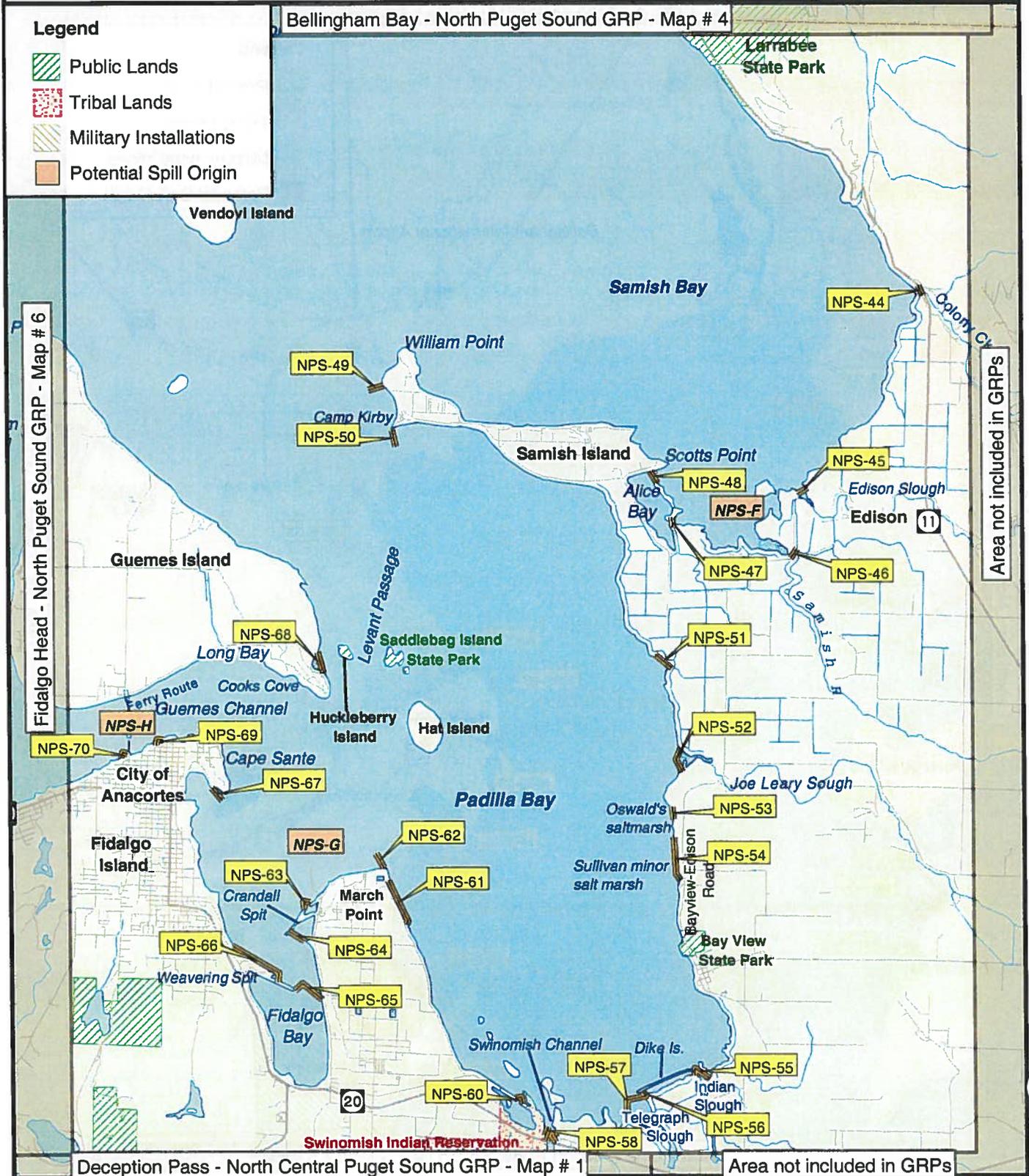
#### MAP # 5

March, 2003



#### Legend

- Public Lands
- Tribal Lands
- Military Installations
- Potential Spill Origin





4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-1	Field visit 4/00	Drayton Harbor Entrance WHA0038 48°-59.525'N 122°-45.980'W	Collection - Keep oil off shoreline.	1000'	Deploy boom at an angle out from the Blaine small boat harbor breakwater to collect oil moving along the shore from the south.	Stage at Blaine Marina.	Boat access from Blaine or Semiahmoo Marina. Vehicle access from I-5 exit 276, go west on Marine Drive to marina, vac truck access on end of breakwater.	Extensive bird habitat (diving ducks, cormorants, loons), eelgrass, sand lance larvae spawning, herring and smelt spawning. Cancer crab, clam beds and seal haulouts.	
NPS-2	Field visit 4/00	Drayton Harbor Entrance WHA0038 WHA0097 48°-59.476'N 122°-46.296'W	Exclusion/ Diversion/ Collection - Keep oil out of Drayton Harbor.	1600'	Deploy boom in a chevron formation out from the point next to the Semiahmoo Marina across to the Blaine small boat harbor breakwater. Collect at each end.	Stage at Blaine or Semiahmoo Marina.	Boat access from Blaine or Semiahmoo Marina. Vac truck access on either side.	Extensive bird habitat (diving ducks, cormorants, loons), eelgrass, sand lance larvae spawning, herring and smelt spawning. Cancer crab, clam beds and seal haulouts.	
NPS-3		Dakota Creek WHA0047 48°-58.217'N 122°-43.735'W	Exclusion - Keep oil from moving up creek.	500'	Deploy boom at an angle across the creek on the east side of the bridge on Blaine Road. A small workboat will be needed to place the boom.	Stage along the side of the road at the bridge.	Boat access from Blaine or Semiahmoo Marina. Vehicle access from I-5 exit 274, go east on Blaine Road to site.	Archeological Site, eelgrass, herring spawning, salmonids, cancer crabs, shorebirds and seabirds.	
NPS-4	Field visit 4/00	California Creek WHA0062 48°-57.725'N 122°-43.975'W	Exclusion/ Collection - Keep oil from moving up creek.	300'	Deploy boom at an angle across creek under the bridge on Drayton Harbor Road to collect on the southeast side of bridge. A small workboat will be needed to deploy boom.	Stage from road at bridge.	Boat access from Blaine or Semiahmoo Marina. Vehicle access from I-5 exit 274, go east and south on Blaine Road to Drayton Harbor Road, vac truck access from Drayton Harbor Road.	Archaeological sites, eelgrass, herring spawning, salmonids, cancer crabs, shorebirds, seabirds.	

## 4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-5	Field visit 10/00	Semiahmo Spit WHA0101 48°-58.930'N 122°-47.220'W	Collection - Protect shoreline habitat and keep oil out of Drayton Harbor.	1500'	Deploy boom at an angle out from beach about 1/4 mile north of Semiahmo Park and anchor to collect oil moving around Birch Point into bay. Area subject to extreme adverse weather from northwest, deploy as much boom as possible. Area is shallow and becomes a mudflat at low tide.	Stage at Semiahmo Park parking lot.	Boat access from Blaine or Semiahmo Marina. Vehicle access from I-5 exit 274, go east and south on Blaine Road to Drayton Harbor Road, vac truck access at park.	Archeological site (middens & burial), clam beds, eelgrass, sand lance, smelt, herring spawning, waterfowl concentrations.
NPS-6	Field visit 10/00	Semiahmo Spit WHA0102 48°-58.750'N 122°-47.450'W	Collection - Protect shoreline habitat and keep oil out of Drayton Harbor.	1500'	Deploy boom at an angle out from beach at Semiahmo Park and anchor to collect oil moving around Birch Point into bay. Area subject to extreme adverse weather from northwest, deploy as much boom as possible.	Stage at Semiahmo Park parking lot.	Boat access from Blaine or Semiahmo Marina. Vehicle access from I-5 exit 274, go east and south on Blaine Road to Drayton Harbor Road, vac truck access at park.	Archeological site (middens & burial), clam beds, eelgrass, sand lance, smelt, herring spawning, waterfowl concentrations.
NPS-7	Field tested 10/00	Birch Bay Village Marina WHA0122 48°-55.920'N 122°-47.230'W	Exclusion/ Diversion/ Collection - Keep oil out of Birch Bay, or keep oil off shoreline on Birch Point.	2000'	Deploy 1000' of boom at an angle from the east side of the harbor entrance to collect oil moving into the bay from the southwest, or deploy the boom from the west side of the harbor entrance to collect oil moving around the bay from the east. Loop up to 1000' of boom inside the harbor entrance and anchor to shore on each side to contain collected oil and direct oil to vac truck access on east side.	Stage at the Birch Bay Village Marina.	Boat access from the Birch Bay Village Marina. Vehicle access from I-5 exit 270, go west to Birch Bay Drive and north to Birch Point Road. Vac truck access from marina parking lot. Gated entrance from Birch Point Road to Birch Bay Village, ask guard for directions to marina.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-8	Field tested 10/00	Terrell Creek WHA0135 48°-55.300'N 122°-44.725'W	Exclusion - Keep oil out of creek.	300'	Deploy boom at angle across creek mouth. Can be deployed from land.	Stage along Birch Bay Drive, next to creek mouth.	By boat from Tosco or BP docks. Vehicle access from Birch Bay Drive.	State Park - archaeological sites, eelgrass, herring spawning, major waterfowl site.	
NPS-9	Field visit 10/00	Birch Bay State Park WHA0141 48°-54.410'N 122°-45.975'W	Diversion/Collection - Protect shoreline habitat and state park area.	1000'	Deploy boom at an angle out from beach at state park to collect oil moving around Pt. Whitehorn past NPS-10 and NPS-11.	Stage at Birch Bay State Park.	By boat from Birch Bay Village Marina or ramp at state park. Vehicle access from I-5 exits 266 or 270, go west to Birch Bay Drive, vac truck assess from Birch Bay Drive.	State park, archaeological sites, eelgrass, and herring spawning and major waterfowl site.	
NPS-10	Field visit 10/00	Point Whitehorn (inside Birch Bay) WHA0143 48°-54.090'N 122°-46.420'W	Collection - Keep oil out of inner Birch Bay.	1000'	Deploy boom at an angle out from beach at state park boat ramp to collect oil moving around Pt. Whitehorn past NPS-11.	Stage at Birch Bay State Park.	By boat from Birch Bay Village Marina or ramp at state park. Vehicle access from I-5 exits 266 or 270, go west to Birch Bay Drive, vac truck assess at boat ramp, off Birch Bay Drive.	State park, archaeological sites, eelgrass, and herring spawning and major waterfowl site.	
NPS-11	Field tested 10/00	Point Whitehorn (inside Birch Bay) WHA0146 48°-53.700'N 122°-47.385'W	Diversion - Divert oil out into deeper water for collection at NPS-9 and NPS-10.	1000'	Deploy boom at an angle out from beach to deflect oil moving around Pt. Whitehorn into bay. If possible, set up skimmer at end of boom to collect.	Stage at Birch Bay State Park.	By boat from Birch Bay Village Marina. No vehicle access.	State park, archaeological sites, eelgrass, and herring spawning and major waterfowl site.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND								
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-12	New strategy 5/01	Cherry Point, at the BP Pier WHA0161 48°-51.950'N 122°-45.160'W	Collection - Prevent oil from moving up beach.	1000'	Deploy boom from beach outward at an angle to collect oil moving along beach, primarily for oil from the south. Area subject to extreme adverse weather that may prevent deployment of boom.	Stage at BP pier.	By boat from BP pier. Vac truck access to beach at boat ramp at base of pier.	
NPS-13	Field tested 3/99	End of Gulf Road WHA0166 48°-51.380'N 122°-43.915'W	Collection - Prevent oil from moving up beach.	1000'	Deploy boom from beach outward at an angle to collect oil moving along beach. Area is a natural collection point, primarily for oil from the south. Area subject to extreme adverse weather that may prevent deployment of boom.	Stage at BP or Tosco piers.	By boat from BP or Tosco piers. Vehicle access from I-5 exit 266, go west on Grandview Road to Kickerville Road, go south to Alder Grove Road, go west to Powder Plant Road, and south to Gulf Road, vac truck access to beach from Gulf Road.	Herring Spawning area, sand lance larvae, smelt spawning and eelgrass.
NPS-14	Field visit 3/99	Neptune Beach WHA0179 48°-48.960'N 122°-42.515'W	Deflection/ Collection - Deflect oil out into open water or collect on beach.	3000'	If winds are from the east or south, deploy boom in three 1000' overlapping legs 100-200' apart to deflect oil out into open water for collection with skimmers. If winds are from the west or northwest, deploy 1000' of boom at an angle to collect oil moving along the beach.	Stage at BP or Tosco piers.	By boat from BP or Tosco piers, or from Bellingham or Sandy Point Marina. Vehicle access from I-5 exit 260, go west on Slater Road, vac truck access to beach from South Beach Way.	Archeology, eelgrass, herring spawning, sand lance larvae.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-15	Field visit 6/99	Sandy Point WHA0187 48°-47.215'N 122°-42.640'W	Deflection - Deflect oil out into open water.	1000'	Deploy boom from north shore of Sandy Point Shores Marina entrance out into straits and anchor to deflect oil into open water for collection with skimmers.	Stage at BP or Tosco piers, or from Bellingham or Sandy Point Marina. No vehicle access.	By boat from BP or Tosco piers, or from Bellingham or Sandy Point Marina. No vehicle access.	Marina, marsh, eelgrass, waterfowl, herring spawning, sand lance larvae, cancer crab.	
NPS-16	Field tested 8/99	Lummi Bay WHA0190 WHA0209 48°-47.245'N 122°-41.455'W	Exclusion - Prevent oil from entering north bay.	4500'	Deploy boom from Sandy Point to the seapond dike in Lummi Bay and anchor well. Area is shallow and becomes a mudflat at low tide. Strong winds may prevent deployment of boom.	Stage at Tosco or BP Pier at Cherry Point or CSCI moorage in Anacortes or Bellingham.	By boat from BP or Tosco piers, or from Bellingham, Anacortes, or Sandy Point Marina. Vehicle access to seapond dike road from Haxton Way.	Eelgrass, waterfowl, shorebirds, aquaculture, clam and oyster beds, cancer crabs and herring spawning.	
NPS-17		Lummi Bay WHA0217 48°-46.215'N 122°-39.315'W	Exclusion - Prevent oil from entering east bay.	2000'	Deploy boom from seapond dike to shoreline to the south. Area is shallow and becomes a mudflat at low tide.	Stage at Tosco or BP Pier at Cherry Point or CSCI moorage in Anacortes or Bellingham.	By boat from BP or Tosco piers, or from Bellingham, Anacortes, or Sandy Point Marina. Vehicle access to seapond dike road from Haxton Way.	Eelgrass, waterfowl, shorebirds, aquaculture, clam and oyster beds, cancer crabs and herring spawning.	
NPS-18		Gooseberry Point WHA0230 48°-43.920'N 122°-40.320'W	Diversions/ Collection - Keep oil from moving up or down Hale Passage.	1500'	Deploy boom from beach west of Lummi ferry terminal. If oil is from the north, use as diversion. If oil is from the south, use as collection. Notify Lummi Ferry terminal.	Stage at ferry terminal at Gooseberry Point.	By boat from Bellingham or Anacortes. Vehicle access, from I-5 exit 260, take Slater Road west to Haxton Way to ferry terminal.	Eelgrass beds, herring spawning, seabirds, archeology sites, clam beds.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-19	Field visit 4/00	Portage Spit WHA0351 48°-42.815'N 122°-39.175'W	Exclusion - Keep oil out of Portage Bay.	1500'	Deploy boom from Portage Point to Portage Island on the Hale Passage side of Portage Spit in a chevron formation. Water flow across the spit is primarily from Portage Bay to Hale Passage.	Stage at ferry terminal at Gooseberry Point.	By boat from Bellingham or Anacortes. Vehicle access, from I-5 exit 260, take Slater Road west to Haxton Way to Lummi View Drive.	Shellfish, clambeds, herring spawning grounds, Western Grebe, waterfowl and shorebird concentrations and eelgrass.
NPS-20	Field visit 4/00	Point Francis (Southwest corner of Portage Island) WHA0359 48°-41.695'N 122°-37.465'W	Diversion - Keep oil from moving up or down Hale Passage.	1000'	Deploy boom at an angle out from the southwest corner of Portage Island to deflect the oil out into Hale Passage.	Stage at ferry terminal at Gooseberry Point, or Bellingham Marina.	By boat from Bellingham or Anacortes. No vehicle access.	Eelgrass beds, herring spawning, clam beds, cancer crabs.
NPS-21		Portage Bay, (Hermosa Beach to Brant Island) WHA0368 48°-43.880'N 122°-37.900'W	Exclusion /Collection - Prevent oil from entering Portage Bay.	3000'	Deploy boom in chevron configuration from Hermosa Beach to Brant Island. Can collect with a vac truck at Hermosa Beach from Lummi Shore Road. Area is shallow and becomes a mudflat at low tide.	Stage at ferry terminal at Gooseberry Point, or Bellingham Marina.	By boat from Bellingham or Anacortes. Vehicle access, from I-5 exit 260, take Slater Road west to Haxton Way to Lummi Shore Drive.	Shellfish, clam beds, herring spawning grounds, western grebe, waterfowl & shorebird conc., eelgrass.
NPS-22		Portage Bay, (Brant Island to Brant Point) WHA0368 48°-43.450'N 122°-37.380'W	Exclusion - Prevent oil from entering Portage Bay.	3000'	Deploy boom in chevron configuration from Brant Island to Brant Point. Area is shallow and becomes a mudflat at low tide.	Stage at ferry terminal at Gooseberry Point, or Bellingham Marina.	By boat from Bellingham or Anacortes. Vehicle access, from I-5 exit 260, take Slater Road west to Haxton Way to Lummi Shore Drive.	Shellfish, clam beds, herring spawning grounds, western grebe, waterfowl & shorebird conc., eelgrass.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-23	New strategy 5/01	Legoe Bay (West side of Lummi Island) WHA0253 48°-42.935'N 122°-42.045'W	Exclusion - Keep oil out of Legoe Bay.	1200'	Deploy boom from Lovers Bluff to north shoreline of Legoe Bay. Deploy only if oil is coming from the south and outer Legoe Bay is being used to collect oil from the Village Point strategy.	Stage from Sandy Point Marina or Lummi Island ferry terminal.	By boat from Sandy Point Marina, Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving to Village Point on Legoe Bay Road.		
NPS-24	Field visit 3/99	Village Point (West side of Lummi Island) WHA0248 48°-43.005'N 122°-43.130'W	Collection - Keep oil from moving further up or down the straits.	1000'	Deploy boom from beach on Village Point out into straits and anchor. Boom could be tended with a vessel at tide changes to reposition angles. Oil can be collected from either direction.	Stage from Sandy Point Marina or Lummi Island ferry terminal.	By boat from Sandy Point Marina, Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving to Village Point on Legoe Bay Road.	Eelgrass, herring spawning, sand lance larvae.	
NPS-25	New strategy 5/01	Point Megley (North tip of Lummi Island) WHA0238 48°-44.935'N 122°-42.955'W	Diversion/ Deflection - Keep oil off point and deflect oil back into open water.	1500'	Deploy boom from beach on Point Megley out into straits and anchor. Boom could be tended with a vessel at tide changes to reposition angles.	Stage from Sandy Point Marina or Lummi Island ferry terminal.	By boat from Sandy Point Marina, Bellingham, or Anacortes. No vehicle access.	Eelgrass, herring spawning, clam beds, seabirds, Murrelets, Pigeon Guillemots and Grebes.	
NPS-26	Field visit 4/00	Lummi Point (East side of Lummi Island) WHA0231 48°-44.070'N 122°-41.350'W	Diversion/ Collection - Keep oil from moving up or down Hale Passage.	1000'	Deploy boom from beach on Lummi Point out into Hale Passage and anchor. Boom could be tended with a vessel at tide changes to reposition angles.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving north on Nugent Road.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-27	Field visit 4/00	Lummi Island Ferry (Lummi Island side) WHA0338 48°-43.180'N 122°-40.845'W	Diversion/ Collection - Keep oil from moving up or down Hale Passage.	1000'	Deploy boom from beach south of the ferry terminal out into Hale Passage and anchor. Boom could be tended with a vessel at tide changes to reposition angles.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes, vehicle access by ferry.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.
NPS-28	Field visit 4/00	Sunrise Cove (East side of Lummi Island) WHA0329 48°-41.905'N 122°-39.800'W	Exclusion - Keep oil out of Sunrise Cove.	1200'	Secure boom to shore at an angle across bay.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving south on Nugent Road and east on Sunrise Road. Beach access through private property.	Eelgrass, clambeds and herring spawning grounds, Geoducks.
NPS-29	Field visit 4/00	Echo Point (East side of Lummi Island) WHA0328 48°-41.850'N 122°-39.580'W	Diversion/ Collection - Keep oil from moving up or down Hale Passage.	1000'	Deploy boom from beach on Echo Point out into Hale Passage and anchor. Boom could be tended with a vessel at tide changes to reposition angles.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving south on Nugent Road and east on Sunrise Road. Beach access through private property.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-30	Field visit 4/00	Lummi Island Gravel Pit WHA0318 48°-40.785'N 122°-37.820'W	Diversions/ Collection - Keep oil from moving up or down Hale Passage.	1000'	Deploy boom from beach and pilings at gravel pit out into Hale Passage and anchor. Boom could be tended with a vessel at tide changes to reposition angles.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving south on Nugent Road, east on Sunrise Road, and south on Seacrest Road. Beach access through private property.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.	
NPS-31	New strategy 5/01	Smugglers Cove (East side of Lummi Island) WHA0317 48°-40.770'N 122°-37.730'W	Exclusion - Keep oil out of Smugglers Cove.	600'		Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. Vehicle access by taking Lummi Island ferry and driving south on Nugent Road, east on Sunrise Road, and south on Seacrest Road. Beach access through private property.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.	
NPS-32	New strategy 5/01	Inati Bay (East side of Lummi Island) WHA0314 48°-40.370'N 122°-37.345'W	Exclusion - Keep oil out of Inati Bay.	1000'	Secure boom to shore at an angle across bay entrance.	Stage at ferry terminal at Gooseberry Point, or at ferry terminal on Lummi Island.	By boat from Bellingham or Anacortes. No vehicle access.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-33	New strategy 5/01	Cove on West side of Eliza Island WHA0293 48°-38.910'N 122°-35.040'W	Exclusion - Keep oil out of Cove.	1500'	Deploy boom from beach near the south end of the grass airstrip, south to the beach on the south end of the island.	Stage at ferry terminal at Gooseberry Point, or at the Bellingham Marina.	By boat from Bellingham or Anacortes. No vehicle access.	Eelgrass, herring spawning, clam beds, cancer crab, seabirds, murrelets, pigeon guillemots and grebes.
NPS-34	New strategy 5/01	Kwina Slough (south entrance) WHA0394 48°-46.420'N 122°-36.070'W	Exclusion - Keep oil out of slough and protect water intake.	300'	Deploy boom across south entrance to slough.	Stage at the Bellingham Marina.	By boat from Bellingham or Anacortes. No vehicle access.	Slough water intake.
NPS-35	Field visit 4/00	Whatcom Creek (Whatcom Waterway near the Roeder Avenue overpass) WHA0419 48°-45.170'N 122°-29.090'W	Exclusion - Keep oil from moving up into the mouth of Whatcom Creek.	300'	Deploy boom at an angle across the waterway under the Roeder Avenue/Chestnut Street bridge. A small workboat or skiff will be needed to deploy the boom.	Stage at the Marine Heritage Center parking lot, or at the Bellingham Marina (WHA0414).	By boat from the Bellingham Marina; vehicle access from I-5 Lakeway Drive exit, go west to Holly Street and follow to waterway.	Salmon stream, fish hatchery at Heritage Center.
NPS-36		Padden Creek WHA0431 48°-43.315'N 122°-30.485'W	Exclusion - Keep oil out of creek.	200'	Deploy boom across creek mouth at railroad trestle. Anchor to trestle pilings. Can be deployed from land.	Stage at parking lot for boat ramp on south end of trestle.	By boat from ramp on south end of trestle; vehicle access from I-5 Fairhaven exit, go west on Fairhaven Parkway to 12th St., go north to Harris Ave., west to 6th St. and north to site.	Tidal stream, wetland habitat.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-37	New strategy 5/01	Lagoon at the Port of Bellingham Marine Park WHA0433 48°-43.105'N 122°-31.010'W	Exclusion - Keep oil out of lagoon.	200'	Deploy boom in chevron configuration in front of gap in railroad trestle to lagoon. Anchor to railroad trestle. Flow through gap may be significant during tidal exchanges. Will need a small workboat to set the anchor at the apex of the chevron.	Stage at the Port of Bellingham Marine Park.	By boat from the ramp at Padden Creek; vehicle access from I-5 Fairhaven exit, go west on Fairhaven Parkway to 12th St., go north to Harris Ave. and west to site.	Habitat for waterfowl and fish.	
NPS-38		Post Point Lagoon WHA0436 48°-42.615'N 122°-31.055'W	Exclusion - Keep oil out of lagoon.	200'	Deploy boom in chevron configuration in front of gap in railroad trestle to lagoon. Anchor to railroad trestle. Flow through gap may be significant during tidal exchanges. Will need a small workboat to set the anchor at the apex of the chevron.	Stage at the Padden Creek boat ramp.	By boat from the ramp at Padden Creek; no vehicle access.	Habitat for waterfowl and fish.	
NPS-39		Chuckanut Creek WHA0449 48°-42.615'N 122°-31.055'W	Exclusion - Keep oil out of creek & North Chuckanut Bay.	400'	Deploy boom in chevron configuration in front of gap in railroad trestle to isolate bay and creek. Anchor to railroad trestle. Flow through gap may be significant during tidal exchanges.	Stage at the Padden Creek boat ramp.	By boat from the ramp at Padden Creek; no vehicle access.	Waterfowl, clam beds, cancer crabs.	
NPS-40	New strategy 5/01	Second Cove North of Pleasant Bay WHA0460 48°-40.275'N 122°-29.510'W	Exclusion - Keep oil out of cove.	1200'	Deploy boom at a similar angle to NPS-41 to close off the cove.	Stage at Larrabee State Park.	By boat from the Larrabee State Park or the Padden Creek ramp. No vehicle access.	Waterfowl, clam beds, eelgrass beds.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-41	New strategy 5/01	First Cove North of Pleasant Bay WHA0461 48°-40.135'N 122°-29.735'W	Exclusion - Keep oil out of cove.	1300'	Deploy boom from Chuckanut Point to the opposite shore on the point to the northeast.	Stage at Larrabee State Park.	By boat from the Larrabee State Park or the Padden Creek ramp. No vehicle access.	Waterfowl, clam beds, cancer crabs.
NPS-42		Pleasant Bay WHA0462 48°-40.010'N 122°-30.140'W	Exclusion - Keep oil out of bay.	1300'	Deploy boom from Chuckanut Point to the opposite shore on the peninsula to Governors Point.	Stage at Larrabee State Park.	By boat from the Larrabee State Park or the Padden Creek ramp. No vehicle access.	Waterfowl, clam beds, cancer crabs.
NPS-43		Larrabee State Park, Wildcat Cove WHA0476 48°-39.170'N 122°-29.670'W	Exclusion - Protect State Park, keep oil out of Wildcat Cove.	800'	Deploy boom across the entrance of the cove.	Stage at Larrabee State Park.	By boat from the Larrabee State Park or the Padden Creek ramp. Vehicle access to the ramp from I-5 exit 250, go west to Chuckanut Drive (Hwy 11) and follow it south to the park.	State Park.
NPS-44	New strategy 5/01	Colony Creek SKA0215 48°-36.030'N 122°-25.550'W	Exclusion - Keep oil out of Colony Creek.	300'	Deploy boom across the entrance to the creek in front of the railroad trestle. Necessary only at high tide. Can be deployed from land.	Stage at the end of the dirt road on the south side of the creek mouth.	By boat from Larrabee State Park, boat access at high tide only. Vehicle access from I-5 exit 236, go west on Bow Hill Road to Chuckanut Drive (Hwy 11), go north to site.	Salmon stream, marsh habitat, waterfowl.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-45	Field visit 8/95	Edison Slough SKA0231 48°-33.865'N 122°-27.165'W	Exclusion - Keep oil out of Edison Slough.	300'	Deploy boom across entrance to slough. Can only be deployed at high tide, boat access only and area becomes a mudflat at low tide.	Stage in Edison or at the site for NPS-44.	By boat from the Larrabee State Park ramp or from Anacortes; no vehicle access.	Marsh, salmonids, waterfowl.
NPS-46	Field visit 8/95	Samish River SKA0241 48°-33.310'N 122°-27.310'W	Exclusion - Keep oil out of the Samish River.	300'	Deploy boom approx. 1000' down stream from bridge over Bayview-Edison Road. Necessary only on high flood tide.	Stage along dirt road off the northeast side of the bridge on the Bayview- Edison Road.	By boat from the Larrabee State Park ramp or from Anacortes; vehicle access from the staging area.	Marsh, salmonids, waterfowl.
NPS-47	New strategy 5/01	Alice Bay (South Entrance) SKA0248 48°-33.590'N 122°-29.195'W	Exclusion - Keep oil out of Alice Bay.	300'	Deploy boom across south entrance at the foot bridge. The island between the north and south entrances is very low and may not block oil at extreme high tides. May be able to deploy from land. Area is shallow and becomes a mudflat at low tide.	Stage at private property at foot bridge, at Camp Kirby, or at Bayview State Park.	By boat from the Larrabee State Park ramp or from Anacortes; vehicle access from I-5 exit 236, go west on Bow Hill Road to Bayview-Edison Road, to Samish Island Road, to private drive at south end of Alice Bay.	Marsh, salmonids, waterfowl.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-48	New strategy 5/01	Alice Bay (North Entrance) SKA0257 48°-34.045'N 122°-29.515'W	Exclusion - Keep oil out of Alice Bay.	900'	Deploy boom across the north entrance from the south shoreline on Scotts Point. The island between the north and south entrances is very low and may not block oil at extreme high tides. Area is shallow and becomes a mudflat at low tide.	Stage along road to Scotts Point, or at Bayview State Park.	By boat from the Larrabee State Park ramp or from Anacortes; vehicle access from I-5 exit 236, go west on Bow Hill Road to Bayview-Edison Road, to Samish Island Road, to road to Scotts Point; access through private property. May need helicopter support.	Marsh, salmonids, waterfowl.
NPS-49	Field tested 5/98	William Point (200' South of Light) SKA0276 48°-34.955'N 122°-33.650'W	Deflection/Collection - Deflect oil out into open water or collect to prevent oil from moving north into Samish Bay.	1000'	Deploy boom from gravel beach south of light at an angle to deflect the oil into deeper water, or at an angle to collect oil with a skimmer at the end of the boom. Current can be strong in this area, and boom should be tended.	Stage at Camp Kirby or Bayview State Park.	By boat from the Larrabee State Park ramp or from Anacortes; no vehicle access.	Samish Bay resources.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-50	New strategy 5/01	Camp Kirby SKA0278 48°-34.455'N 122°-33.490'W	Collection - Prevent oil from moving up beach from the south.	1000'	Deploy boom from end of spit at Camp Kirby to enhance natural collection area.	Stage at Camp Kirby.	By boat from Anacortes; vehicle access from I-5 exit 236, go west on Bow Hill Road to Bayview- Edison Road, to Samish Island Road and follow to camp, vac truck access to beach at camp. Call the camp at 360-766- 6060 for access.	Protect resources to the north, Samish Bay.
NPS-51	Field visit 3/98	Pocket Marsh North of Joe Leary Slough (eastern shore of Padilla Bay) SKA0299 48°-32.185'N 122°-29.295'W	Exclusion - Keep oil out of marsh.	1200'	Deploy boom to close off pocket marshes. Pilings in front of marshes can be used to help anchor the boom. Area is shallow and becomes a mudflat at low tide.	Stage at Bayview State Park.	By boat from Anacortes, you need a 7' plus tide to reach the area. No vehicle access. May need helicopter support.	Salt marsh, waterfowl habitat, shorebirds.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-52	Field visit 3/98	Joe Leary Slough SKA0306 48°-31.185'N 122°-29.100'W	Exclusion/ Collection - Keep oil out of marsh, Collect if feasible.	1600'	Deploy boom in a chevron configuration with point of apex facing west. Area is shallow and becomes a mudflat at low tide.	Stage at Bayview State Park.	By boat from Anacortes, you need a 7' plus tide to reach the area. There is road access on the south side of the slough through a private orchard (contact Merritt's Apples 360- 766-6224 for access). From I-5 exit 236, go west on Bow Hill Road to Bayview- Edison Road to site. May need helicopter support.	Salt marsh, waterfowl habitat and sand lance larvae.
NPS-53	Field visit 3/98	Oswald's salt marsh SKA0310 48°-30.580'N 122°-29.115'W	Exclusion - Protect salt marsh behind crumbling pilings.	800'	Deploy boom to close off gaps between pilings in front of Oswald's salt marsh. Area is shallow and becomes a mudflat at low tide.	Stage at Bayview State Park, or along Bayview- Edison Road.	By boat from Anacortes, you need a 7' plus tide to reach the area. Vehicle access from Bayview- Edison Road; from I-5 exit 236, go west on Bow Hill Road to Bayview- Edison Road to site. May need helicopter support.	Salt marsh, waterfowl habitat, shorebirds, oysters, Sand Lance larvae and State Park.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-54	Field visit 3/98	Sullivan Minor salt marsh SKA0312 48°-30.205'N 122°-29.045'W	Exclusion - Keep oil out of salt marsh.	2800'	Deploy boom along the length of the Sullivan Minor salt marsh, from Oswald's marsh to Persons Road. Area is shallow and becomes a mudflat at low tide.	Stage at Bayview State Park, or along Bayview- Edison Road.	By boat from Anacortes, you need a 7' plus tide to reach the area. Vehicle access from Bayview- Edison Road; from I-5 exit 236, go west on Bow Hill Road to Bayview- Edison Road to site. May need helicopter support.	Salt marsh, waterfowl habitat, shorebirds, oysters, Sand Lance larvae and State Park.
NPS-55	Field visit 3/98	Indian Slough (southern end of Padilla Bay) SKA0331 48°-28.065'N 122°-28.720'W	Exclusion - Keep oil out of slough.	1600'	Deploy boom in a chevron configuration with apex pointing north. Deploy 400' for the west leg from the west side of the slough entrance directly north to the east end of Dike Island and to the apex anchor point in the main channel, which will also block the eastern opening between Dike Island and the mainland. Deploy 1200' for the east leg from the east side of the slough entrance to the apex. Area is shallow and becomes a mudflat at low tide.	Stage at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp. Potential vehicle access from the Padilla Bay bike trail on the east side of the slough, contact the Padilla Bay Reserve at 360-428-1558 for access. May need helicopter support.	Salt marsh habitat, harbor seals, waterfowl and shorebird concentrations.
NPS-56		West end of Dike Island SKA0334 48°-27.805'N 122°-29.475'W	Exclusion - Keep oil out of area behind Dike Island.	500'	Deploy boom across western opening between Dike Island and the mainland. Area is shallow and becomes a mudflat at low tide.	Stage at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp. No vehicle access. May need helicopter support.	Salt marsh habitat, harbor seals, waterfowl and shorebird concentrations.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-57	Field visit 3/98	Telegraph Slough (southern end of Padilla Bay) SKA0335 48°-27.685'N 122°-29.670'W	Exclusion - Keep oil out of slough.	2600'	Deploy two 1300' legs of boom to form a chevron with the apex facing northwest. Area is shallow and becomes a mudflat at low tide.	Stage at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp. No vehicle access. May need helicopter support.	Salt marsh habitat, harbor seals, waterfowl and shorebird concentrations.
NPS-58	Field visit 3/98	Swinomish Channel (under Highway 20 bridge) SKA0592 48°-27.320'N 122°-30.830'W	Deflection/Collection - Keep oil from moving into the Swinomish Channel.	2000'	Deploy two 500' booms on each side of the channel between the railroad trestle and the Highway 20 bridge to deflect the oil moving into the channel to collection sites along the shoreline.	Stage at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp. Vehicle access from I-5 to Highway 20, go west to the boat ramp on the east side of the channel. Vac truck access on both sides of the channel.	Wetland habitat; waterfowl and shorebirds.
NPS-60	New strategy 5/01	Whitemarsh Junction SKA0350 48°-27.695'N 122°-31.380'W	Exclusion - Keep oil out of the marsh.	200'	Deploy boom in chevron configuration in front of gap in railroad trestle to lagoon. Anchor to railroad trestle. Flow through gap may be significant during tidal exchanges. Will need a small workboat to set the anchor at the apex of the chevron.	Stage at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp. Vehicle access from I-5 to Highway 20, go west and exit at the Swinomish Casino, follow the dirt road along the railroad tracks on the east side of the trestle.	Wetland habitat; waterfowl and shorebirds.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-61	Field visit 3/98	Northeast Shoreline of March Point SKA0362 48°-29.715'N 122°-33.280'W	Exclusion - Keep oil off nearshore area and beach.	3000'	Starting at the boat ramp on the NE corner of March Point, deploy the boom along the shoreline 100-300 feet off the beach in a southerly direction, and bring the south end back in and anchor on the beach. Add boom as it becomes available and time allows (priority will depend on the trajectory) to protect as much beach as possible down to North Texas Road.	Stage at the boat ramp on March Point Road or at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp, or from Anacortes. Vehicle access from March Point Road. Most of the beach becomes exposed at low tide, may need helicopter support.	Smelt spawning, herring, sand lance spawning, waterfowl, clam beds and shorebirds.	
NPS-62		March Point SKA0363 48°-30.025'N 122°-33.470'W	Deflection/Collection - Prevent oil from moving around March Point to the east and south.	1000'	Deploy boom at an angle from the tip of March Point to collect oil moving along the beach from the west. Extend boom to 1500' if it will improve collection efficiency and the currents allow it.	Stage at the boat ramp on March Point Road or at the Swinomish Channel boat ramp parking lot (under Highway 20).	By boat from the Swinomish Channel ramp, or from Anacortes. Vehicle access on March Point Road.	Smelt spawning, herring, sand lance spawning, waterfowl, clam beds and shorebirds.	
NPS-63	Field visit 8/03	Tidal Lagoon North of Crandall Spit SKA0370 48°-29.630'N 122°-34.655'W	Exclusion - Keep oil out of tidal lagoon.	200'	Deploy boom across the entrance to the lagoon on the north shore of Crandall Spit. Can be deployed from land.	Stage along March Point Road.	By boat from Anacortes. Vehicle access on March Point Road.	Wetland habitat; waterfowl and shorebirds.	
NPS-64	Field tested 8/03	Crandall Spit SKA0371 48°-29.305'N 122°-34.835'W	Exclusion - Keep oil out of cove south and east of Crandall Spit.	1200'	Deploy boom across cove between the Shell recreation area and Crandall Spit. Pilings on each side of the cove can be used as anchor points. Cove becomes a mudflat at low tide.	Stage along March Point Road or at the Equilon recreation area.	By boat from Anacortes. Vehicle access on March Point Road.	Herring and smelt spawning, dungeness crab, sand lance larvae.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-65	Field visit 8/95	Causeway Across Fidalgo Bay SKA0374 48°-28.835'N 122°-34.680'W	Exclusion - Prevent oil from entering south Fidalgo Bay.	2200'	Deploy boom in a chevron configuration across the causeway opening. Anchor to the Railroad trestle.	Stage along March Point Road or at the Equilon recreation area.	By boat from Anacortes. Vehicle access on March Point Road.	Seagrass, saltmarsh, smelt, herring, clams, crab, waterfowl, shorebirds, harbor seals.
NPS-66	Field visit 8/95	Weaverling Spit SKA0388 48°-28.980'N 122°-35.045'W	Exclusion - Protect shoreline habitat on Weaverling Spit.	4000'	Deploy boom in a chevron configuration with a 1000' leg from the railroad causeway to the tip of Weaverling Spit, and a 3000' leg from the tip of the spit to the beach near Highway 20.	Stage from R/V Park on Weaverling Spit.	By boat from Anacortes. Vehicle access from Fidalgo Bay Road. From Highway 20, turn right onto Fidalgo Bay Road near the southwest end of Fidalgo Bay.	Herring & smelt spawning, sand lance larvae, hard shell clams, waterfowl & shorebird concentrations, seal haulouts.
NPS-67	New strategy 5/01	Cap Sante Park SKA0402 48°-30.800'N 122°-36.125'W	Collection - Keep oil from moving north into Guemes Channel.	1000'	Deploy boom at an angle from the beach at the picnic area in Cap Sante Park.	Stage from the Cap Sante Marina parking lot.	By boat from Anacortes. Potential vehicle access to picnic area on a pedestrian path. From Highway 20 in Anacortes, continue north on Commercial Avenue to 4th Street, turn right to "T" Avenue and right again to the park.	Fidalgo Bay and Guemes Channel resources.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND									
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected	
NPS-68	New strategy 8/01	Long Bay (Southeast corner of Guemes Island) SKA0068 48°-32.095'N 122°-34.545'W	Exclusion - Keep oil off of the bay.	1000'	Deploy boom across the bay from the rocky point on the south side of the bay, to the beach to the northwest.	Stage from from Anacortes or Bellingham.	By boat from Anacortes or Bellingham.	Cultural/ archeological site.	
NPS-69		Pocket Beach on North Side of Fidalgo Island SKA0410 48°-31.255'N 122°-36.965'W	Exclusion - Keep oil off of the pocket beach.	500'	Deploy boom along shore from the north end of "M" Avenue to "O" Avenue.	Stage at the north end of "N" or "M" Avenue.	By boat from Anacortes. Vehicle access from "N" or "M" Avenue. From Highway 20 in Anacortes, continue north on Commercial Avenue to 4th Street, turn left and go one block to "O" Avenue.	Surf smelt spawning habitat.	
NPS-70		Pocket Beach on North Side of Fidalgo Island SKA0412 48°-31.100'N 122°-37.480'W	Exclusion - Keep oil off of the pocket beach.	500'	Deploy boom along shore from the north end of "H" Avenue to "I" Avenue at the ferry terminal (Guemes Island ferry).	Stage at the ferry terminal on "I" Avenue.	By boat from Anacortes. Vehicle access from "I" Avenue at the ferry terminal.	Surf smelt spawning habitat.	

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-71		Ship Harbor SKA0420 48°-30.345'N 122°-40.465'W	Exclusion - Keep oil out of Ship Harbor.	3600'	Deploy boom from pilings at the ferry terminal to where road comes down to shore southeast of the terminal. Run boom along outside piling line. Keep boom outside mudflats so it does not dry out at low tide. Anchor offshore, not to pilings.	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the ferry terminal and to the beach on a road southeast of the terminal, from I-5 to Highway 20 west, follow signs to the ferry terminal.	Sand lance and surf smelt spawning habitat. Large concentration of dungeness crabs, eelgrass beds, waterfowl, shorebirds, and sea urchins.
NPS-72	Field visit 6/99	Shannon Point Research Lab SKA0424 48°-30.560'N 122°-41.070'W	Exclusion - Protect seawater intake to lab and shoreline sites.	1200'	Deploy 200' of boom from shore to the Shannon Point daymarker, another 200' of boom from shore to the "submerged crib" (on chart), and 800' of boom parallel to shore to connect the two 200' legs (from the daymarker to the submerged crib).	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the lab from I-5 to Highway 20 west (follow signs to ferry), turn left onto Sunset Avenue and right onto Shannon Point Road.	Marine laboratory sea water intake, seabirds, and shoreline habitat.
NPS-73	New strategy 5/01	Sunset Beach SKA0427 48°-30.085'N 122°-41.555'W	Exclusion - Keep oil off of Sunset Beach.	1100'	Deploy boom from the rocks at each end of the gravel beach in Washington Park (at the boat ramp).	Stage at Washington Park.	By boat from Washington Park or Anacortes. Vehicle access to the park from I-5 to Highway 20 west (follow signs to ferry), turn left onto Sunset Avenue to park entrance.	Surf smelt spawning habitat.

4.3.2.2 Proposed Booming and Collection Strategies: Matrices - NORTH PUGET SOUND								
Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
NPS-74		Burrows Pass SKA0435 48°-29.540'N 122°-41.275'W	Diversion/ Collection - Prevent oil from moving into Burrows Bay.	1000'	Deploy boom at an angle out from the cove west of Flounder Bay in Burrows Pass to collect oil moving along the shore from the west. The current in Burrows Pass can be very strong and may require less boom to be deployed at a sharper angle.	Stage at the Skyline Marina or Washington Park.	By boat from the Skyline Marina or the Washington Park ramp. Vehicle access from I-5 to Highway 20 west (follow signs to ferry), turn left onto Sunset Avenue and left again onto Skyline Way, then turn right onto Hughes Lane to the cove.	Sea urchins, abalone, Burrows Bay resources.
NPS-75	Field visit 8/01	Secret Harbor (Southeast Side of Cypress Island) SKA0164 48°-33.350N 122°-41.360'W	Exclusion - Keep oil out of the harbor.	1000'	Deploy boom across the narrowest part of the entrance to the harbor, from the rocky point on the south side of the harbor, directly north to the north shore. Attach boom to the shore or trees, and anchor to maintain position.	Stage from from Anacortes or Bellingham.	By boat from Anacortes or Bellingham.	Feeding habitat for marbled murrelets, eelgrass beds.
NPS-76	Field visit 8/01	Eagle Harbor (Northeast Side of Cypress Island) SKA0185 48°-35.360N 122°-41.835'W	Exclusion - Keep oil out of the harbor.	1300'	Deploy boom from the ramp on the west shoreline. No attachment point is available at the east bluff; anchor the boom in as near as possible to the bluff.	Stage from from Anacortes or Bellingham.	By boat from Anacortes or Bellingham.	Feeding habitat for marbled murrelets, eelgrass beds.





## Tidegate protection in Lummi Bay

### 1). Response Trailer

High Clearance 18' – 20' enclosed trailer

500' 8" x 12" containment boom w/ HD 3/8" galv. Chain & HD anchor points.

4 ea. 40-50 lb anchor systems w/ 3/4" nylon, 150' rode & chain

4 each 25 lb anchor systems w 3/4" nylon 100' rode and chain

#### HANDTOOLS

Screened pitchforks

Pike Poles

4 ea 50 count rolls 6mil x 36" x 60" PVC disposal bags

Duct Tape

1 case 4X raingear

1 case rubber gloves

heaving lines

#### SORBENTS

10 cases 'oil snare-on-a-rope'

10 cases oil sorbent sweeps 19" x 100'

5 bales 5" dia x 10' long sorbent booms 4/bale

5 bales of 16" x 20" sorbent pads 200/bales count.

Diagrams of boom strategies – plasticized

Appropriate line & shackles for shore connections.

2). Suitable container for 500' of boom at the fuel/ferry docks and moorage.

## North Gate #1

Gate and raceway is in the best condition of all, with one each 6' – 8' gate. The leakage of water and/or oil during the flood tide could be controlled with sorbents placed inside and across raceway.

Hang sorbent, booms, sweeps or snare lines between weighted drop lines to hold ends to vertical walls.

(See Sketch #2)

## North Gate #2

Gates and raceways are in poor condition, as they deteriorate successful exclusion of oil from the lagoon via this structure will be increasingly difficult, due to increasing flow rate.

Deployment of a chevroned exclusion boom would help deflect oil away from the gates on flood tide. The substantial pressure against the boom would require solid shore anchor points, and robust anchor gear for the offshore apex.

(See Sketch #3)

## South Gate (SE-1)

Small gate with broken concrete rip-rap at the mouth.

Deploy 200' chevron deflection boom to divert oil on flood tide away from gate. Avoid fouling boom on broken concrete. Anchor boom ends to shore anchors.

(See sketch #4)

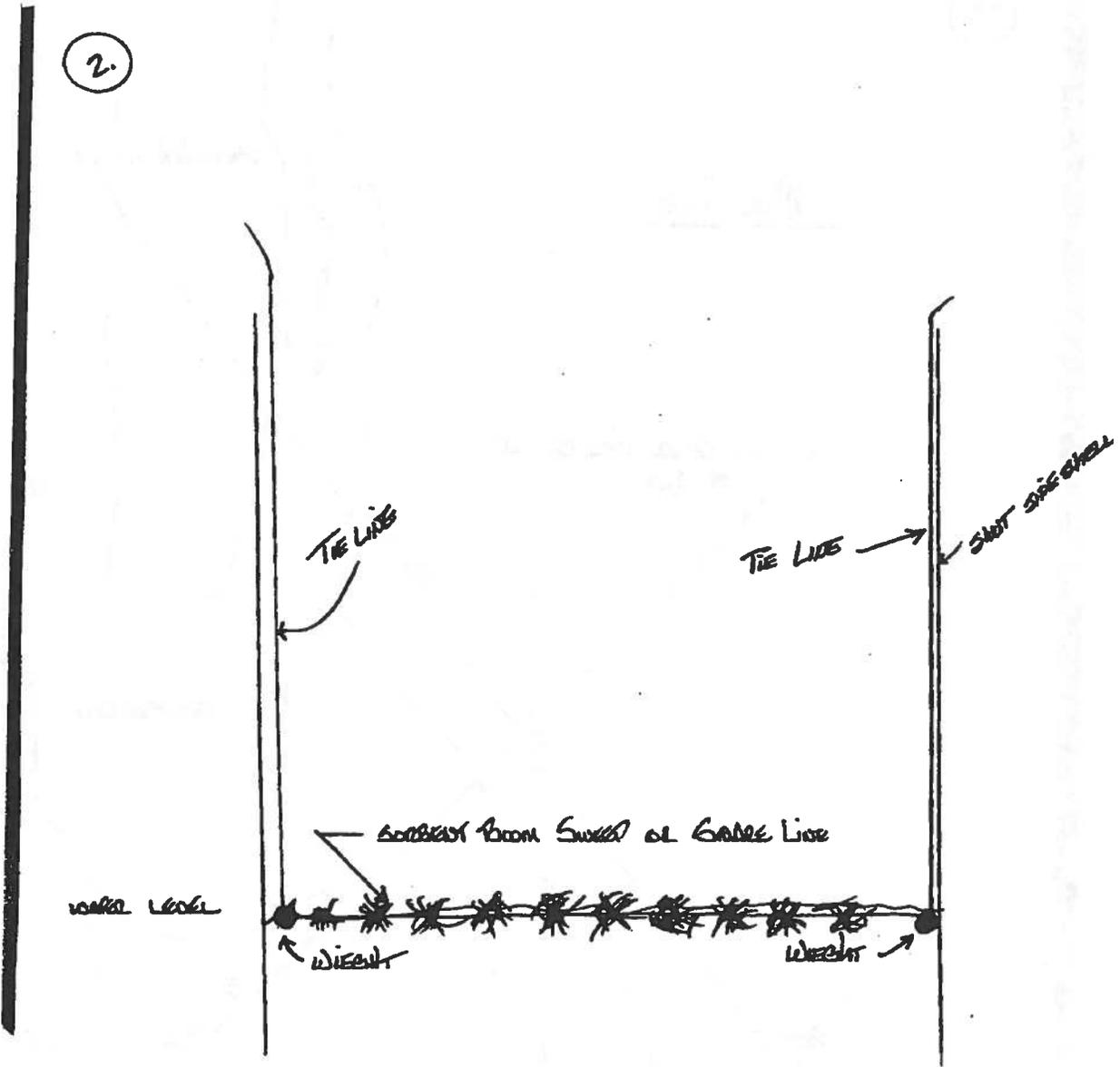
## Shore Anchors

Stainless or galvanized eye poured into rip rap

Or

Stainless or galvanized pad eye bolted with drilled rock anchors into rip rap boulders.

2.



# Tidegate NW-2

#3

Mud Flats

40% 50 lb. Anchor chain AND  
150' ROPE

200' BOOM

SHORE ANCHOR →

LOW WATER SLAUGH

DIKE

LOW WATER DISCHARGE POOL

GATES

FLOOD ↑

EBB ↓

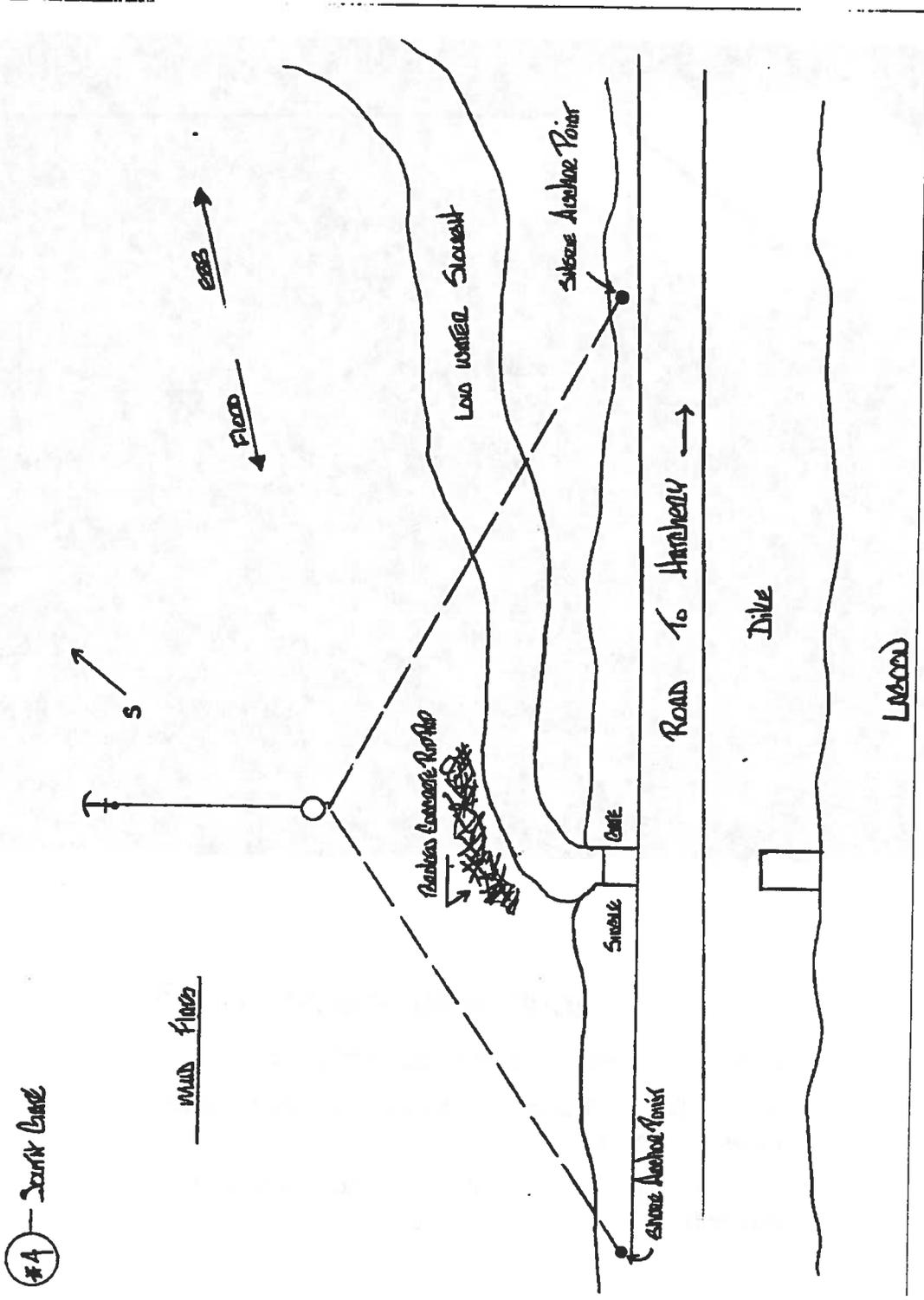
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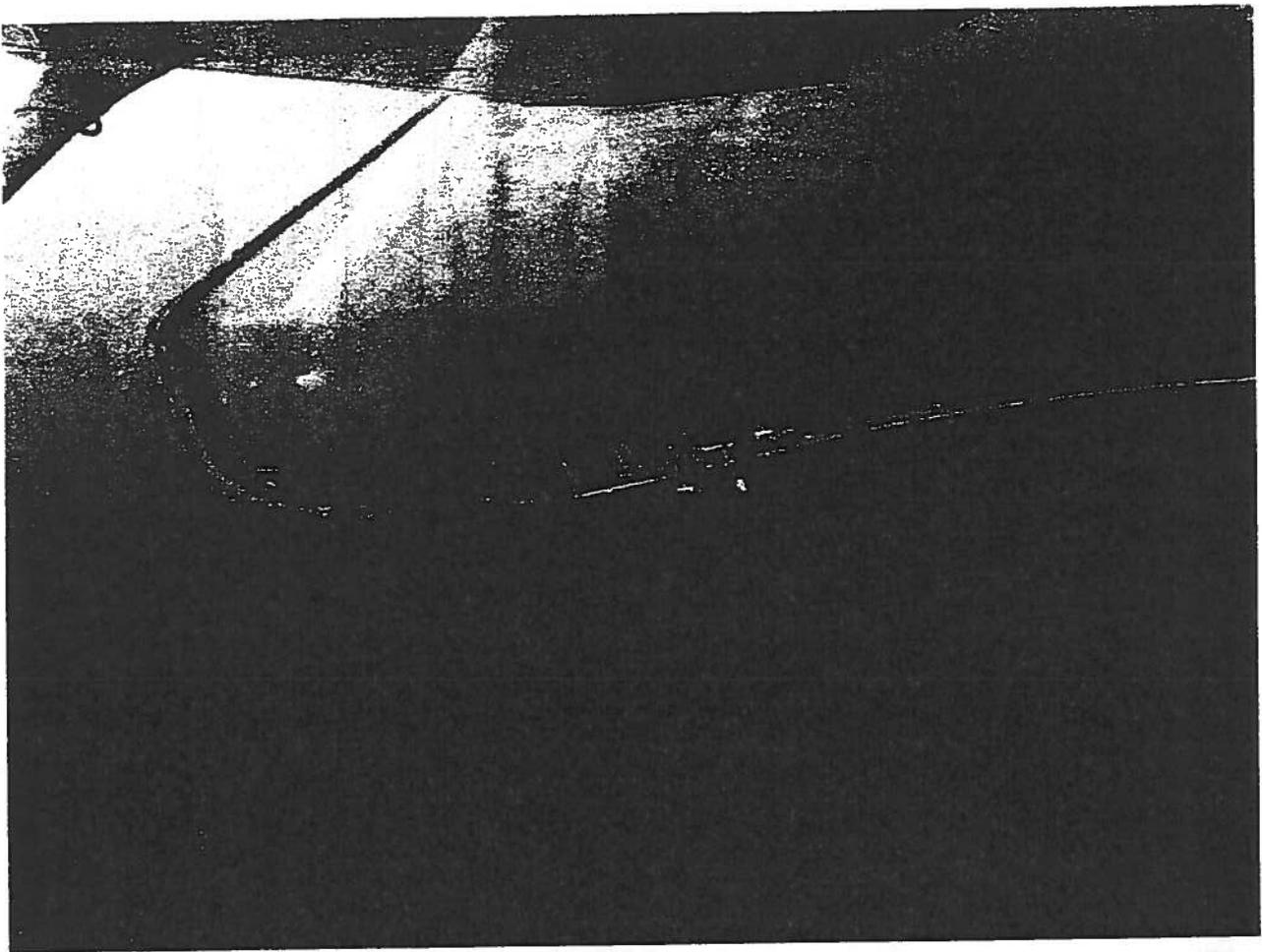
200' BOOM

DIKE

SHORE ANCHOR →

# Tidegate SE-1





## South Gate Aerial (SE-3)

Install Shore anchors either side of tidal gates.

Anchor 500'-600' boom in chevron seaward to deflect oil away from gates

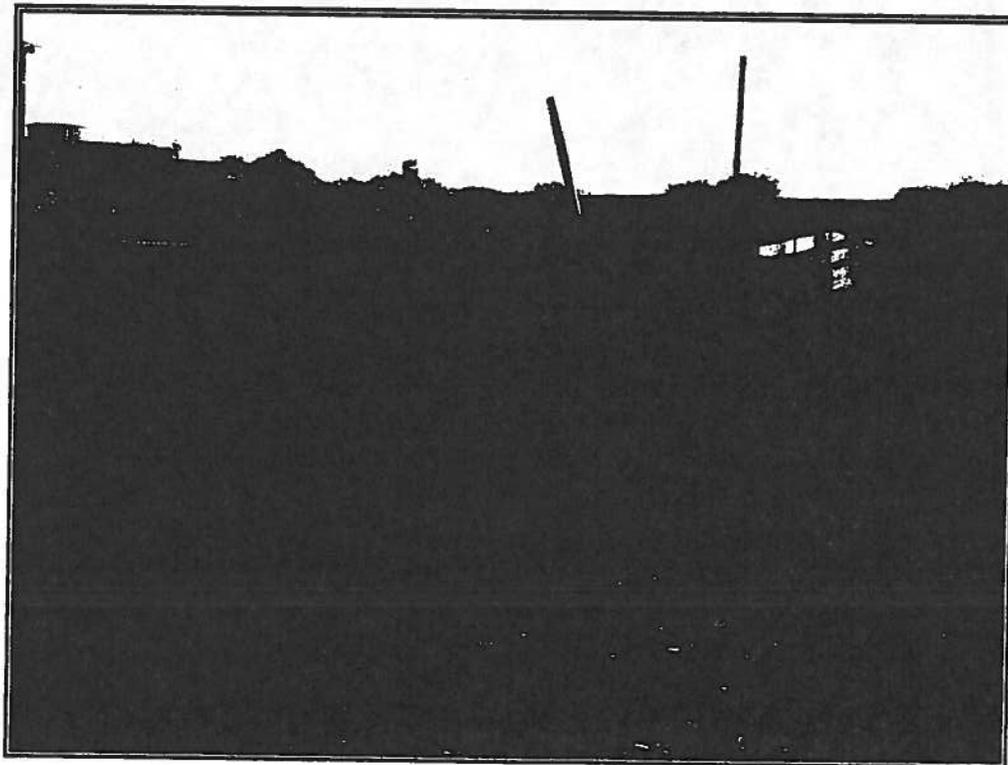
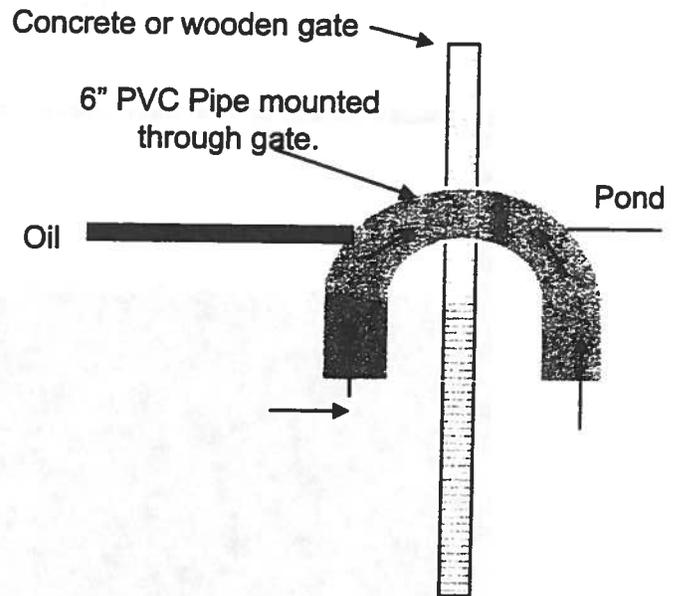
(May require substantial off shore anchors to hold chevron)

## South Gate – Fish Hatchery (SE-2)

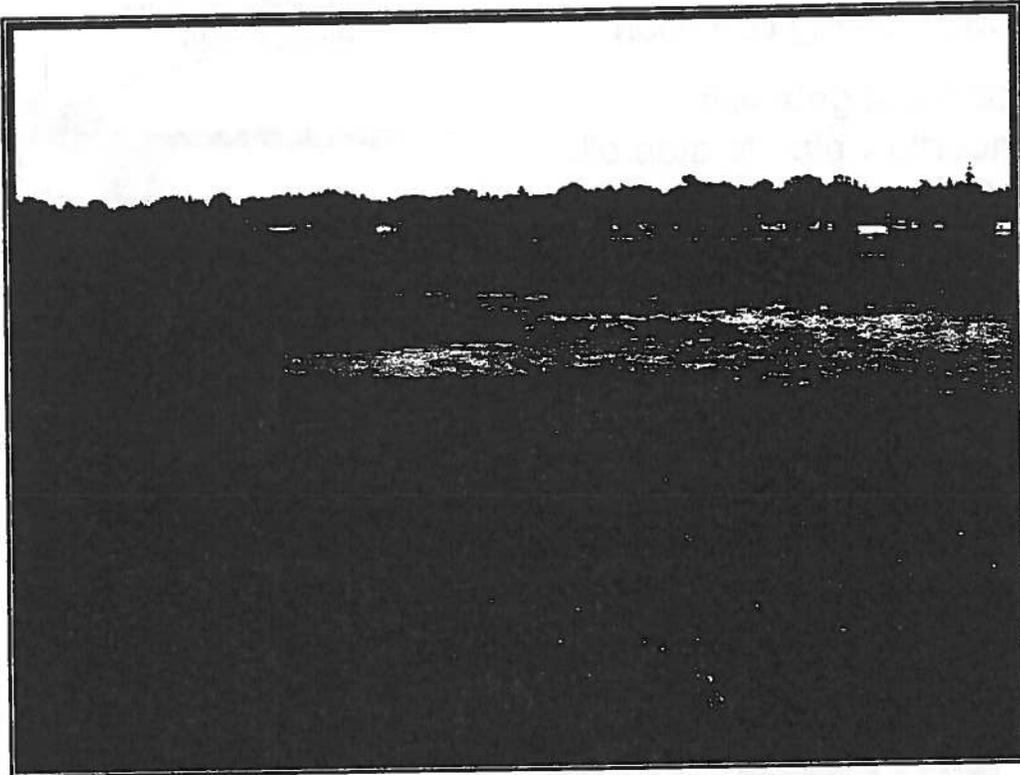
Gate at fish hatchery is in good working condition.

Fabricate gate with underflow pipe to stop oil, yet let water flow each way.

Or close raceway completely



South Gate #4 Oyster Bed  
(SE-4)



Slots in raceway are in good condition.  
Close off completely with solid gate.

## LIBC Staff with Current OSHA Hazardous Materials Training

Name	Department	Certification Date
<b>General Site Worker, 40 hour HAZWOPER</b>		
Cultee, Clifff	Lummi Natural Resources	March 12, 2004 renewed July 20, 2005
Dunphy, Gregg	Lummi Natural Resources	May 21, 2004, renewed July 20, 2005
<b>Hazardous Materials Technician, 24 hour</b>		
Linda Delgado	Lummi Natural Resources	December 20, 2005
Zach Dewees	Lummi Natural Resources	December 20, 2005
Craig Dolphin	Lummi Natural Resources	December 20, 2005
Stacy Fawell	Lummi Natural Resources	December 20, 2005
Lee First	Lummi Natural Resources	December 20, 2005
Jeremy Freimund	Lummi Natural Resources	December 20, 2005
Terry Hillaire	Lummi Natural Resources	December 20, 2005
Harlan James	Lummi Natural Resources	December 20, 2005
Merle Jefferson, Jr.	Lummi Natural Resources	December 20, 2005
Mann Lewis	Lummi Natural Resources	December 20, 2005
Adam Pfund	Lummi Natural Resources	December 20, 2005
Amy Sattler	Lummi Natural Resources	December 20, 2005
Wayne Watne	Lummi Natural Resources	December 20, 2005
<b>First Responder – Operations Level, 8 hour</b>		
Alan Chapman	Lummi Natural Resources	December 16, 2005
Bob Hall	Lummi Natural Resources	December 16, 2005
Charles Jefferson	Lummi Natural Resources	December 16, 2005
Isaac Jefferson	Lummi Natural Resources	December 16, 2005
Merle Jefferson, Sr.	Lummi Natural Resources	December 16, 2005
Randy Kinley	Lummi Natural Resources	December 16, 2005
Frank Lawrence	Lummi Natural Resources	December 16, 2005
Mike McKay	Lummi Natural Resources	December 16, 2005
Tom Morris	Lummi Natural Resources	December 16, 2005
Andre Revey	Lummi Natural Resources	December 16, 2005
Bill Revey	Lummi Natural Resources	December 16, 2005
Mike Williams	Lummi Natural Resources	December 16, 2005

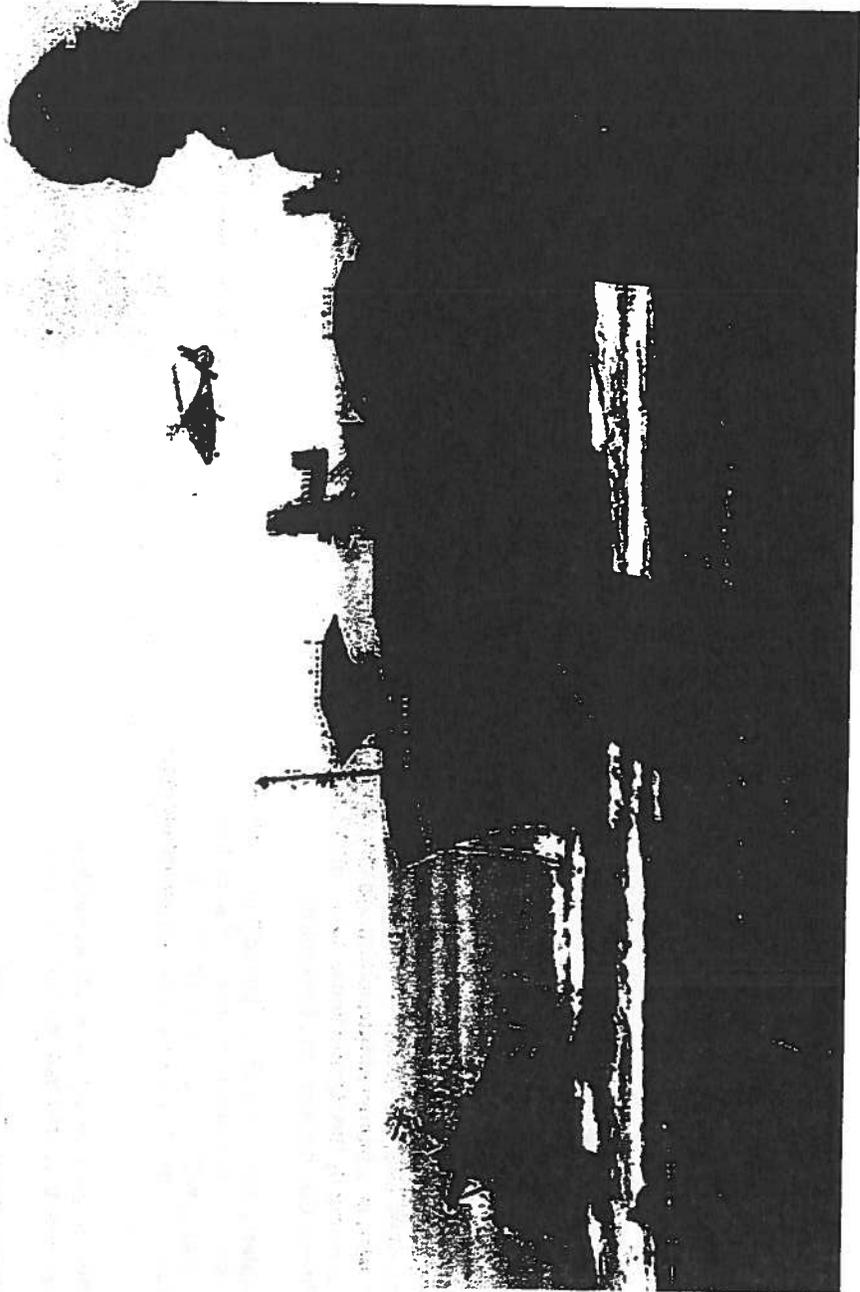


# Training Marine Oil Spill Response Workers Under OSHA's Hazardous Waste Operations and Emergency Response Standard



U.S. Department of Labor  
Occupational Safety and Health Administration

OSHA 3172  
2001



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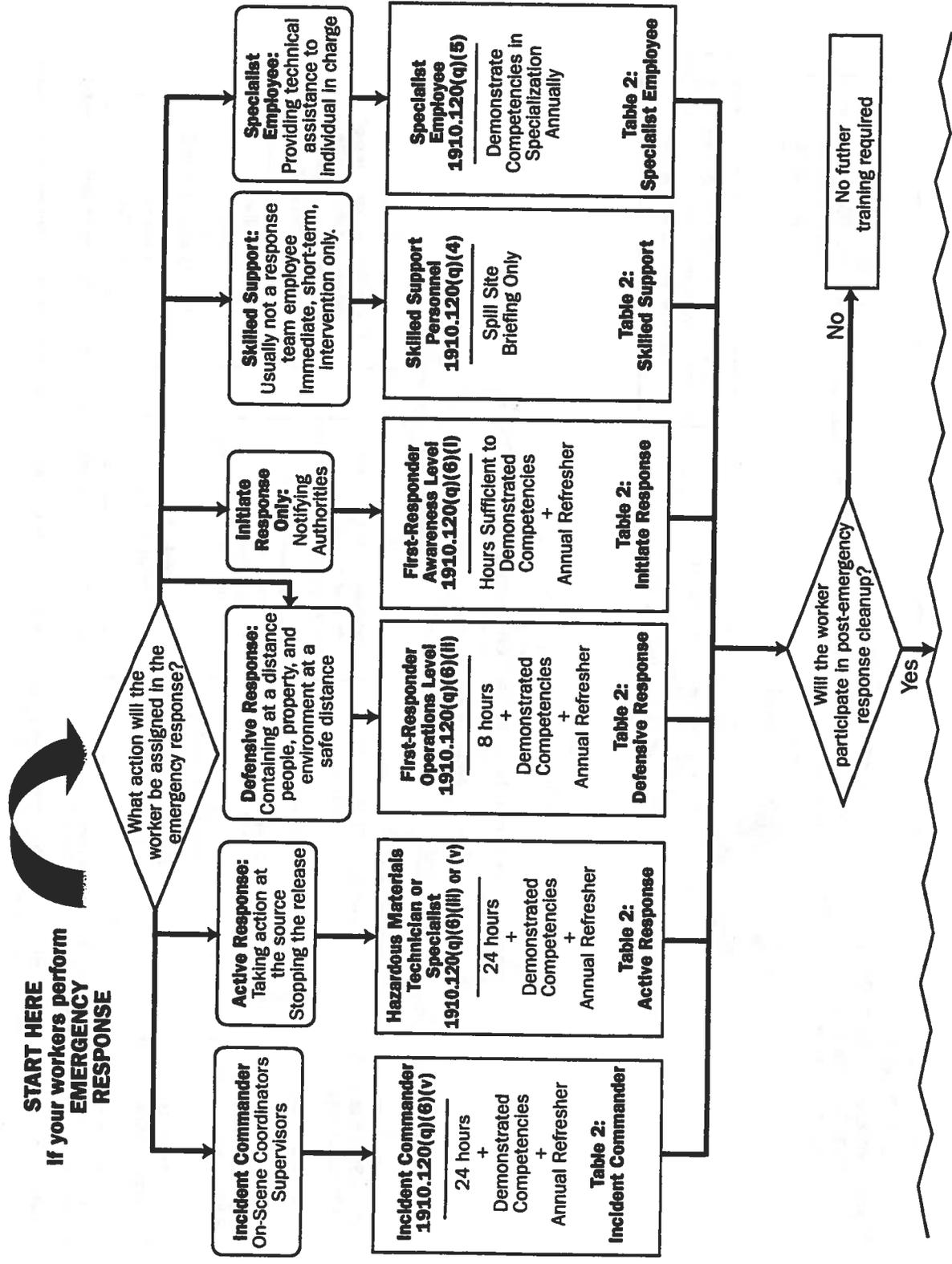
## About this Booklet

This informational booklet is intended to provide a generic, non-exhaustive overview of a particular standards-related topic. This publication does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves and the *Occupational Safety and Health Act*. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current and administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the Courts.

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**Figure 1. Training Decisions Flowchart for Emergency Response Workers**



**Table 2. Training for Workers Who Perform Emergency Response**

Job functions are examples only. Workers should be trained to the highest level of responsibility you would assign them. See Table 4 for descriptions of training topics and competency areas.

Job Function Examples		Minimum Training & Experience
Incident Commander	<ul style="list-style-type: none"> <li>- On-Scene Coordinators</li> <li>- On-Scene Coordinator Representatives</li> <li>- On-Scene Industry Representatives</li> <li>- ICS Operations Section Chief</li> <li>- ICS Site Safety Enforcement Personnel</li> </ul>	<p>As shown on Figure 1</p> <ul style="list-style-type: none"> <li>- Supervisors/Managers</li> <li>- ICS Safety Officer</li> <li>- ICS Group Supervisors</li> </ul> <p>24 hours initial emergency response training covering areas 25-36 AND competency in areas 1-6</p> <p>Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36 and 1-6</p>
Active Response	<ul style="list-style-type: none"> <li>- Work close to flammable/combustible liquids such as in a pumping operation</li> <li>- Work in confined or enclosed spaces containing volatile oil</li> <li>- Underwater free-floating oil removal</li> <li>- Soil/sand subsurface oil assessment</li> <li>- Plugging holes/emergency repairs to source</li> <li>- Diving operations close to source</li> <li>- Work adjacent to volatile fuel during initial spill hours (boat operations, etc.)</li> <li>- Site characterization of chemical exposures, air monitoring/sampling</li> <li>- Soil investigation/sampling</li> <li>- Dispersant application and monitoring operations</li> <li>- In-situ burn and monitoring operations</li> <li>- Application of herding agents/emulsion breakers</li> </ul>	<p>As shown on Figure 1</p> <p><b>Technician Level [(q)(6)(III)]:</b></p> <ul style="list-style-type: none"> <li>• 24 hours initial emergency response training covering areas 25-36 AND competency in areas 7-15</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36 and 7-15</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p><b>Specialist Level [(q)(6)(IV)]:</b></p> <ul style="list-style-type: none"> <li>• 24 hours initial emergency response training covering areas 7-15 and 25-36 AND competency in areas 16-24</li> <li>• Annual refresher training or annual demonstration of competency, ensuring competencies in areas 7-36</li> </ul>
Defensive Response	<ul style="list-style-type: none"> <li>- Booming operations at a safe distance*</li> <li>- Surface level shoreline impact assessment</li> <li>- Manual pickup and removal of irritant oil and oily debris for oils that could be re-released into environment</li> <li>- Damming/diking at a safe distance</li> <li>- Loading of oil into receptacles at a safe distance</li> <li>- Emergency medical personnel (if working in contaminated areas)</li> </ul>	<p>As shown on Figure 1</p> <ul style="list-style-type: none"> <li>- Staging area managers</li> <li>- Vacuum truck operations at a safe distance</li> <li>- Security operations</li> <li>- Safety zone enforcement</li> <li>- Skimmer/boat operations at a safe distance</li> </ul> <p>8 hours initial emergency response training covering areas 31-36 AND competency in areas 25-30</p> <p>Annual refresher training or annual demonstration of competency, ensuring competencies in areas 25-36</p>

**Table 2. Training for Workers Who Perform Emergency Response (Cont).**

Job Function Examples	Minimum Training & Experience
<ul style="list-style-type: none"> <li>- Crew members who discover a release and alert the proper emergency response personnel</li> <li>- Industry and government watchstanders</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Sufficient hours to demonstrate competency in areas 31-36</li> <li>• Annual refresher training including demonstration of competency in areas 31-36</li> <li>• Additional training required for post-emergency cleanup activities unless there is no exposure to hazardous substances. See Figure 1 for guidance.</li> </ul>
<ul style="list-style-type: none"> <li>- Immediate, short-term intervention of a specialized nature that cannot be performed by other workers</li> <li>- On-scene resource documentation</li> <li>- Operation of certain equipment such as mechanized digging equipment, cranes, and other hoisting equipment</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Spill site briefing in areas 55-59</li> </ul>
<ul style="list-style-type: none"> <li>- Dispersion modeling personnel</li> <li>- Meteorologist</li> <li>- Analytical chemical/oil specialist</li> <li>- Professional engineer/spill recovery system or shipbuilding specialist</li> </ul>	<p><b>As shown on Figure 1</b></p> <ul style="list-style-type: none"> <li>• Briefing covering areas 55-59</li> <li>• Training or demonstrated competency in area of specialization annually</li> </ul>

**NOTES:**

1. Tables 2, 3, and 4 are intended to clarify HAZWOPER (29 CFR 1910.120 or 1926.65) training requirements for marine oil spill response. The tables do not relieve employers from the requirements of HAZWOPER, nor do they specifically address training that may be required by other OSHA standards.
2. All employees should receive pre-entry site briefings covering, at a minimum, training areas 55-59 in Table 4.
3. Table 4 lists the training areas referenced throughout Tables 2 and 3. For example, an Incident Commander must receive 24 hours of initial training covering training areas 25-36 in Table 4.

\*Defensive personnel must be at a safe distance from the point of release, outside the hot zone or danger zone.

**Table 3. Training for Workers Who Perform Only Post-Emergency Response**

Job functions are examples only. Workers should be trained to the highest level of responsibility you would assign them.

Job/Site Characterization	Job Function Examples	Minimum Training & Experience
<p><b>Moderate-High (At/Above Exposure Limits)</b></p> <ul style="list-style-type: none"> <li>Unknown oil or unknown hazardous substance mixed with oil</li> <li>Exposures equal or exceed exposure limits or other published limits</li> <li>Respiratory protection required</li> <li>Concentrations at or above 10 percent of the Lower Explosive Limit (LEL)</li> <li>Oxygen levels <math>\geq 19.5</math> &lt;22 percent</li> <li>Carcinogen: known or suspected</li> <li>Situations in which oil is known but parameters above cannot be reasonably assessed</li> </ul>	<ul style="list-style-type: none"> <li>Manual cleanup of stranded oil with potential skin carcinogens (e.g., benzo (a) pyrene)</li> <li>Cleanup of stranded oil when toxic chemicals are persistent and above exposure limits</li> <li>Wildlife capture and treatment depending on explosives</li> <li>Load and transfer piled oil-saturated decaying plants and animals that provide a hydrogen sulfide risk</li> <li>Cleanup of stranded oil in confined spaces</li> <li>On land marsh burning operations</li> </ul>	<ul style="list-style-type: none"> <li>40 hours of initial training in areas 37-43 and 3 days supervised field experience, or equivalent training certification</li> <li>At least 8 hours of annual refresher training</li> <li>Supervisory/management personnel must also receive 8 hours of additional initial training covering at a minimum areas 51-54</li> </ul>
<p><b>Low (Below Exposure Limits)</b></p> <p><b>Routine spill cleanup workers [(e)(3)(H)]:</b></p> <ul style="list-style-type: none"> <li>Oil and other hazards of spill constituents known</li> <li>Exposures may cause irritation (skin, eye, respiratory) but are below permissible published limits</li> <li>Oxygen levels <math>\geq 19.5</math> &lt;22 percent</li> <li>Concentrations less than 10 percent, but more than the LEL</li> <li>Other significant hazards may be present: Physical, safety, ergonomic, thermal.</li> </ul> <p><b>[(e)(3)(I)]:</b></p> <ul style="list-style-type: none"> <li>Oil and other hazards of spill constituents known</li> <li>Exposures below permissible/published limits</li> </ul>	<ul style="list-style-type: none"> <li>Pressure washing operations of stranded weathered oil</li> <li>Cutting of contaminated live vegetation</li> <li>Natural resource damage assessment</li> <li>Bioremediation operations</li> <li>Shoreline cleanup assessment</li> <li>Vessel/equipment decontamination</li> <li>Underwater stranded oil removal operations</li> <li>Soil/sand substance oil removal</li> <li>Containerized/packaged waste handling and disposal for transport operations</li> </ul>	<p><b>As shown in Figure 1</b></p> <ul style="list-style-type: none"> <li>24 hours of initial training in areas 44-50 and 1 day supervised field experience, or equivalent training</li> <li>At least 8 hours of annual refresher training</li> <li>Supervisory management personnel must also receive 8 hours of additional initial training covering at a minimum areas 51-54</li> </ul>

**Table 3. Training for Workers Who Perform Only Post-Emergency Response (Cont.)**

<b>Job/Site Characterization</b>	<b>Job Function Examples</b>	<b>Minimum Training &amp; Experience</b>
<p><b>Non-Recurring/Minimal Exposure</b></p> <ul style="list-style-type: none"> <li>• Oil and other spill constituents known</li> <li>• Exposures below permission/published limits</li> <li>• Respirators not required</li> <li>• Oxygen levels <math>\geq 19.5</math> &lt;22 percent)</li> <li>• No potential for chemical emergency, explosion, or fire</li> <li>• Minimal irritants to respiratory system, eyes, or skin</li> <li>• No significant physical, safety, ergonomic, and thermal hazards</li> </ul>	<ul style="list-style-type: none"> <li>- Workers who do not participate in marine oil spill responses on a frequent recurring basis and who will have minimal exposure</li> <li>- Tarball shoreline cleanup</li> <li>- On scene cost documentation</li> <li>- Operators of large construction vehicles during stranded oil removal</li> </ul>	<p><b>As footnoted in Figure 1</b></p> <ul style="list-style-type: none"> <li>• If conditions described in CPL 2-2.51 are met, reduced initial training or equivalent training certification covering items 44-50</li> <li>• Up-to-date training consistent with 1910.38(a) and 1910.1200, and health and safety training associated with assigned tasks</li> </ul> <p><b>Supervisory/management personnel</b> must receive:</p> <ul style="list-style-type: none"> <li>• At least 24 hours of initial training in areas 44-50 and 1 day of supervised field experience;</li> <li>• 8 hours of additional initial training covering at a minimum areas 51-54; and</li> <li>• 8 hours annual refresher training</li> </ul>
<p><b>No Exposure</b></p> <ul style="list-style-type: none"> <li>• Area characterized and stable with:</li> <li>• No potential for exposure to hazardous waste or substances by any route (i.e., inhalation, skin absorption, ingestion)</li> <li>• No safety hazards associated with hazardous waste or hazardous substances</li> </ul>	<ul style="list-style-type: none"> <li>- Aerial photo documentation - Historians</li> <li>- Command Post support - Press</li> <li>- Food service personnel</li> <li>- Legal representation</li> <li>- Over-flight assessment (if no potential for exposure)</li> <li>- Resource tracking (if no potential for exposure)</li> <li>- Financial services personnel</li> </ul>	<p><b>As shown in Figure 1</b></p> <ul style="list-style-type: none"> <li>• Briefing covering areas 55-59</li> </ul>

**NOTES:**

1. Tables 2, 3, and 4 are intended to clarify HAZWOPER (29 CFR 1910.120 or 1926.65) training requirements for marine oil spill response. The tables do not relieve employers from the requirements of HAZWOPER, nor do they specifically address training that may be required by other OSHA standards.
2. All employees should receive pre-entry site briefings covering, at a minimum, training areas 55-59 in Table 4.
3. Equivalent training must be documented or certified by the employer. The documentation or certification must show that an employee's work experience and/or training has resulted in training equivalent to the training required in paragraphs (e)(1) through (e)(4) of 1910.120. Equivalently trained employees must receive appropriate, site-specific training prior to site entry and have appropriate supervised experience at the new site. Equivalent training includes any academic training or the training that existing employees might have received from prior spill site experience. Certification or documentation as equivalently trained does not apply to refresher training requirements.
4. Table 4 lists the training areas referenced throughout Tables 2 and 3. For example, Supervisory/Management personnel in low exposure level conditions must receive 8 hours of additional initial training covering those training areas 51-54 in Table 4.
5. The oxygen concentration range used in these tables,  $\geq 19.5$  < 22 percent, is consistent with 29 CFR 1915 Subpart B, Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment.

**Table 4. Training Topics and Competency Areas (from Tables 2 and 3)**

**ON-SCENE COORDINATOR**

- 1) Know and be able to implement the employer's incident command system.
- 2) Know how to implement the employer's emergency response plan.
- 3) Know and understand the hazards and risks associated with employees working in personal protective clothing.
- 4) Know how to implement the local emergency response plan.
- 5) Know the state emergency response plan and the Federal Regional Response Team.
- 6) Know and understand the importance of decontamination procedures.

**ACTIVE RESPONSE**

- 7) Know how to implement the employer's emergency response plan.
- 8) Know how to use field survey instruments and equipment to classify, identify, and verify known and unknown materials.
- 9) Be able to function within an assigned role in the Incident Command System.
- 10) Know how to select and use proper specialized personal protective equipment provided to the hazardous materials technician.
- 11) Understand and be able to apply hazard and risk assessment techniques.
- 12) Be able to perform advanced control, containment, and/or confinement operations within the capabilities of the resources and available personal protective equipment.
- 13) Understand and implement decontamination procedures.
- 14) Understand termination procedures.
- 15) Understand terminology and behavior of chemicals and their toxic effects.
- 16) Know how to use advanced survey instruments and equipment to classify, identify, and verify known and unknown materials.
- 17) Understand in-depth hazard and risk techniques.
- 18) Be able to determine and implement decontamination procedures.
- 19) Know how to implement the local emergency response plan.
- 20) Know the state emergency response plan.
- 21) Be able to develop a site safety and control plan.

- 22) Understand chemical, radiological, and toxicological terminology and behavior.
- 23) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
- 24) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.

**DEFENSIVE RESPONSE**

- 25) Know basic hazard and risk assessment techniques.
- 26) Know how to select and use proper personal protective equipment necessary for the first responder operation level.
- 27) Understand basic hazardous materials terms.
- 28) Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and available personal protective equipment.
- 29) Know how to implement basic decontamination procedures.
- 30) Understand the relevant standard operating and termination procedures.

**INITIATE RESPONSE ONLY**

- 31) Understand the hazards of oil and the risks in a spill.
- 32) Understand what happens during an emergency involving spilled oil.
- 33) Recognize the presence of oil or related hazardous materials in an emergency.
- 34) Identify hazardous substances, if possible (e.g., appearance, smell, monitoring equipment).
- 35) Understand individual role in employer's emergency response plan.
- 36) Recognize when help is needed and when to request assistance from the response team.

**POST-EMERGENCY CLEANUP—EXPOSURES ABOVE EXPOSURE LIMITS**

- 37) Know the name(s) of and how to contact the site safety and health personnel for spill cleanup.
- 38) Know the safety, health, and other hazards present during oil spill cleanup.
- 39) Know safe cleanup work practices including decontamination procedures to minimize risks.
- 40) Know how to use available controls and equipment, including contamination control procedures and personal protective equipment, to minimize risks.

- 41) Know the contents of the safety and health plan for the specific cleanup.
- 42) Know and be able to recognize signs and symptoms of overexposure to hazards present.
- 43) Know the medical surveillance requirements.

**POST-EMERGENCY CLEANUP—EXPOSURES BELOW EXPOSURE LIMITS OR NON-RECURRING MINIMAL EXPOSURE**

- 44) Know the name(s) of and how to contact site safety and health personnel for spill cleanup.
- 45) Know the safety, health, and other hazards present during oil spill cleanup.
- 46) Know safe cleanup work practices including decontamination procedures to minimize risks.
- 47) Know how to use available controls and equipment, including contamination control and personal protective equipment, to minimize risks from hazards present.
- 48) Know the contents of the safety and health plan prepared for the specific cleanup.
- 49) Know and be able to recognize signs and symptoms of overexposure to hazards present.
- 50) Know the medical surveillance requirements.

**SUPERVISOR/MANAGER FOR CLEANUP OPERATIONS**

- 51) Know and be able to implement effectively the employer's safety and health program.
- 52) Know and be able to implement effectively the employer's personal protective equipment plan.
- 53) Know and be able to implement effectively the employer's spill containment program.
- 54) Know and be able to implement effectively health hazard monitoring procedure and techniques.

**BRIEFING TOPICS**

- 55) Purpose of visit or duties to be performed.
- 56) Site personnel, chain-of-command, and communications procedures.
- 57) Chemical/physical hazards involved, signs and symptoms of exposure.
- 58) Emergency alarm system, escape routes, and places of refuge.
- 59) Appropriate contamination control procedures, personal protective equipment, decontamination, and other control measures provided.

**Figure 3. Sample Certifications**

No. 00232

This is to certify that  
**John Smith**  
 has satisfactorily completed  
**40-Hour HAZWOPER Marine Oil Spill Training**  
 as described in 29 CFR 1910.120(e)

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001

No. 00233

This is to certify that  
**Jane Smith**  
 has satisfactorily completed  
**8-Hour HAZWOPER Marine Oil Spill**  
**Supervisor Training**  
 as described in 29 CFR 1910.120(e)(4)

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001

No. 00234

This is to certify that  
**Joy Smith**  
 satisfactorily completed  
**HAZWOPER Post-Emergency Response**  
**Cleanup Training for Minimal Exposure Conditions**  
 Only for (insert name of spill) Spill  
 consistent with OSHA CPL 2-2-51

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001

No. 00235

This is to certify that  
**James Smith**  
 has satisfactorily completed  
**24-Hour Marine Oil Spill Training**  
 for **Hazardous Materials Technicians**  
 and demonstrated the necessary competencies  
 as described in 29 CFR 1910.120(q)(6)(iv)

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001

No. 00236

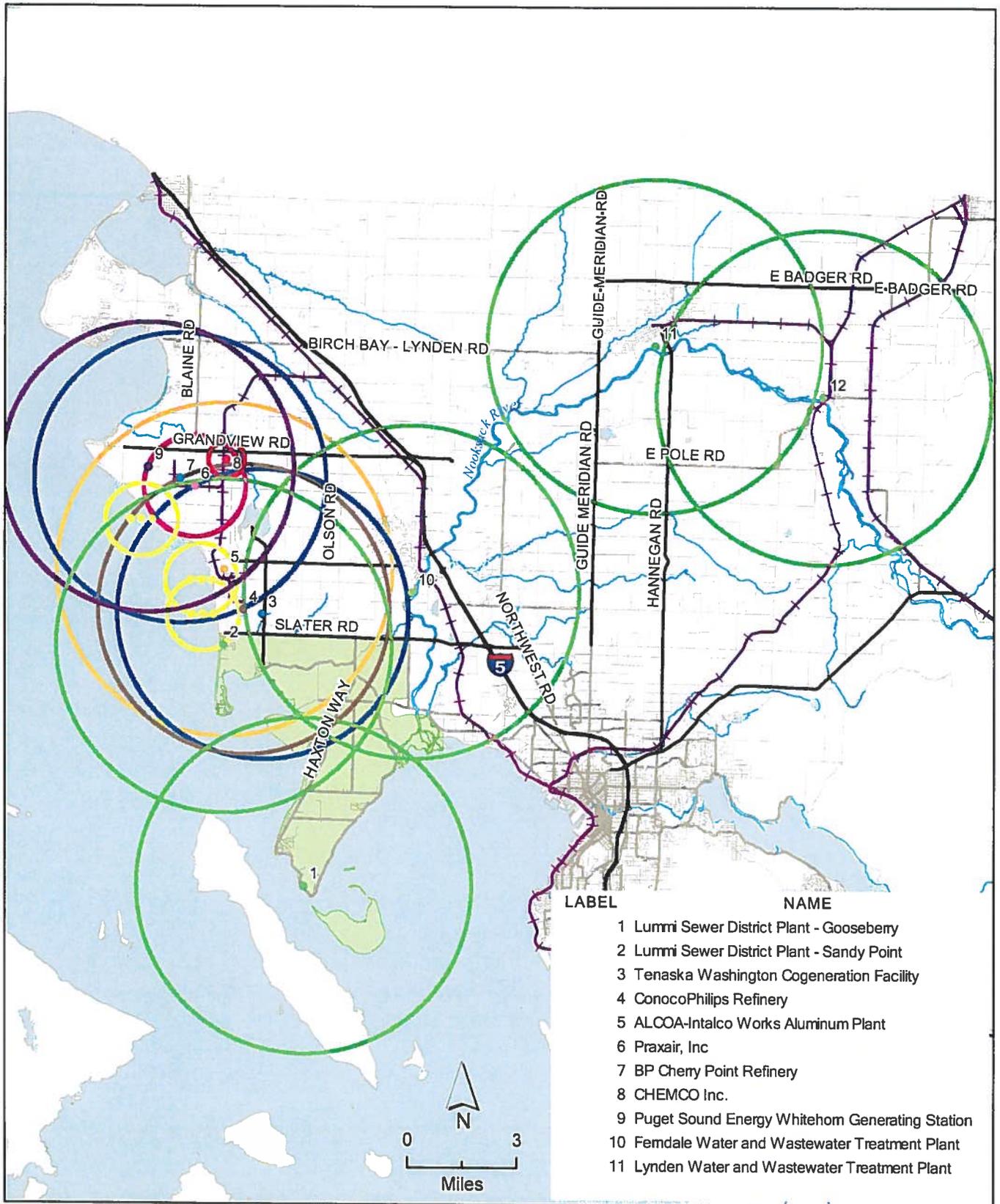
This is to certify that  
**Julie Smith**  
 has satisfactorily completed  
**8-Hour HAZWOPER Marine Refresher Training**  
 for **Hazardous Waste Site Workers**  
 as described in 29 CFR 1910.120(e)(8)

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001

No. 00237

This is to certify that  
**Joe Smith**  
 has satisfactorily demonstrated competency  
 in lieu of annual refresher training for  
**Marine Oil Spill First Responder Operations Level**  
 as described in 29 CFR 1910.120(q)(8)

H.L. Teacher, Instructor \_\_\_\_\_ Date  
 SEA Training Institute  
 Street, City, ST 00001



**Figure 3.1 Inhalation Hazard Zones for Facilities in the Reservation Area**

Lummi Nation GIS Department makes no claim as to the accuracy, completeness, or content of any data contained herein. Any user of this data assumes all responsibility for use thereof and further agrees to hold the Lummi Nation harmless from any use of this data. This map is not intended to reflect the exterior or tideland boundaries of the Lummi Reservation.

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**Legend**

- Hazard Piers
  - Major Arteries
  - Interstate 5
  - Major Roads
  - Other Roads
  - Railroads
  - Lummi Reservation
  - Streams
- Chemical Type**
- Ammonia
  - Sulfuric Acid
  - Chlorine
  - Ammonia and Sulfuric Acid
  - Chlorine and Sulfuric Acid
  - Diesel and Formaldehyde
  - Hydrofluoric Acid and Sulfuric Acid
  - Multiple



### 3.2.1 Industrial Facilities

The industrial facilities on or near the Reservation that present a potential inhalation hazard are listed in Table 3.1 and mapped in Figure 3.1. The hazard zones depicted in Figure 3.1 are derived from the "Table of Initial Isolation and Protective Action Distances" in the 2004 North American Emergency Response Guidebook (USDOT 2004). They are based on the "Large Spill, Night" downwind protective distances. A "large spill" is defined as a spill from a large package or multiple spills from many small packages (USDOT 2004). According to the North American Emergency Response Guidebook (NAERG), the protective zones suggest "distances useful to protect people from vapor resulting from spills involving dangerous goods which are considered toxic by inhalation (TIH). The Table provides first responders with initial guidance until technically qualified emergency response personnel are available. Distances show areas likely to be affected during the first 30 minutes after materials are spilled and could increase with time." These hazard zone maps are designed as a tool for first responders and are not intended to suggest maximum potential vulnerability zones for any facility.

Table 3.1 Inhalation Hazard Zones for Facilities in the Reservation Area \*

Location	Facility	Hazardous Material	Initial Isolation Distance		Phone
			(feet)	(miles)	
Lummi Reservation	LTSWD Gooseberry Treatment Plant	Chlorine	800	4.6	360-815-6095
	LTSWD Sandy Point Treatment Plant	Chlorine	800	4.6	360-815-6095
Cherry Point Heavy Industrial Area or Ferndale Area	Tenaska Washington Cogeneration facility	Ammonia	200	1.4	360-380-2119
		Sulfuric acid	1000	4.0	
	ConocoPhillips Refinery	Hydrofluoric acid	700	2.7	360-384-8351
		Sulfuric acid	1000	4.0	
	ALCOA-Intalco Works Aluminum Plant	Chlorine	800	4.6	360-384-7301
		Sulfuric acid	1000	4.0	
	Praxair, Inc.	Ammonia	200	1.4	800-772-9247
	BP Cherry Point Refinery	Ammonia	200	1.4	360-371-1301
		Sulfuric acid	1000	4.0	
		Multiple	500**	1.0**	
	CHEMCO, Inc., wood plant	Multiple (diesel, formaldehyde)	160**	0.5**	360-354-4807
	Puget Sound Energy Whitehorn Generating Station	Sulfuric acid	1000	4.0	888-225-5773
	Ferndale Water and Wastewater Plant	Chlorine	800	4.6	360-384-4006 or 911
Lynden Water and Wastewater Treatment Plant	Chlorine	800	4.6	360-354-3446	
Everson Wastewater Treatment Plant	Chlorine	800	4.6	360-966-0282	

\*(USDOT 2004).

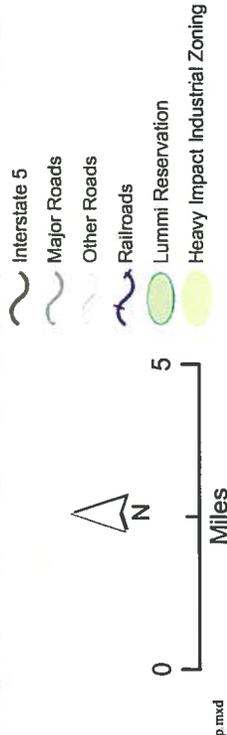
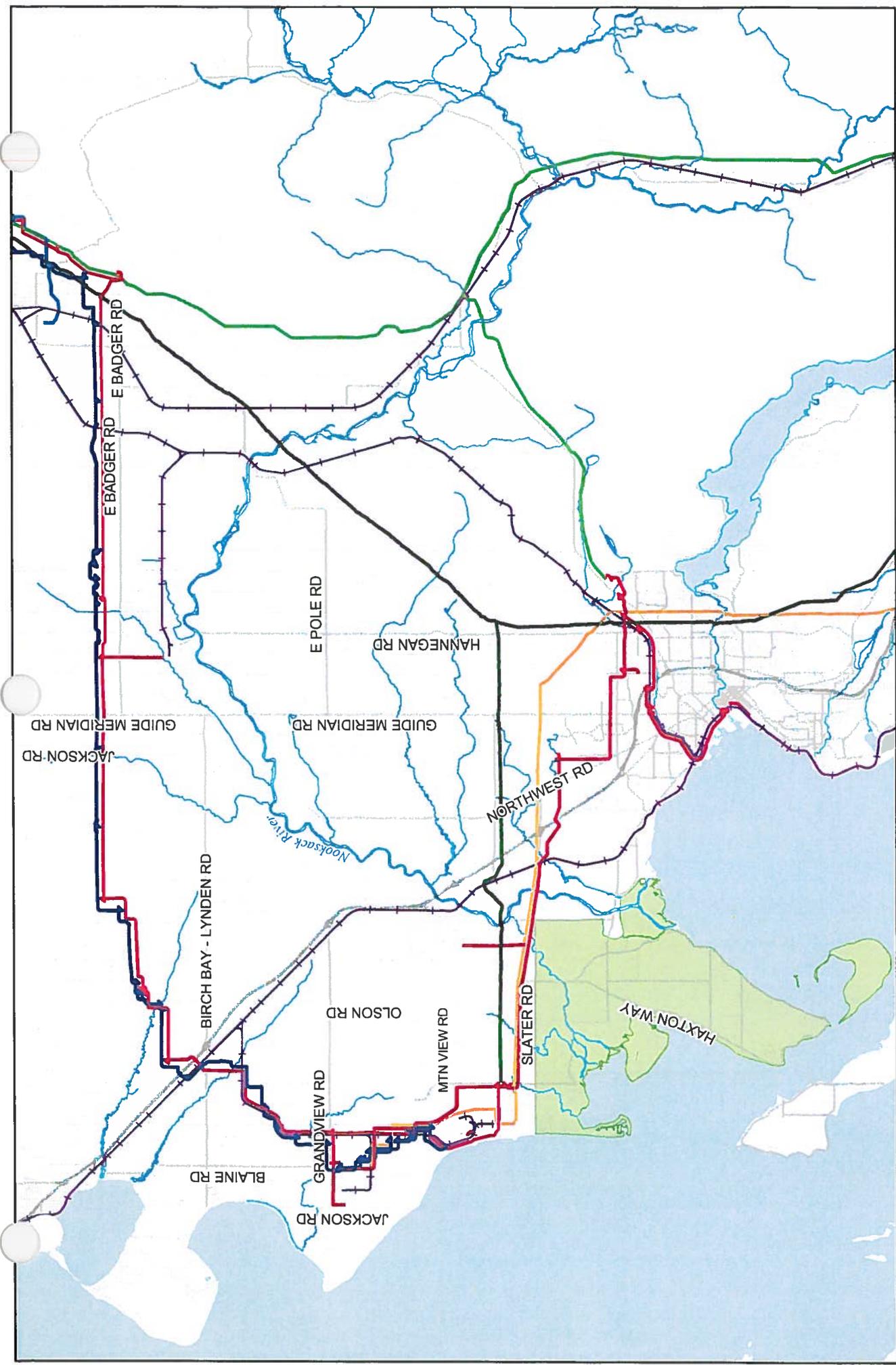
\*\* (Whatcom County 2001) These values are based on USDOT 1996.

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### Pipelines in the Reservation Area

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## Petrochemical Pipelines near the Lummi Reservation

Pipeline	Product	Route	Risk to Reservation
BP Olympic	Refined fuels	<ul style="list-style-type: none"> <li>Runs north-south to connect the BP and ConocoPhillips refineries, then runs east-west just north of the Reservation</li> <li>Crosses the Nooksack River just east of the northeast corner of the Reservation</li> </ul>	High
Terasen	Crude oil	<ul style="list-style-type: none"> <li>Runs east-west from Cherry Point to the I-5 corridor (approximately) then north-south.</li> <li>Crosses the Nooksack River approximately 1 mile north of the northern boundary of the reservation.</li> </ul>	High
Cascade	Natural gas	<ul style="list-style-type: none"> <li>Runs east-west from Cherry Point to the I-5 corridor (approximately).</li> <li>Crosses the Nooksack River just east of the northeast corner of the Reservation</li> <li>Includes a segment that runs between BP and ConocoPhillips</li> </ul>	Medium-High
Williams	Natural gas	<ul style="list-style-type: none"> <li>Begins or crosses Canadian border near Sumas, travel west across northern Whatcom County, and then southwest to the industrial zone.</li> <li>Cross several tributaries to the Nooksack River</li> <li>Also runs directly south from Sumas with a branch into Bellingham. This section crosses the Nooksack River twice.</li> </ul>	Low
BP Natural Gas	Natural gas	<ul style="list-style-type: none"> <li>Begins or crosses Canadian border near Sumas, travels west across northern Whatcom County, and then southwest to the industrial zone.</li> </ul>	Low
Sumas Pipeline	Natural gas	<ul style="list-style-type: none"> <li>Runs east-west between the Canadian border near Sumas and the Sumas Cogeneration plant.</li> </ul>	Low
BP Cherry Point	Crude oil	<ul style="list-style-type: none"> <li>Connects the Terasen crude oil pipeline to the BP Cherry Point refinery.</li> <li>Runs north-south within the Cherry Point Heavy Impact Industrial area</li> </ul>	High (when in use)
BP Cherry Point	Butane	<ul style="list-style-type: none"> <li>Runs from BP Cherry Point refinery to the BP Ferndale Terminal</li> </ul>	Medium

The following table shows the results of the experiment. The first column is the initial concentration of the reactants, the second column is the initial rate of reaction, and the third column is the order of reaction with respect to each reactant.

Initial Concentration of Reactants	Initial Rate of Reaction	Order of Reaction
0.10 M A, 0.10 M B	0.010 M s <sup>-1</sup>	1 with respect to A, 1 with respect to B
0.20 M A, 0.10 M B	0.020 M s <sup>-1</sup>	1 with respect to A, 0 with respect to B
0.10 M A, 0.20 M B	0.010 M s <sup>-1</sup>	0 with respect to A, 1 with respect to B
0.20 M A, 0.20 M B	0.020 M s <sup>-1</sup>	1 with respect to A, 0 with respect to B

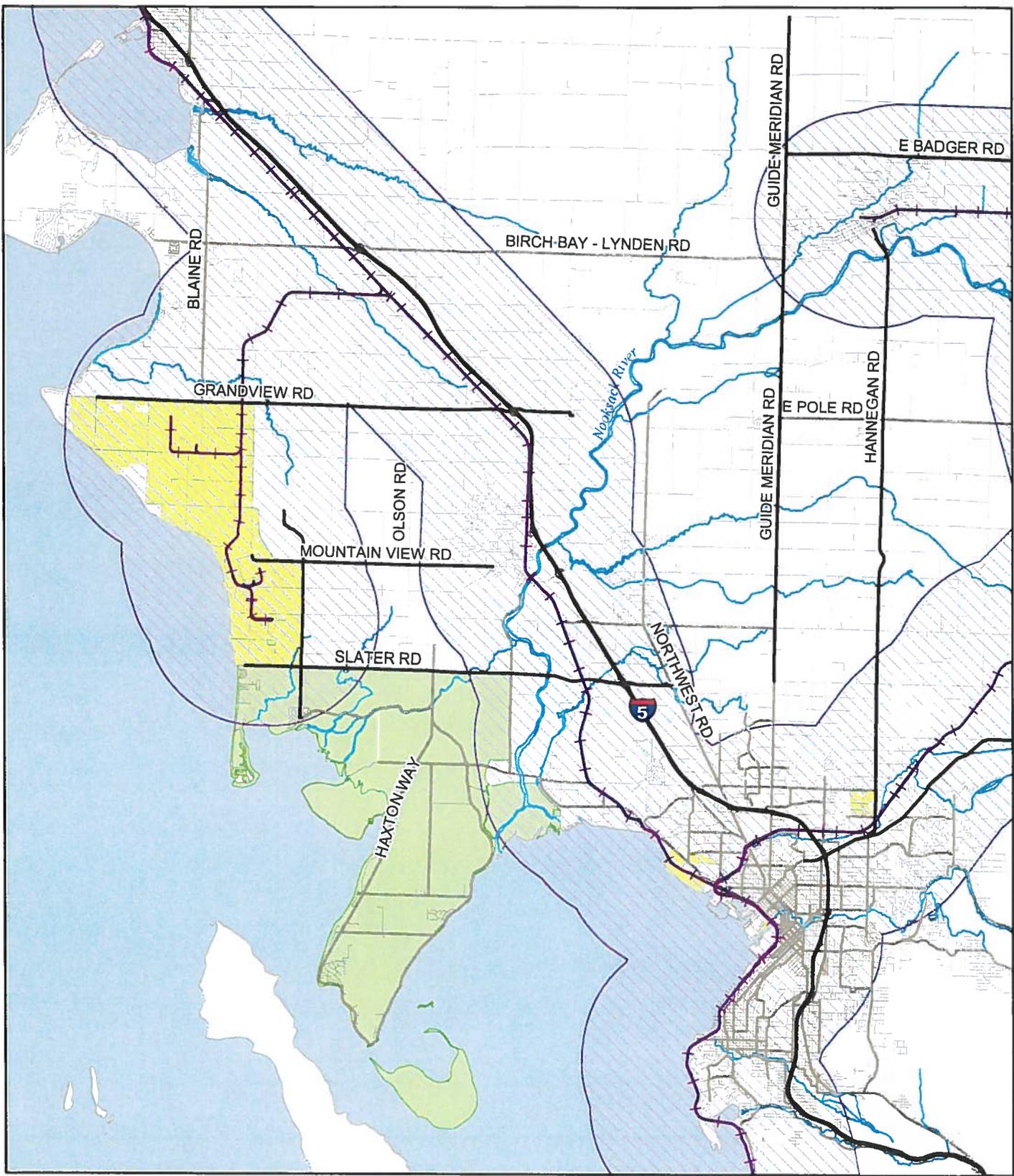
The overall order of reaction is 1 + 1 = 2. The rate equation is:

$$\text{Rate} = k[A]^1[B]^1$$

The rate constant,  $k$ , is 0.010 M s<sup>-1</sup> / (0.10 M × 0.10 M) = 1.0 M<sup>-1</sup> s<sup>-1</sup>.

The half-life of the reaction is 100 s.



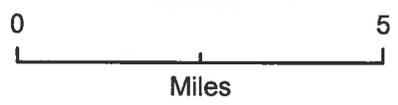


**Hazardous Materials Corridors  
for Railroads in the Reservation  
Area**

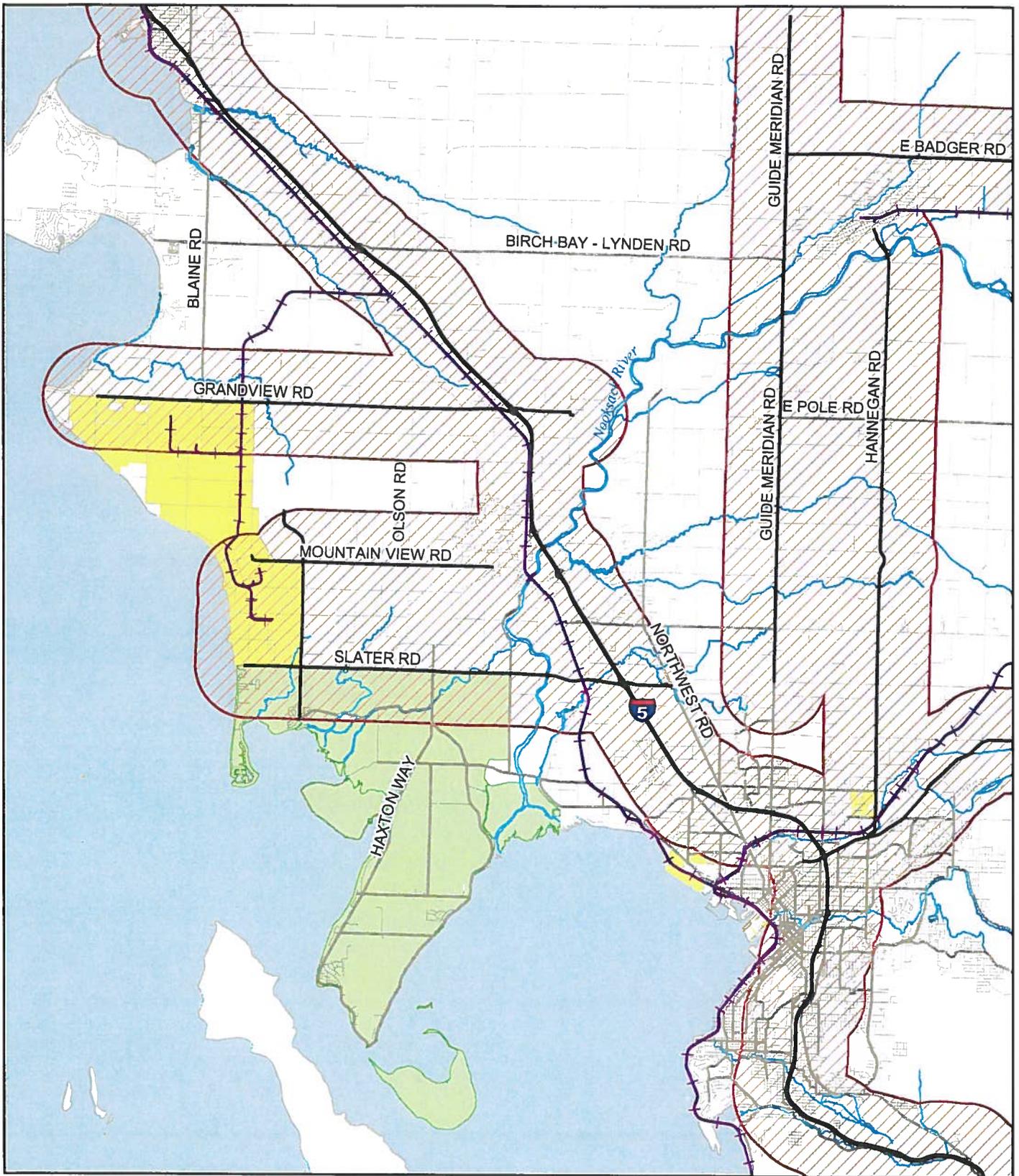
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**Legend**

- Major Arteries
- Interstate 5
- Major Roads
- Other Roads
- Railroads
- Streams
- ▨ 2-Mile Corridor
- Lummi Reservation
- Heavy Impact Industrial Zoning







### Hazardous Materials Corridors for Major Roads in the Reservation Area

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### Legend

- Major Arteries
- Interstate 5
- Major Roads
- Other Roads
- Railroads
- Streams
- ▨ 1-Mile Corridor
- Lummi Reservation
- Heavy Impact Industrial Zoning



Miles





1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for financial transparency and accountability. This section also outlines the various methods used to collect and analyze data, ensuring that the information is reliable and up-to-date.

2. The second part of the document focuses on the implementation of these practices. It provides a detailed overview of the systems and processes in place, highlighting the challenges faced and the solutions implemented. This section also includes a discussion on the role of technology in streamlining operations and improving efficiency.

3. The third part of the document addresses the future of the organization. It discusses the strategic goals and the steps being taken to achieve them. This section also includes a discussion on the importance of continuous improvement and the need to stay ahead of the competition.

4. The fourth part of the document provides a summary of the key findings and conclusions. It highlights the main points discussed throughout the document and provides a clear overview of the organization's current state and future prospects. This section also includes a list of recommendations for further action.

5. The final part of the document is a conclusion. It summarizes the main points and provides a clear overview of the organization's current state and future prospects. This section also includes a list of recommendations for further action.



**Calibration IS VERY IMPORTANT!** Do a calibration exercise to make sure that all teams are consistently using the same terminology and estimations.

**Units:** Use either metric (m, cm) or English (yd, ft, in). Circle the units used.

**Tide Height:** Circle the two letters indicating the progression of the tidal stage during the survey.

**Segment/Survey Length:** Always record both lengths on the first survey, especially where the SCAT team creates the segments in the field. On repeat surveys, always enter in the Survey Length, especially if only part of the segment is surveyed.

**Start/End GPS:** Use of decimal degrees is preferred, but be consistent among teams.

### SURFACE OILING CONDITIONS

**Zone ID:** Use a different ID for each different oil occurrence, e.g., two distinct bands of oil at mid-tide and high-tide levels, or alongshore where the oil distribution changes from 10 % to 50%. Describe each different occurrence on a separate line.

**Tidal Zone:** Use the codes to indicate the location of the oil being described, as in the lower (LI), mid (MI), or upper (UI) intertidal zone, or in the supra (SU) tidal zone (above the normal high tide level).

**Distribution:** Enter the estimated percent of oil on the surface, or codes for the following intervals:

C	Continuous	91-100% cover
B	Broken	51-90%
P	Patchy	11-50%
S	Sporadic	<1-10%
T	Trace	<1%

**Surface Oiling Descriptors - Thickness:** Use the following codes:

PO	Pooled Oil (fresh oil or mousse > 1 cm thick)
CV	Cover (oil or mousse from >0.1 cm to <1 cm on any surface)
CT	Coat (visible oil <0.1 cm, which can be scraped off with fingernail)
ST	Stain (visible oil, which cannot be scraped off with fingernail)
FL	Film (transparent or iridescent sheen or oily film)

**Surface Oiling Descriptors - Type**

FR	Fresh Oil (unweathered, liquid oil)
MS	Mousse (emulsified oil occurring over broad areas)
TB	Tarballs (discrete accumulations of oil <10 cm in diameter)
TC	Tar (highly weathered oil, of tarry, nearly solid consistency)
SR	Surface Oil Residue (non-cohesive, oiled surface sediments)
AP	Asphalt Pavements (cohesive, heavily oiled surface sediments)
No	No oil (no evidence of any type of oil)

### SUBSURFACE OILING CONDITIONS

**Oiled Interval:** Measure the depths (from the sediment surface) to top/bottom of subsurface oiled layer. Enter multiple oil layers on separate lines.

**Subsurface Oiling Descriptors:** Use the following codes:

OP	Oil-Filled Pores (pore spaces are completely filled with oil)
PP	Partially Filled Pores (the oil does not flow out of the sediments when disturbed)
OR	Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces)
OF	Oil Film (sediments are lightly oiled with an oil film, or stain on the clasts)
TR	Trace (discontinuous film or spots of oil, or an odor or tackiness)

**Sheen Color:** Describe sheen on the water table as brown (B), rainbow (R), silver (S), or none (N).

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SHORT SHORELINE ASSESSMENT FORM for \_\_\_\_\_ Spill Page \_\_ of \_\_

1. GENERAL INFORMATION		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height
Segment ID:				L/M/H
Segment Name:				hrs to

Survey By: Foot / Boat / Helicopter / Overlook / \_\_\_\_\_ Sun / Clouds / Fog / Rain / Snow / Windy

2. SURVEY TEAM No. ____	Name	Organization	Phone Number

3. SEGMENT Total Length \_\_\_\_ m/yd Length Surveyed \_\_\_\_ m/yd Differential GPS Yes/No  
 Start GPS: LAT \_\_\_\_ deg. \_\_\_\_ min LONG \_\_\_\_ deg. \_\_\_\_ min  
 End GPS: LAT \_\_\_\_ deg. \_\_\_\_ min LONG \_\_\_\_ deg. \_\_\_\_ min

4. SHORELINE TYPE	Select only ONE Primary (P) and ANY Secondary (S) types present	
Rocky Cliffs		Riprap
Exposed Man-made Structures		Exposed Tidal Flats
Wave-cut Platforms		Sheltered Rocky Shores
Fine-Medium grained Sand Beaches		Sheltered Man-made Structures
Coarse-grained Sand Beaches		Sheltered Tidal Flats
Mixed Sand and Gravel Beaches		Wetlands
Gravel Beaches		Other _____

5. OPERATIONAL FEATURES Oiled Debris? Yes / No Type \_\_\_\_\_ Amount \_\_\_\_\_ bags  
 Direct backshore access? Yes / No Access restrictions \_\_\_\_\_  
 Alongshore access from next segment? Yes / No Suitable backshore staging? Yes / No

Zone ID \_\_\_\_\_ Description of oil in: Supra / Upper / Mid / Lower Tidal Zone (circle oil location)

Oil Band Dimensions	Surface Oil Distribution	Surface Oil Thickness	Surface Oil Type	Subsurface Oil	
				Penetration	Burial
Width: ____ m/ft	<1%	Film	Fresh Oil	<1 cm / in	Clean Layer
	1-10%	Stain	Mousse/Tar	1-5 cm / in	____ cm / in
Length: ____ m/ft	11-50%	Coat	Tarballs/Patties	5-10 cm / in	Oiled Layer
	51-90%	Cover	Surface Oil Residue	>10 cm / in	
	91-100%	Pooled	Asphalt Pavement	____ cm / in	
	____%	____ cm / in	Other _____		

Zone ID \_\_\_\_\_ Description of oil in: Supra / Upper / Mid / Lower Tidal Zone (circle oil location)

Oil Band Dimensions	Surface Oil Distribution	Surface Oil Thickness	Surface Oil Type	Subsurface Oil	
				Penetration	Burial
Width: ____ m/ft	<1%	Film	Fresh Oil	<1 cm / in	Clean Layer
	1-10%	Stain	Mousse/Tar	1-5 cm / in	____ cm / in
Length: ____ m/ft	11-50%	Coat	Tarballs/Patties	5-10 cm / in	Oiled Layer
	51-90%	Cover	Surface Oil Residue	>10 cm / in	
	91-100%	Pooled	Asphalt Pavement	____ cm / in	
	____%	____ cm / in	Other _____		

8. COMMENTS Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Obs.

Sketch: Yes / No Photos: Yes / No (Roll# \_\_\_\_ Frames \_\_\_\_ ) Video Tape: Yes / No (Tape# \_\_\_\_ )

*[Faint, illegible text covering the majority of the page, likely bleed-through from the reverse side.]*



**Calibration IS VERY IMPORTANT!** Do a calibration exercise to make sure that all teams are consistently using the same terminology and estimations.

**Units:** Use either metric (m, cm) or English (yd, ft, in). Circle the units used.

**Tide Height:** Circle the two letters indicating the progression of the tidal stage during the survey.

**Segment/Survey Length:** Always record both lengths on the first survey, especially where the SCAT team creates the segments in the field. On repeat surveys, always enter in the Survey Length, especially if only part of the segment is surveyed.

**Start/End GPS:** Use of decimal degrees is preferred, but be consistent among teams.

**Shoreline Type:** Use a "P" to indicate the primary shoreline type for the entire segment or sub-segment being surveyed. Use an "S" to indicate the presence of other, secondary shoreline types. Provide more explanation in the Comments section, where necessary.

**Zone ID:** Use a different Zone ID for each different oil occurrence, e.g., two distinct bands of oil at mid-tide and high-tide levels, or alongshore where the oil distribution changes from 10% to 50%. Describe each different occurrence in a separate block. Use as many blocks (and sheets) as needed for each segment.

**Tidal Zone:** Circle the location of the oil being described in the block, as being in the lower, mid, or upper intertidal zone, or in the supra-tidal zone (above the normal high tide level).

**Surface Oil Distribution:** Enter the estimated percent of oil on the surface, or circle the intervals.

**Surface Oiling Thickness:** Use the following terms:

- Film (transparent or iridescent sheen or oily film)
- Stain (visible oil, which cannot be scraped off with fingernail)
- Coat (visible oil <0.1 cm, which can be scraped off with fingernail)
- Cover (oil or mousse from >0.1 cm to <1 cm on any surface)
- Pooled Oil (fresh oil or mousse > 1 cm thick)

**Surface Oiling Type:** Use the following terms:

- Fresh Oil (unweathered, liquid oil)
- Mousse (emulsified oil occurring over broad areas)
- Tar (highly weathered oil, of tarry, nearly solid consistency)
- Tarballs (discrete accumulations of oil <10 cm in diameter)
- Patties (discrete accumulations of oil >10 cm in diameter)
- Surface Oil Residue (non-cohesive, oiled surface sediments)
- Asphalt Pavements (cohesive, heavily oiled surface sediments)
- No Oil (no evidence of any type of oil)

**Subsurface Oil Penetration:** Circle the average depth of oil penetration from the surface, in either cm or inches, as measured in trenches dug into the sediment throughout the zone being described.

**Subsurface Oil Burial:** Use this column when there is a clean layer of sediment overlying an oiled layer.

**Subsurface Oiling Descriptors:** In the Comments Section, use the following terminology to describe the degree of oiling of subsurface sediments:

- Oil-Filled Pores (pore spaces are completely filled with oil)
- Partially Filled Pores (the oil does not flow out of the sediments when disturbed)
- Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces)
- Oil Film (sediments are lightly oiled with an oil film, or stain on the clasts)
- Trace (discontinuous film or spots of oil, or an odor or tackiness)

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<b>1. GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height
Segment ID: _____				L/M/H
Segment Name: _____				hrs to

Survey By: Foot / Boat / Helicopter / Overlook / \_\_\_\_\_ Sun / Clouds / Fog / Rain / Snow / Windy

<b>2. SURVEY TEAM</b> No. _____	Name _____	Organization _____	Phone Number _____

**3. SEGMENT** Total Length \_\_\_\_\_ m/yd Length Surveyed \_\_\_\_\_ m/yd Differential GPS Yes/No

Start GPS: LAT \_\_\_\_\_ deg. \_\_\_\_\_ min LONG \_\_\_\_\_ deg. \_\_\_\_\_ min

End GPS: LAT \_\_\_\_\_ deg. \_\_\_\_\_ min LONG \_\_\_\_\_ deg. \_\_\_\_\_ min

**4. WETLAND CHARACTER** Physical Setting: \_\_\_\_\_

Wetland Type: Salt Marsh / Fresh Marsh / Mangrove / Hardwood Bottomland / Other \_\_\_\_\_

Dominant Vegetation Type/Species: \_\_\_\_\_

**5. OPERATIONAL FEATURES** Oiled Debris? Yes / No Type \_\_\_\_\_ Amount \_\_\_\_\_ bags

Direct backshore access? Yes / No Alongshore access from next segment? Yes / No Access only via boat? Yes / No

Suitable back- or alongshore staging? Yes / No Can substrate support foot traffic? Yes / No

Access restrictions: \_\_\_\_\_

**6. SURFACE OILING CONDITIONS** Enter oil on substrate vs vegetation on different lines, using S or V after the Zone ID (e.g., AS for sediment, AV for vegetation). Indicate each on the cross-section below.

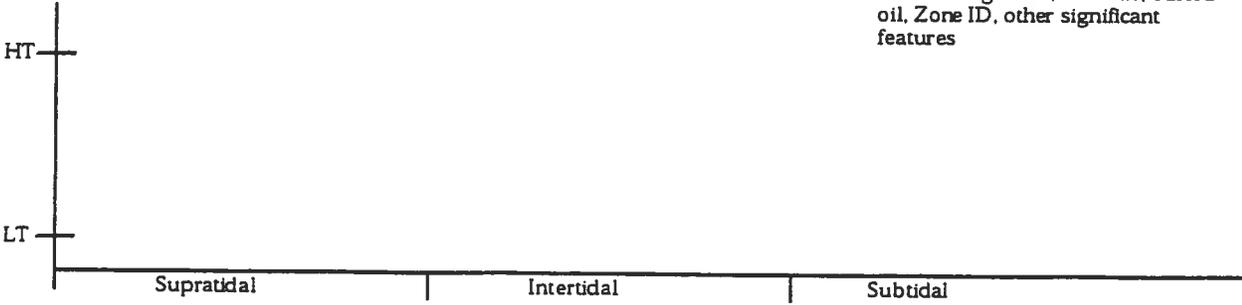
Zone ID	Tidal Zone				Oil Cover			Oil Thickness					Oil Character					Oil on Plants (e.g. all, trunks, stems, leaves)				
					Length	Width	Distri.															
	LI	MI	UI	SU	m/ft	m/ft	%	PO	CV	CT	ST	FL	FR	MS	TB	TC	SR		AP	No		

**7. SUBSURFACE OILING CONDITIONS** Describe in Comments Section and indicate on the cross-section below.

**8. COMMENTS** Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations.

Sketch: Yes / No      Photos: Yes / No (Roll# \_\_\_\_\_ Frames \_\_\_\_\_)      Video Tape: Yes / No (Tape# \_\_\_\_\_)

**CROSS-SECTION SKETCH**





**Calibration IS VERY IMPORTANT!** Do a calibration exercise to make sure that all teams are consistently using the same terminology and estimations.

**Units:** Use either metric (m, cm) or English (yd, ft, in). Circle the units used.

**Tide Height:** Circle the two letters indicating the progression of the tidal stage during the survey.

**Segment/Survey Length:** Always record both lengths on the first survey, esp. where the SCAT team creates the segments in the field. On repeat surveys, always enter in the Survey Length, esp. if only part of the segment is surveyed. Make a sketch when dealing with irregular wetland shapes.

**Start/End GPS:** Use of decimal degrees is preferred, but be consistent among teams.

### SURFACE OILING CONDITIONS

**Zone ID:** Use a different ID for each different oil occurrence and differentiate between oil on the substrate (S) and vegetation (V). Describe each different occurrence on a separate line.

**Tidal Zone:** Use the codes to indicate the location of the oil being described, as in the lower (LI), mid (MI), or upper (UI) intertidal zone, or in the supra (SU) tidal zone (above the normal high tide level).

**Distribution:** Enter the estimated percent of oil on the surface, or codes for the following intervals:

C	Continuous	91-100% cover
B	Broken	51-90%
P	Patchy	11-50%
S	Sporadic	<1-10%
T	Trace	<1%

**Surface Oiling Descriptors - Thickness:** Use the following codes:

PO	Pooled Oil (fresh oil or mousse > 1 cm thick)
CV	Cover (oil or mousse from >0.1 cm to <1 cm on any surface)
CT	Coat (visible oil <0.1 cm, which can be scrapped off with fingernail)
ST	Stain (visible oil, which cannot be scrapped off with fingernail)
FL	Film (transparent or iridescent sheen or oily film)

### Surface Oiling Descriptors - Type

FR	Fresh Oil (unweathered, liquid oil)
MS	Mousse (emulsified oil occurring over broad areas)
TB	Tarballs (discrete accumulations of oil <10 cm in diameter)
TC	Tar (highly weathered oil, of tarry, nearly solid consistency)
SR	Surface Oil Residue (non-cohesive, oiled surface sediments)
AP	Asphalt Pavements (cohesive, heavily oiled surface sediments)
No	No oil present in Zone ID

**Oil on Plants:** Describe what part of the vegetation is oiled. Terms will vary depending on vegetation type (e.g., stems for marshes, trunks for trees).

### Subsurface Oil Conditions

Describe in Comments Section 8, using the following terminology and codes:

OP	Oil-Filled Pores (pore spaces are completely filled with oil)
PP	Partially Filled Pores (the oil does not flow out of the sediments when disturbed)
OR	Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces)
OF	Oil Film (sediments are lightly oiled with an oil film, or stain on the clasts)
TR	Trace (discontinuous film or spots of oil, or an odor or tackiness)

**Cross-Section Sketch:** Draw entire intertidal and supra-tidal zone, showing the oil relative to normal high tide (important to determine re-mobilization and potential for natural removal).

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TARBALL SHORELINE ASSESSMENT FORM for \_\_\_\_\_ Spill Page \_\_\_ of \_\_\_

1. GENERAL INFORMATION		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height
Segment ID:			hrs to hrs	L/M/H
Segment Name:				H/M/L
Survey By: Foot / Boat / Helicopter / Overlook / _____			Sun / Clouds / Fog / Rain / Snow / Windy	
2. SURVEY TEAM No. ___	Name	Organization	Phone Number	
3. SEGMENT	Description of Shoreline Surveyed:			
Total Length: _____ m/yd Length Surveyed: _____ m/yd Differential GPS? Yes / No				
Start GPS: LAT _____ deg. _____ min LONG _____ deg. _____ min				
End GPS: LAT _____ deg. _____ min LONG _____ deg. _____ min				
4. SHORELINE TYPE	Select only ONE Primary (P) and ANY Secondary (S) types present			
	Rocky Cliffs		Riprap	
	Exposed Man-made Structures		Exposed Tidal Flats	
	Wave-cut Platforms		Sheltered Rocky Shores	
	Fine-Medium grained Sand Beaches		Sheltered Man-made Structures	
	Coarse-grained Sand Beaches		Sheltered Tidal Flats	
	Mixed Sand and Gravel Beaches		Wetlands	
	Gravel Beaches		Other _____	
5. TARBALL DESCRIPTION	AREA 1	AREA 2	AREA 3	
Tar Balls Observed?	Yes / No	Yes / No	Yes/No	
Oiled Debris Observed? (Describe below)	Yes / No	Yes / No	Yes/No	
Tidal Zone	LI / MI / UI / SU	LI / MI / UI / SU	LI / MI / UI / SU	
Where the area of tarballs is located				
Length				
Approximate alongshore length of shore in which tarballs/oiled debris are observed	m/yd	m/yd	m/yd	
Width				
Across-shore width of the band on the shore in which tarballs/oiled debris are observed	m/yd	m/yd	m/yd	
Average Number of Tar Balls within Area (e.g., 2/yd <sup>2</sup> within band; 3 per 100 yds along-shore; 6 total within area, etc.) Be specific.				
Average Size of Tar Balls	cm/in	cm/in	cm/in	
Size of Largest Tar Ball	cm/in	cm/in	cm/in	
Type of Tar Balls	Weathered/Fresh Sticky? Yes/No	Weathered/Fresh Sticky? Yes/No	Weathered/Fresh Sticky? Yes/No	
Tar Balls Collected?	Yes / No	Yes / No	Yes / No	
6. COMMENTS	Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Obs.			
Sketch: Yes / No    Photos: Yes / No (Roll# _____ Frames _____)    Video Tape: Yes / No (Tape# _____)				



## TARBALL SHORELINE ASSESSMENT FORM EXPLANATIONS

August 2000

**Calibration IS VERY IMPORTANT!** Do a calibration exercise to make sure that all teams are consistently using the same terminology and estimations.

**Tide Height:** Circle the two letters indicating the progression of the tidal stage during the survey.

**Description of Shoreline Surveyed:** Fill in this field when only part of a segment is surveyed. Be as specific as possible (e.g., from Berry Creek to 1 mile north).

**Total/Surveyed Length:** Always record both lengths on the first survey, especially where the SCAT team creates the segments in the field. On repeat surveys, always enter in the Length Surveyed, especially if only part of the segment is surveyed.

**Start/End GPS:** Use of decimal degrees is preferred, but be consistent among teams.

**Shoreline Type:** Use a "P" to indicate the primary shoreline type for the entire segment or sub-segment being surveyed. Use an "S" to indicate the presence of other, secondary shoreline types. Provide more explanation in the Comments section, where necessary.

### TARBALL DESCRIPTION

This section is divided into "Areas". Use a different Area to describe changes in: presence/absence, size, or concentration of tar balls.

**Tar Balls Observed?** It is important to indicate if no tar balls are observed.

**Oiled Debris Observed?** If yes, describe type, location, and degree oiling for oiled debris under Comments. Use the following descriptors for type:

wrack	unattached vegetation that can be important feeding areas for shorebirds
logs	large pieces of wood that can not be readily removed by hand
trash	man-made materials (e.g., plastic, glass, paper) that can be removed by hand
sorbents	sorbent pads, rolls, boom, etc. used during the spill response
peat	degraded organic material that has been eroded; includes coffee grounds

**Tidal Zone:** Check off the location of the area of tarballs being described, as in the lower (LI), mid (MI), upper (UI), or supra (SU) tidal zone.

**Length and Width:** Enter the dimensions where tar balls of uniform average size and density are observed. If no tar balls are observed, enter the dimensions of the area surveyed. Also, indicate the location of the tar balls as being in the lower (LITZ), mid (MITZ), or upper (UITZ) intertidal zone, or in the supra-tidal (SUPRA) zone (above the normal high tide level).

**Average Number of Tar Balls within Area:** Enter the estimate of the number of tar balls in the surveyed area. Options include:

- Total number - use where so few tar balls are present that they can be readily counted
- Concentration - enter as an average, range, or max per unit area (e.g., 1-2/yd<sup>2</sup>, 3-5 max)

**Average Size of Tar Balls:** Visually estimate the most common or frequent size of tar balls in the surveyed area. Enter a range if tar ball sizes are not uniform. Indicate units by circling.

**Tar Balls Collected?** Provide details in the Comments Section. Indicate if all or only part of the observed tar balls were collected. Indicate units by circling.

*[The text in this block is extremely faint and illegible. It appears to be a multi-paragraph document, possibly a letter or a report, with several lines of text per paragraph. The content is not discernible.]*



## Introduction

When oil contaminates shoreline habitats, responders must survey the affected areas to determine how to respond appropriately.

Though you may have laid the groundwork for shoreline cleanup during planning stages by developing general approvals or decision tools for choosing cleanup methods, you must base your specific cleanup recommendations on field data that you and your colleagues collect by conducting a shoreline assessment. To perform an assessment, you survey the affected shoreline, segment by segment, to collect information about the shoreline habitats, type and degree of shoreline contamination, and spill-specific physical processes.

A shoreline assessment program is

- a systematic approach that uses standard terminology to collect data on shoreline oiling conditions and support decision-making for shoreline cleanup.
- flexible in terms of the scale of the survey and detail of the data sets collected.
- multi-agency, including trained representatives from all interested parties who have authority to make decisions.

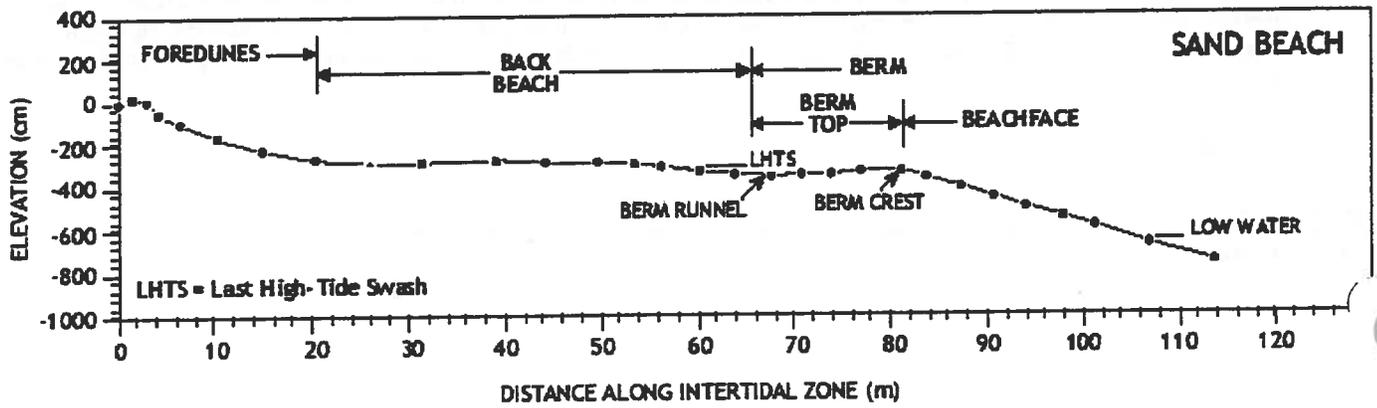
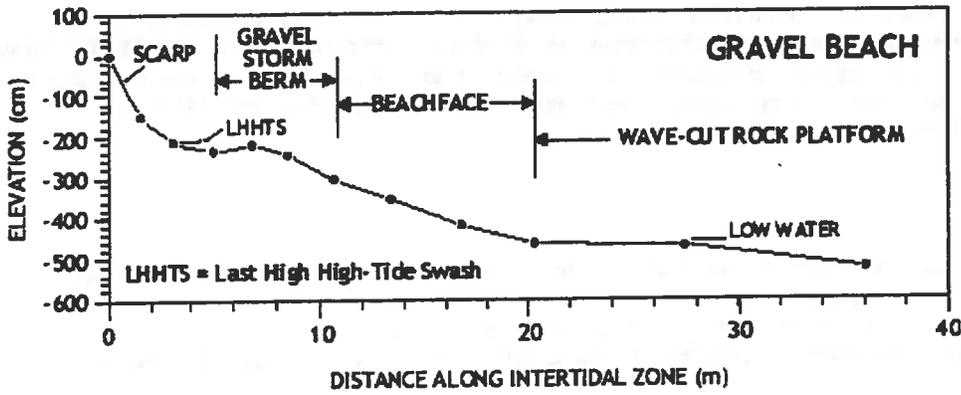
At a spill, it is important to "calibrate" your shoreline assessment by having all team members visit a shoreline segment together and agree on how the oiling descriptors will be applied for that specific spill when used with the Shoreline Assessment Manual. Use this job aid as a tool for calibrating your shoreline assessment and promoting consistency among teams.

◀ [Job Aid Index](#)

Revised: July 18, 2001  
Office of Response and Restoration, National Ocean Service, National Oceanic and Atmospheric Administration  
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## Beach Profiles

Here are profiles of typical gravel and sand beaches. Beach features are labeled with the terms you'd use to perform a shoreline assessment.



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### Percent Coverage Charts

The charts below are aids for estimating the percent oil coverage on a section of oiled shoreline you are observing. On both charts, black areas represent oil. Because it's difficult to precisely estimate oil coverage, you'll probably find it sufficient to identify the percent coverage in terms of the four ranges shown below: "Sporadic," "Patchy," "Broken," or "Continuous." Use the top chart on this page to estimate percent coverage in areas where oil deposits have formed as bands; use the lower chart for discrete oil deposits such as tarballs.

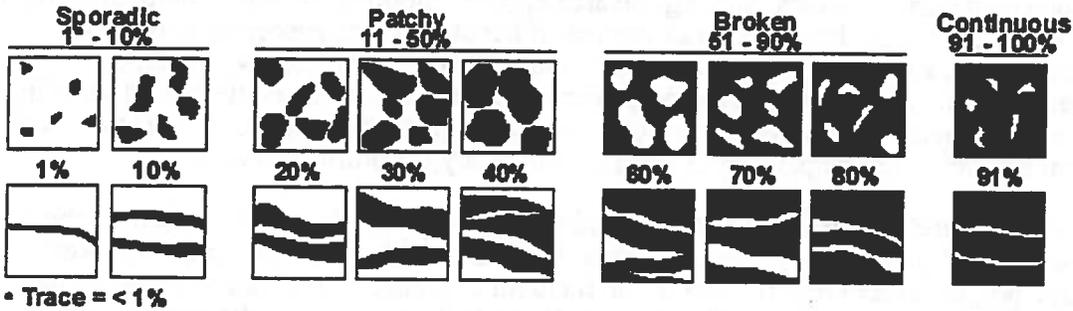
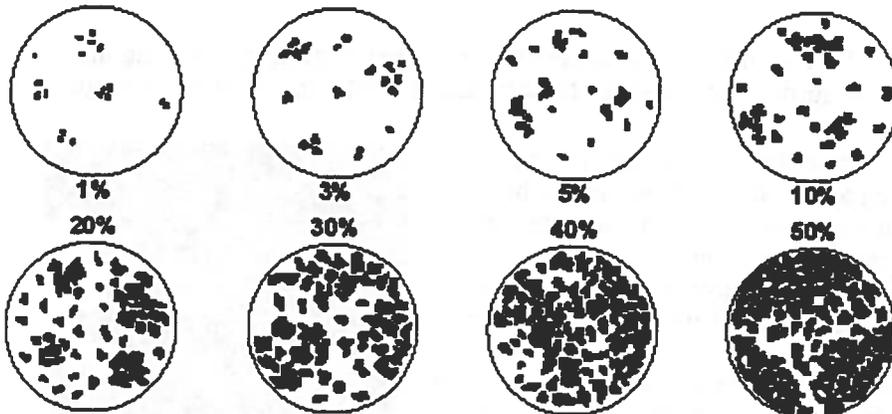


Chart source: Owens, E.H., and G.A. Sergy. Field Guide to the Documentation and Description of Oiled Shorelines. Environment Canada, Edmonton, Alberta, Canada. March 1994. ISBN 0-662-22048-X.



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[NOAA HAZMAT](#) | [Oil Spill Aids](#) | [Oil ID Job Aid](#) | [Intro](#)

## Introduction

**When oil enters the water** from a source, such as a vessel, pipeline, or facility, it initially spreads out and forms a continuous or cohesive patch on the water surface. This layer or patch of oil absorbs energy and dampens out surface waves, making the area appear smoother or "slick" compared with the surrounding water. As the oil layer becomes thinner, it becomes more susceptible to being broken up by wave, wind, and current movement into smaller patches and narrow bands, or "windrows," oriented in the direction of the wind or current. Light oils, such as diesel and gasoline, may evaporate and disappear completely. Heavy oils, such as bunker fuels and crude oil, eventually spread out to form smaller, discrete patches or streaks, ultimately becoming tarballs.

The **color, distribution, and consistency** of the oil indicate the type of oil spilled, how long the oil has been on the water, and how readily it can be contained and/or recovered. You may be asked to observe these three properties and report them to the Incident Command. This aid is designed to help you characterize the oil and describe what you see in standard terms. The observations on which you should concentrate are the on-scene weather, the location of the spill, and the color and distribution of the oil. In addition, you might be requested to report other observations pertaining to the response that you notice while on-scene (e.g., the location of response equipment or the presence of wildlife).

**Your choice of platform** from which to make your observations--a helicopter, fixed-wing aircraft, or vessel--will be determined by a number of different factors. Each platform offers advantages and disadvantages:

- **Aircraft**, whether helicopters or fixed-wing, allow you a greater overview of the area affected by an oil spill. They allow you to reach the scene sooner and to investigate the outer edges of the area affected by a large spill.
- A **helicopter** can generally fly more slowly and at a lower altitude than can fixed-wing aircraft, allowing you a closer view of the spill.
- On the other hand, a **vessel** affords you an even closer look at the oil itself, giving you a better sense of its thickness and consistency. Taking a close look from a vessel also allows you to determine whether the reported spill is actually oil or a natural phenomenon that resembles an oil spill. Spawning herring, algae blooms, and jellyfish are often mistaken for oil. Finally, from a vessel you are likely to be able to spot tarballs that have formed during a spill. Tarballs are often not visible from aircraft.



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### ◀ [Job Aid Index](#)

[Introduction](#) | [Photo Index](#) | [Chart](#) | [Checklist](#) | [Examples](#) | [Glossary](#)

Revised: January 30, 1998  
 Hazardous Materials Response and Assessment Division, National Oceanic and Atmospheric Administration  
[webmaster@hazmat.noaa.gov](mailto:webmaster@hazmat.noaa.gov)

<http://response.restoration.noaa.gov/order/order.html>

7/3/98 3:38 PM

NOAA HAZMAT | [Oil Spill Aids](#) | [Oil ID Job Aid](#) | [Checklist](#)

# Oil Spill Observation Checklist

Record your observations of spilled oil either in a notebook or directly on a chart of the area under observation. Here is a checklist for organizing your observations.

## General Information

<input type="checkbox"/> Date	<input type="checkbox"/> Stage of tide (flood, ebb, slack)
<input type="checkbox"/> Time	<input type="checkbox"/> On-scene weather (wind, sea state, visibility)
<input type="checkbox"/> Case name	<input type="checkbox"/> Platform (helicopter, fixed-wing aircraft, boat)
<input type="checkbox"/> Observers' names	<input type="checkbox"/> Flight path/trackline
<input type="checkbox"/> Observers' affiliations	<input type="checkbox"/> Altitude where observations taken
<input type="checkbox"/> Location of oil's source (if known)	<input type="checkbox"/> Areas not observed (e.g., foggy locations, restricted air spaces, shallow water areas)

**Note:** When following a flight path or trackline, travel beyond known impacted areas to check for oil beyond these areas and to minimize the number of observations made while facing into the sun.

**Note:** Include the name and phone number of the person making the observations.

## Oil Observations

Slick location(s)

Slick dimension(s)

Orientation of slick(s)

Distribution of oil (e.g., as windrows, streamers, pancakes, or patches)

Color and appearance (e.g., rainbow, dull or silver sheen, black, or brown in color, or mousse)

Percent coverage (see Percentage Coverage Chart)

Is oil recoverable (Y/N)? (examples of recoverable oil types include black oil, mousse, and heavy dull- or dark-colored sheens)

**Note:** Clearly describe the locations where oil is observed, as well as the areas where no oil has been seen.

## Other Observations

### Response Operations...

Skimmer deployment (general locations where skimmers are working. Are they working in the heaviest concentrations of oil?)

Boom deployment (general locations of boom(s). Does the boom contain oil? Is oil entraining under the boom?)

\_\_\_ Source of oil (describe the status of the source. Is oil still being released?)

**Environmental observations...**

\_\_\_ Locations of convergence lines, rip tides, and sediment plumes

\_\_\_ Locations of kelp beds, seagrass beds, and other features that could be mistaken for oil

\_\_\_ Wildlife present in area (locations and approximate numbers of birds and marine mammals)

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Revised: January 30, 1998

Hazardous Materials Response and Assessment Division, National Oceanic and Atmospheric Administration

[webmaster@hazmat.noaa.gov](mailto:webmaster@hazmat.noaa.gov)

[NOAA HAZMAT](#) | [Oil Spill Aids](#) | [Oil ID Job Aid](#) | [Glossary](#)

# Glossary of Standard Oil Spill Observation Terms

## **Black oil**

A black or very dark brown layer of oil. Depending on the quantity spilled, oil tends to quickly spread out over the water surface to a thickness of about 1 millimeter (0.04 inches). However, from the air, it is impossible to tell how thick a black oil layer is.

## **Convergence line**

A line on the water surface where floating objects and oil collect. A convergence can be the interface between two different types or bodies of water, or it can be caused by a significant depth change, tidal changes, or other common phenomena. Convergences are common in the marine environment.

## **Dispersion**

The breaking up of an oil slick into small droplets that are mixed into the water column by breaking waves and other sea surface turbulence.

## **Emulsification**

The formation of a water-in-oil mixture. Different oils exhibit different tendencies to emulsify, and emulsification is more likely to occur under high energy conditions (strong winds and waves). An emulsified mixture of water in oil is commonly called "mousse"; its presence indicates a spill that has been on the water for some time. See also **mousse**.

## **Entrainment**

The loss of oil from containment when it is pulled under a boom by a strong current. Entrainment typically occurs from booms deployed perpendicular to currents greater than 1 knot (0.5 meter per second).

## **Mousse**

An emulsified mixture of water in oil. Mousse can range in color from dark brown to nearly red or tan, and typically has a thickened or pudding-like consistency compared with fresh oil. Incorporation of up to 75 percent water into the oil will cause the apparent volume of a given quantity of oil to increase by up to four times. See also **emulsification**.

## **Pancakes**

Isolated, roughly circular patches of oil ranging in size from a few feet across to hundreds of yards (or meters) in diameter. Sheen may or may not also be present.

## **Recoverable oil**

Oil in a thick enough layer on the water to be recovered by conventional techniques and equipment. Only black or dark brown oil, mousse, and heavy sheens (which are dull brown in color) are generally considered to be thick enough to be effectively recovered by skimmers.

## **Sheen**

A very thin layer of oil (less than 0.0001 inches or 0.003 millimeters in thickness) floating on the water surface. Sheen is the most commonly-observed form of oil during the later stages of a spill. Depending on thickness, sheens range in color from dull brown for the thickest sheens to rainbows, grays, silvers, and near-transparency in the case of the thinnest sheens.

**Slick**

Oil spilled on the water, which absorbs energy and dampens out surface waves, making the oil appear smoother--or slicker--than the surrounding water.

**Streamers**

A narrow line of oil, mousse, or sheen on the water surface, surrounded on both sides by clean water. Streamers result from the combined effects of wind, currents, and/or natural convergence zones. Often, heavier concentrations of mousse or sheen will be present in the center of a streamer, with progressively lighter sheen along the edges. Streamers are also often called "fingers" or "ribbons."

**Tarballs**

Weathered oil that has formed pliable balls or patches that float on the water. Tarballs can range in diameter from a few millimeters (much less than an inch) to a foot (0.3 meters). Depending on how weathered, or hardened, the outer layer of the tarball is, sheen may or may not be present.

**Weathering**

A combination of physical and environmental processes, such as evaporation, dissolution, dispersion, and emulsification, which act on spilled oil to change its physical properties and composition.

**Windrows**

Streaks of oil that line up in the direction of the wind. Windrows typically form early during a spill when the wind speed is at least 10 knots (5.1 meters per second). Sheen is the form of spilled oil that most frequently windrows.

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**Job Aid Index**

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Revised: January 30, 1998

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# Northwest Area Shoreline Countermeasures Manual and Matrices

February 1995  
Northwest Area Committee

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# Introduction

Shoreline countermeasures following an oil spill are a critical element in determining the ultimate environmental impact and cost resulting from a spill. As with most aspects of spill response, careful planning can significantly increase the effectiveness of treatment operations. Local response organizations need to develop mechanisms for identifying shorelines requiring treatment, establishing treatment priorities, monitoring the effectiveness and impacts of treatment, and for identifying and resolving problems as the treatment progresses.

The National Oceanic and Atmospheric Administration (NOAA) developed this manual as a tool for shoreline countermeasure planning and response by Regional Response Teams, Area Planning Committees, and State response agencies. The manual is presented as a template that can be tailored for each region or area.

Each section of the manual should be adapted to the specific environments, priorities, and treatment methods appropriate to the planning area. These elements provide the information needed to select cleanup methods for specific combinations of shoreline and oil types. Adapting and completing the template creates a better manual that meets the specific needs of the area. At a minimum, the shoreline environments and special resources need to be revised to reflect those found in the area of concern. Local information on shoreline types (discussed in Chapter 2) can be obtained from Environmental Sensitivity Index (ESI) atlases prepared by NOAA for most of the U.S. shorelines, including the Great Lakes. These atlases describe the shoreline types in each area; these descriptions can be used to replace those included in this template, if appropriate. The section on Special Considerations only lists those resource issues that are potentially of concern. Each region or area should identify those issues of greatest concern and provide guidance on how to best minimize impacts from oil spills. More importantly, the pre-spill process of adapting this manual should allow response agencies the opportunity to discuss and resolve shoreline treatment issues prior to a spill emergency. This tool also outlines a process of documenting and recommending cleanup options for a section of a shoreline after it has been oiled.

## Shoreline Countermeasures Matrix

### Very Light Oil (Jet fuels, Gasoline)

- Highly volatile (should all evaporate within 1-2 days)
- High concentration of toxic (soluble) compounds
- Result: Localized, severe impacts to water column and intertidal resources
- Duration of impact is a function of the resource recovery rate
- No dispersion necessary

### SHORELINE TYPES CODES

1 - Exposed rock shores and vertical, hard man-made structure (e.g. seawalls) 2 - Exposed wave-cut platforms 3 - Fine to medium grained sand beaches & steep unvegetated river banks 4 - Course grained sand beaches 5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material 6A - Gravel beaches - pebbles to cobble	6B - Gravel beaches - cobbles to boulders 6C - Exposed rip rap 7 - Exposed tidal flat 8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, 8B - Sheltered rubble slope 9A - Sheltered sand and mud flats 9B - Sheltered vegetated low bank 10 - Marshes
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### SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
<b>CONVENTIONAL METHODS</b>														
No action	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Manual removal of oil														
Passive collection of oil			C	C	C	C	C	C						
Oiled debris removal	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal														
Ambient water flooding (Deluge)														C
Amb water flush <50 psi														
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil														
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement														
Cutting oiled vegetation														
<b>ALTERNATIVE METHODS*</b>														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement														
Microbial addition														

- R Recommend - May be Preferred Alternative  
 C Conditional (Refer to NW Shoreline Countermeasures Manual)  
 Shaded areas are Not Applicable or Not Generally Recommended  
 \* Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

## Shoreline Countermeasures Matrix

### Light Oil (Diesel, No 2 Fuel Oils, Light Crudes)

- Moderately volatile; will leave residue (up to 1/3 of spilled amount)
- Moderate concentrations of toxic (soluble) compounds
- Long-term contamination of intertidal resources possible
- Potential for subtidal impacts (dissolution, mixing, sorption onto suspended sediments)
- No dispersion necessary
- Cleanup can be very effective

### SHORELINE TYPES CODES

1 - Exposed rock shores and vertical, hard man-made structure (e.g. seawalls) 2 - Exposed wave-cut platforms 3 - Fine to medium grained sand beaches & steep unvegetated river banks 4 - Course grained sand beaches 5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material 6A - Gravel beaches - pebbles to cobble	6B - Gravel beaches - cobbles to boulders 6C - Exposed rip rap 7 - Exposed tidal flat 8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads) 8B - Sheltered rubble slope 9A - Sheltered sand and mud flats 9B - Sheltered vegetated low bank 10 - Marshes
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### SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
<b>CONVENTIONAL METHODS</b>														
No action	R	R	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil			C	C	C	C	C	C		R	R		C	
Passive collection of oil	C	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	C	R	R	R	R	R	R	C	R	R	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C								
Ambient water flooding (Deluge)			C	C	C	R	R	R			C			C
Amb water flush <50 psi		C			C	C	C	C		R	C			C
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil							C	C						C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C									
Cutting oiled vegetation							C	C		C	C		C	C
<b>ALTERNATIVE METHODS*</b>														
In-situ burning of shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

- R Recommend - May be Preferred Alternative  
 C Conditional (Refer to NW Shoreline Countermeasures Manual)  
 Shaded areas are Not Applicable or Not Generally Recommended  
 \* Follow approved process defined in NCP and NW Area Plan

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## Shoreline Countermeasures Matrix

### Medium Oil (Most Crude Oils & Some Heavily Weathered Light Crudes)

- About 1/3 will evaporate within 24 hours
- Maximum water-soluble fraction is 10-100ppm
- Oil contamination of intertidal areas can be severe and long-term
- Impact to waterfowl and fur-bearing mammals can be severe
- Chemical dispersion is an option within 1-2 days
- Cleanup most effective if conducted quickly

#### SHORELINE TYPES CODES

1 - Exposed rock shores and vertical, hard man-made structure (e.g. seawalls) 2 - Exposed wave-cut platforms 3 - Fine to medium grained sand beaches & steep unvegetated river banks 4 - Course grained sand beaches 5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material 6A - Gravel beaches - pebbles to cobble	6B - Gravel beaches - cobbles to boulders 6C - Exposed rip rap 7 - Exposed tidal flat 8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads) 8B - Sheltered rubble slope 9A - Sheltered sand and mud flats 9B - Sheltered vegetated low bank 10 - Marshes
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#### SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
<b>CONVENTIONAL METHODS</b>														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	R	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C							C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		R	R		C	C
Amb water flush <100 psi	C	C					C	C		C				
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	R	R		C	R	R		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C			C			
Cutting oiled vegetation							C	C		C	C		C	C
<b>ALTERNATIVE METHODS*</b>														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C			C			C
Microbial addition														

- R Recommend - May be Preferred Alternative  
 C Conditional (Refer to NW Shoreline Countermeasures Manual)  
 Shaded areas are Not Applicable or Not Generally Recommended  
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## Shoreline Countermeasures Matrix

**Heavy Oil (Heavy Crude Oils, Intermediate Fuel Oils, Bunker C & Heavily Weathered Medium Crudes)**

- Heavy oils with little or no evaporation or dissolution
- Water-soluble fraction likely to be <10ppm
- Heavy contamination of intertidal areas likely
- Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion)
- Long-term contamination to sediments possible
- Weathers very slowly
- Dispersion seldom effective
- Shoreline cleanup difficult under all conditions

### SHORELINE TYPES CODES

1 - Exposed rock shores and vertical, hard man-made structure (e.g. seawalls) 2 - Exposed wave-cut platforms 3 - Fine to medium grained sand beaches & steep unvegetated river banks 4 - Course grained sand beaches 5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material 6A - Gravel beaches - pebbles to cobble	6B - Gravel beaches - cobbles to boulders 6C - Exposed rip rap 7 - Exposed tidal flat 8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads) 8B - Sheltered rubble slope 9A - Sheltered sand and mud flats 9B - Sheltered vegetated low bank 10 - Marshes
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### SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
<b>CONVENTIONAL METHODS</b>														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C		C					C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		C	C		C	C
Amb water flush <100 psi	C	C					C	C		C	C			
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	C	C	C	C	C	C		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C						
Cutting oiled vegetation							C	C		C	C		C	C
<b>ALTERNATIVE METHODS*</b>														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

- R Recommend - May be Preferred Alternative  
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# **1 Shoreline Evaluation and Mapping**

## **STILL TO BE DEVELOPED:**

### **Objectives:**

- 1. Assess the need for shoreline cleanup.**
- 2. Select the most appropriate cleanup method**
- 3. Determine priorities for shoreline cleanup.**
- 4. Document the spatial oil distribution over time.**
- 5. Internally consistent historical record of shoreline oil distribution.**

### **A. Shoreline Evaluation Process**

### **B. Guidelines for Shoreline Surveys**

- 1. Joint participation in ground surveys**
- 2. Selecting and Naming Segments**
- 3. Shoreline Survey Evaluation Forms with accepted common shoreline oiling terminology**

## 2 Shoreline Types and Sensitive Resources

The type of shoreline, degree of exposure to waves and currents, and associated biological sensitivity are the main criteria for selecting appropriate treatment techniques. Prediction of the behavior and persistence of oil on intertidal habitats is based on an understanding of the coastal environment, not just the substrate type and grain size. The vulnerability of a particular intertidal habitat is an integration of the:

- 1) Shoreline type (substrate, grain size, tidal elevation, origin)
- 2) Exposure to wave and tidal energy
- 3) Biological productivity and sensitivity
- 4) Ease of cleanup

All of these factors are used to determine the relative sensitivity of shorelines. Key to the sensitivity ranking is an understanding of the relationships between: physical processes, substrate, shoreline type, product type, sediment transport, and product fate and effect. Thus, the intensity of energy expended upon a shoreline by wave action, tidal currents, and river currents directly affects the persistence of stranded oil. The need for shoreline cleanup activities is determined, in part, by the lack or slowness of natural processes in removal of oil stranded on the shoreline.

These concepts were used in the development of the Environmental Sensitivity Index (ESI), which ranks shoreline environments as to their relative sensitivity to oil spills, potential biological injury, and ease of cleanup. ESI maps have been prepared for most areas of the coastline of the United States. Generally speaking, areas exposed to high levels of physical energy, such as wave action and tidal currents, and low biological activity rank low on the scale, while sheltered areas with associated high biological activity have the highest ranking. The shoreline types used in this manual are the rankings, on a scale of 1 to 10, used on most ESI maps (NOAA, 1992). Each atlas has a legend that defines the shoreline ranking scale, describes the nature and distribution of each shoreline type in the area, predicts the behavior of oil on that shoreline type, and makes general cleanup recommendations.

The descriptions, predicted oil impact, and recommended response activity listed in the following sections were updated from existing ESI Atlases for the following areas: the Strait of Juan de Fuca

- These habitats can support large populations of encrusting animals and plants, with rich tidal pool communities.

#### Predicted Oil Impact

- Oil will not adhere to the rock platform, but rather be transported across the platform and accumulate along the high-tide line.
- Oil can penetrate and persist in the beach sediments, if present.
- Tide -pool organisms may be killed
- Persistence of oiled sediments is usually short term (on the order of days to weeks), except in wave shadows or larger sediment accumulations.

#### Response Considerations

- In most wave-exposed areas, cleanup is not necessary.
- High recreational-use areas may be effectively cleaned using high-pressure water flushing if oil is still fresh.
- Removal of organisms should be avoided.
- Monitoring for impacts to marine birds and mammals is advised.

### ESI 3. Fine to Medium Grained Sand Beaches & Unvegetated Steep River Banks

#### Description

- Sand beaches common along the outer coast, but not very common in the Puget Sound Region
- These beaches are generally wide, hard-packed, and flat if fine grained; gentle sloping ( slope < 5° ) if medium grained.
- They are commonly backed by dunes or seawalls along the exposed, outer coast.
- Along sheltered bays, they are narrower, often fronted by tidal flats.
- Upper beach fauna are scarce; lower intertidal biota may include clams, worms and amphipods.
- Near vertical scarps in unconsolidated sediments (most often sand and gravel) and bedrock; most common in urban areas and below dams.
- Undergoing active erosion, as indicated by lack of vegetation

### Predicted Oil Impact

- Light oil accumulations will be deposited as oily swashes or bands along the upper intertidal zone.
- Heavy oil accumulations will cover the entire beach surface, although the oil will be lifted off the lower beach with the rising tide.
- Maximum penetration of oil into fine-grained sand will be 10 centimeters (cm).
- Burial of oiled layers by clean sand within the first few weeks will be less than 30 cm along the upper beach face.
- Oil will form a band on steep river banks. In unconsolidated sediments the substrate will be removed taking the oil with it.
- Organisms living in the beach sands may be killed either by smothering or by lethal oil concentrations in the interstitial water.
- Shorebirds may be killed if oiled, though they may shift to clean sites.

### Response Considerations

- Cleanup not generally recommended on unconsolidated sediments of steep river banks unless in high recreational use areas.
- Cleanup should concentrate on removal of oil from upper swash zone after all oil has come ashore.
- Sand removal should be minimal to avoid erosion problems; use of heavy equipment for oil/sand removal may result in the removal of excessive amounts of sand; manual cleanup may be more efficient.
- Activity through the oiled sand should be limited to prevent grinding oil deeper in the beach.
- Activity through dune areas should be severely limited.

## ESI 4. Coarse-Grained Sand Beaches

### Description

- Commonly found near headlands and along the southern Oregon coast.
- These beaches are moderate-to-steep, of variable width, and have soft sediments.
- They may be present as pocket beaches or on top of bedrock platforms.
- Coastal beaches are typically inhabited by razor clams, burrowing worms, and mysids.

### Predicted Oil Impact

- Light oil will be deposited primarily as a band along the high-tide line.

and Northern Puget Sound (NOAA 1984), Central and Southern Puget Sound (NOAA 1985), Oregon and Washington (NOAA 1986) and Columbia River (NOAA 1991). It should be noted that the description of riverine shoreline in the Columbia River ESI Atlas uses different names and includes only six types. Based on the predicted oil impact and response considerations, these six Columbia River shoreline types correspond to the coastal shoreline types in the following way:

<ul style="list-style-type: none"> <li>• CR ESI Unvegetated steep banks and cliffs</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-3 Fine and medium grain sand beach, eroding scarp and unvegetated steep river bank</li> </ul>
<ul style="list-style-type: none"> <li>• CR ESI Sand/gravel beaches</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-5 Mixed sand and gravel beaches</li> </ul>
<ul style="list-style-type: none"> <li>• CR ESI Rip rap</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-6C Exposed rip rap</li> </ul>
<ul style="list-style-type: none"> <li>• CR ESI Flats</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-7 Exposed tidal flat</li> </ul>
<ul style="list-style-type: none"> <li>• CR ESI Vegetated banks</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-9B Sheltered vegetated low bank</li> </ul>
<ul style="list-style-type: none"> <li>• CR ESI Marsh/swamp</li> </ul>	<ul style="list-style-type: none"> <li>• ESI-10 Marshes</li> </ul>

## Shoreline Types

### ESI 1. Exposed Rocky Cliff Face & Vertical Sea Walls or Piers

#### Description

- Exposed rocky shores are most common along the Washington and Oregon outer coasts, but also present along the outer Strait of Juan de Fuca and the San Juan Islands.
- Composed of steeply dipping to vertical bedrock; intertidal zone is steep (< 30° slope), with very little width.
- Exposed to high waves, sediment accumulations are uncommon and ephemeral, since waves remove debris that has slumped from eroding cliffs.
- Frequently found interspersed with other shoreline types.
- Rock surfaces are colonized by barnacles, mussels, snails and algae; many of the cliffs are used by marine birds and mammals.
- Manmade seawalls and piers are common along inlets, urbanized areas and developed beachfront sites.
- They are composed of concrete and stone, wooden, or metal bulkheads and wooden pilings.
- Organisms, such as barnacles, shellfish, and algae may be common on pilings; biota on concrete structures along the upper intertidal or supratidal zones is sparse.

### Predicted Oil Impact

- Oil typically held offshore by waves reflecting off the steep cliff; on less steep shores, oil may come onshore.
- Oil persistence will be short and will be function of the wave energy during the spill; during high wave energy, oil will be removed in days.
- Marine birds (especially diving birds) and mammals using these rocky shores maybe affected.
- Impacts to intertidal communities are expected to be of short duration; an exception would be where heavy concentrations of a light refined product (e.g., No. 2 fuel oil) came ashore very quickly.
- Oil would percolate between the joints of manmade structures and coat the narrow intertidal area of solid structures.
- Biota would be damaged or killed under heavy accumulations.

### Response Considerations

- On most shores, no cleanup is necessary.
- Access is usually very difficult and may pose significant safety issues to response personnel.
- Monitoring for impacts to marine birds and mammals is advised.
- Cleanup of recreational areas may be necessary; high-pressure water flushing is effective while oil is still fresh.

## ESI 2. Exposed Wave-Cut Platforms

### Description

- The intertidal zone consists of a flat rock bench of highly variable width; along the Oregon and Washington coasts the platform surface is irregular and tidal pools are common.
- The shoreline may be backed by a steep scarp or low bluff. In Puget Sound these areas are usually made up of low-lying bedrock or glacial till.
- There may be a narrow, perched beach of gravel- to boulder-sized sediments at the base of the scarp; pockets of sandy "tidal flats" can occur on the platform in less exposed settings.
- Small accumulations of gravel can be found in the tidal pools and crevices in the platform.

- Under very heavy accumulations, oil may spread across the entire beach face, though the oil will be lifted off the lower beach with the rising tide.
- Penetration of oil into coarse-grained sand can reach 25 cm.
- Burial of oiled layers by clean sand can be rapid, and up to 60 cm or more.
- Burial over one meter is possible if the oil comes ashore at the start of a depositional period.
- Biological impacts include temporary declines in infaunal populations, which can also affect feeding shorebirds.

#### Response Considerations

- Cleanup should commence after the majority of the oil has come onshore unless significant burial is expected to occur.
- Cleanup should concentrate on oil removal from the upper swash zone.
- Sand removal should be minimal to avoid erosion problems; use of heavy equipment for oil/sand removal may result in the removal of excessive amounts of sand; manual cleanup may be more efficient.
- Activity through the oiled sand should be limited to prevent grinding oil deeper in the beach.
- Activity through dune areas should be severely limited.

### ESI 5. Mixed Sand And Gravel Beaches

#### Description

- The most common beach type in Puget Sound; found along the coast as extensive beaches along rocky shores, perched beaches on bedrock, and in the vicinity of river mouths along the southern Oregon coastline
- Narrow, moderately sloping beach composed of a mixture of sand (greater than 20 percent) and gravel (greater than 25 percent).
- The high-tide berm area is usually composed of sand or fine gravel (pebbles to cobbles), whereas the lower part of the beach is coarser, with cobbles to boulders.
- Because of the mixed sediment sizes, there may be zones of sand, pebbles, or cobbles.
- Because of sediment mobility and desiccation on exposed beaches, there are low densities of attached animals and plants.
- Upper intertidal zone used extensively by surf smelt and sand lance for spawning.
- The presence of attached algae, mussels, and barnacles indicates beaches that are relatively sheltered, with the more stable substrate supporting a richer biota.

### Predicted Oil Impact

- During small spills, oil will be deposited along and above the high-tide swash.
- Large spills will spread across the entire intertidal area.
- Oil penetration into the beach sediments may be up to 50 cm; however, the sand fraction can be quite mobile, and oil behavior is much like on a sand beach if the sand fraction exceeds about 40 percent.
- Burial of oil may be deep at and above the high-tide line, where oil tends to persist, particularly where beaches are only intermittently exposed to waves.
- On sheltered beaches, extensive pavements of asphalted sediments can form if there is no removal of heavy oil accumulations, because most of the oil remains on the surface; once formed, pavements are very stable and can persist for many years.
- Oil can be stranded in the coarse sediments on the lower part of the beach, particularly if the oil is weathered or emulsified.
- Biota present may be killed by the oil, either by smothering or by lethal concentrations in the water column.

### Response Considerations

- Cleanup should commence only after the majority of oil has come ashore.
- Heavy accumulations of oil and oil-soaked debris at the high-tide swash line should be removed to prevent asphalt formation.
- Exposed beaches do not require cleanup unless heavily oiled.
- Removal of sediments should be minimal to prevent erosion.
- Mechanical reworking of sediment into the surf zone can effectively remove fresh oil, especially in sheltered areas of low biological activity; sorbents and booms should be used to contain released oil.

## ESI 6A. Gravel Beaches - Pebbles to Cobbles

### Description

- Present along coast of Washington.
- Fine grained gravel beaches composed of sediments ranging in size from pebbles to cobbles (from 4 cm to 256 cm in diameter), with boulders a very minor fraction. No sand is on the surface and less than 20 percent is in subsurface.
- Zones of pure pebbles or cobbles may be present, with pebbles forming berms at high-tide line and cobbles and boulders dominating lower beach face.

- The beach slope is intermediate to steep (between 10 and 20 degrees), with multiple wave-built berms forming the upper beach.
- Natural replenishment rate of sediments is extremely slow.
- There is high annual variability in degree of exposure, and thus in frequency of mobilization by waves. Degree of exposure or sediment mobility can be predicted by the amount of rounding or smoothing of the individual pebbles and cobbles.
- Sediment mobility limits the amount of attached algae, barnacles, and mussels to lower tidal levels.

#### Predicted Oil Impact

- Oil on gravel beaches would coat individual rocks and penetrate up to 60 cm in well-sorted gravels, which may be below the level of annual reworking by the waves.
- Deep penetration and rapid burial of stranded oil is likely on exposed beaches.
- On exposed beaches, oil can be pushed over the high-tide and storm berms, pooling and persisting above the normal zone of wave wash.
- Long-term persistence will be controlled by the depth of penetration versus the depth of routine reworking by storm waves. Oil may persist for years in low wave energy areas.
- In low energy areas, buried oil will tend to seep out, generating sheens that can recontaminate the shoreline.
- On relatively sheltered beaches, formation of asphalt pavements is likely where accumulations are heavy and oil is left uncleaned.

#### Response Considerations

- Heavily oiled wrack and debris should be removed.
- Due to extremely slow natural replenishment, there should be no permanent removal of sediments.
- High-pressure flushing of gravel may help in cleaning exposed surfaces, but will have little effect on oil penetrated deeply into gravel without extensive reworking.
- In heavily oiled, sheltered areas, sediments may have to be removed and replaced.

## ESI 6B. Gravel Beaches - Cobbles to Boulders

### Description

- Gravel beaches are composed of sediments ranging in size from cobbles to boulders. (larger than 256 cm in diameter)
- The beach slope is intermediate to steep (between 10 and 20 degrees), with multiple wave-built berms forming the upper beach.
- Boulders dominate the lower intertidal zone. Boulder and cobble armoring of the surface of the middle to lower intertidal zone may also be present.
- Slowest natural replenishment rate of sediments of all beaches.
- There is high annual variability in degree of exposure, and thus in frequency of mobilization by waves.
- Higher amount of attached algae and epifauna due to increased stability of larger boulders.

### Predicted Oil Impact

- Oil on gravel beaches would coat individual rocks and penetrate up to 100 cm in the poorly sorted larger cobble and boulder.
- The presence of armor may significantly extend persistence of oil; oil located beneath armored surface will remain longer because of the higher velocities required to mobilize the armor.
- On exposed beaches, oil can be pushed over the high-tide and storm berms, pooling and persisting above the normal zone of wave wash.
- Long-term persistence will be controlled by the depth of penetration versus the depth of routine reworking by storm waves. Oil may persist for years in low wave energy areas.
- In low energy areas, buried oil will tend to seep out, generating sheens that can recontaminate the shoreline.
- On relatively sheltered beaches, formation of asphalt pavements is likely where accumulations are heavy and oil is left uncleaned.

### Response Considerations

- Heavily oiled wrack and debris should be removed.
- Due to extremely slow natural replenishment, there should be no permanent removal of sediments.

- High-pressure flushing of gravel may help in cleaning exposed surfaces, but will have little effect on oil penetrated deeply into gravel without extensive reworking.
- In heavily oiled, sheltered areas, sediments may have to be removed and replaced.

## ESI 6C. Rip-Rap

### Description

- Rip rap is angular rock similar in size to that described by EIS 6B, used for shoreline protection and inlet stabilization.
- Rip rap structures have a slope which is generally steep, are located at the high tide line where the heaviest concentration of oil usually impact and are made up of boulders too large to be reworked by waves.
- Due to stability of rip rap, biota on the lower levels may be plentiful and varied.
- No natural replenishment of sediments
- Generally located in areas exposed to higher wave energy..
- Higher amount of attached algae and epifauna may be present due to increased stability of larger boulders.

### Predicted Oil Impact

- With heavy oiling, individual boulders will be heavily coated and penetration to the bottom of the rip rap structure is likely.
- Pools of oil would collect inside the rip rap structure, and potentially be a source of sheens for a long period.
- Biota would be damaged or killed under heavy accumulations.

### Response Considerations

- Heavily oiled wrack and debris should be removed.
- High-pressure flushing of rip rap may help in cleaning exposed surfaces, but will have little effect on oil penetrated deeply into gravel without extensive reworking.
- Heavily oiled rip rap may need to be removed and replaced.

## ESI 7. Exposed Tidal Flats

### Description

- Particularly common in the eastern portion of Puget Sound and at the entrance to bays, estuaries and river mouths along the coast.
- They are composed primarily of sand and mud.
- The presence of sand indicates that tidal or wind-driven currents and waves are strong enough to mobilize the sediments.
- They are always associated with another shoreline type on the landward side of the flat.
- The sediments are water-saturated, with only the topographically higher ridges drying out during low tide.
- Biological utilization can be very high, with large numbers of infauna and heavy use by birds for roosting and foraging. Clams and worms are the most common species.

### Predicted Oil Impact

- Oil does not usually adhere to the surface of exposed tidal flats or penetrate the water saturated sediments, but rather moves across the flat and accumulates at the high-tide line.
- Deposition of oil on the flat may occur on a falling tide if concentrations are heavy, but will frequently be refloated by the next high tide.
- Biological impacts may be severe, especially to burrowing bivalves and worms since oil can penetrate into burrows; this can significantly decrease food for foraging birds and fish in the area.

### Response Considerations

- Cleanup of tidal flat generally not recommended due to likelihood of mixing oil deeper into the sediments during cleanup effort.
- Access usually very poor due to shallow water and soft sediments.
- Passive removal of oil lifted off tidal flat by high tide may be advisable if activity can be accomplished without mixing oil into the sediments.
- Use of heavy machinery should be restricted to prevent mixing oil into the sediments and cannot be used in soft, muddier areas.
- Removal of heavily oiled debris stranded in tidal flat may be advisable if activity can be accomplished without mixing surface oil into the sediments.

## ESI 8A. Sheltered Vertical Rocky Shores & Solid, Vertical, Man-Made Structures

### Description

- Located in calm , interior environments, especially common within interior portion of the San Juan Islands.
- Bedrock shore of variable slope (from vertical cliffs to wide, rocky ledges) which is sheltered from exposure to most wave and tidal energy..
- Uncommon along coast; may occur along the inside of bays and coves.
- Species density and diversity vary greatly, but barnacles, snails, mussels, clams, periwinkles, amphipods, polychaetes, rockweed, and crabs are often very abundant.
- Sheltered solid, vertical, man-made structures consisting of short segments of seawalls, docks and bulkheads are commonly found along the high tide line in harbors, industrial sites and other developed areas.
- Biota on man-made structures along the upper intertidal or supratidal zones are sparse

### Predicted Oil Impact

- On rocky shores, oil will adhere readily to the higher rock surfaces, particularly along the high-tide line, forming a distinct oil band.
- The lower intertidal zone usually stays wet (particularly when algae covered), preventing oil from adhering to the rock surface.
- Oil will not penetrate, except in fractures in the rock where oil can pool and persist.
- Oil will penetrate into joints and voids of man-made structure, and with heavy concentrations will coast the intertidal areas.
- Because of the low energy setting, even light accumulations can persist for years, especially between rocks.
- Fresh oil and light refined products have high acute toxicity that can affect attached organisms after even short exposures.

### Response Considerations

- Cleanup is difficult, oiled shoreline may pose long-term leaching problem.
- High- and low-pressure water flushing of man-made structures and rocky shores is effective while oil is still fresh.
- Cutting of oiled algae is generally not recommended.

## ESI 8B. Sheltered Rubble Slope

### Description

- Shoreline commonly found in industrial waterways of northwest ports.
- Relatively steep (greater than 15 degrees) and short rocky shore which is covered with a thin-to-thick veneer of angular rubble without any evidence of rounding or sorting by sediment transport.
- Sheltered from wave energy or strong tidal currents.
- The surface rubble is highly variable in packing, but there is always some permeability in the surface material.
- Species density and diversity vary greatly, but barnacles, snails, mussels, clams, periwinkles, amphipods, polychaetes, rockweed, and crabs are often very abundant.

### Predicted Oil Impact

- Oil will adhere readily to the rough rocky surface, particularly along the high-tide line, forming a distinct oil band.
- Where the rubble is loosely packed, oil will penetrate deeply, causing long-term contamination of the subsurface sediments.
- Fresh oil and light refined products have high acute toxicity that can affect attached organisms after even short exposures.

### Response Considerations

- Cleanup is difficult, oiled shoreline may pose long-term leaching problem, especially from subsurface contamination.
- High- and low-pressure water flushing is effective for surface contamination while oil is still fresh, but generally does nothing for subsurface contamination.
- Heavily contaminated subsurface sediment may need to be removed and replaced to prevent long term leaching and sheening.
- Cutting of oiled algae is generally not recommended.

## ESI 9A. Sheltered Tidal Flats of Sand and Mud

### Description

- This shoreline is very common in bays and estuaries in Grays Harbor, Willapa Bay, Tillamook Bay, Columbia River estuary and upper Puget Sound.

- They are present in calm-water habitats, sheltered from major wave activity, and frequently fronted by marshes.
- Although wave energy is very low, flats may be exposed to moderate tidal or river currents.
- Substrate slope is flat (less than 3 degrees) and can vary in width from a few meters to nearly one kilometer..
- Sediment is composed of water-saturated mud or muddy sand, so permeability is very low, except where burrowed.
- The sediments are very soft and cannot support even light foot traffic.
- There are usually large populations of clams, crabs, oysters worms, amphipods and snails; many of these flats are commercially harvested.
- May be used heavily by birds for feeding and as staging areas during migration.
- Eelgrass beds may be present and are an important nursery area for juvenile salmonids, dungeness crab, and various marine fish species.

#### **Predicted Oil Impact**

- Oil does not usually adhere to the surface of sheltered tidal flats, but rather moves across the flat and accumulates at the high-tide line.
- Deposition of oil on the flat may occur on a falling tide if concentrations are heavy, but may refloat with the next high tide.
- Oil will not penetrate the water-saturated sediments, however persistent contamination can occur if oil penetrates into burrows of organisms in the mud.
- In areas of high suspended sediments, sorption of oil can result in contaminated sediments that can be deposited on the flats and persist for years.
- Biological impacts may be severe.

#### **Response Considerations**

- These areas require high priority for protection during oil spills .
- Cleanup of sheltered tidal flats is generally not recommended due to likelihood of mixing oil deeper into the sediments during cleanup effort.
- Access is very limited due to shallow water and soft substrate; restrict any active cleanup to upper reaches of high-tide swash or conduct from boats.
- Removal of heavily oiled debris stranded along the high tide line may be advisable if activity can be accomplished without mixing surface oil into the sediments.

## ESI 9B. Sheltered Vegetated Low Bank

### Description

- Either low bank with grasses or low eroding banks with trees and tree roots exposed to the water.
- Found at river mouths in the Puget Sound area, very common throughout the lower Columbia river and above the dams.
- Flooded occasionally by high water.

### Predicted Oil Impact

- At low water there is little impact, with oil coating a narrow band of sediment at the water level.
- At high water the oil will cover and coat grasses at base of the trees, oil may also coat low hanging branches and foliage.
- May cause loss of the grasses, but the trees should survive unless oil penetrates and persists in the substrate.

### Response Considerations

- Low pressure flushing of oiled areas is effective in removing moderate to heavy accumulations of oil from along the banks.
- Sorbent and containment boom should be placed on the water side of the cleanup operations to contain and collect oil outflow.
- Low- to moderate-pressure flushing can be used to remove oil from tree roots and trunks.

## ESI 10. Salt & Fresh-Water Marshes (Herbaceous & Woody Vegetation)

### Description

- Common along the coast and in Puget Sound at the head of many bays; extensive marches are found in the Skagit River and Nisqually River delta areas, as well as the Columbia River estuary and river below Portland.
- Marshes are low energy, protected wetlands containing emergent, herbaceous and/or woody vegetation, generally associated with river systems, bays and estuaries.
- Width of the marsh can vary widely, from a narrow fringe to extensive; substrate is generally silt and mud, with variable amounts of organic matter.

- The moderate tidal range of coastal and estuarine marshes results in presence of numerous tidal channels; frequently they are fronted by tidal flats.
- Resident flora and fauna are abundant and consist of numerous species.
- Marshes provide a nursery ground for numerous fish species and are heavily used by birds for nesting and feeding.

#### Predicted Oil Impact

- Oil adheres readily to marsh vegetation.
- The band of coating will vary widely, depending upon the tidal stage at the time oil slicks are in the vegetation. There may be multiple bands.
- Large slicks will persist through multiple tidal cycles and coat the entire stem from the high-tide line to the base.
- If the vegetation is thick, heavy oil coating will be restricted to the outer fringe, with penetration and lighter oiling to the limit of tidal influence.
- Medium to heavy oils do not readily adhere or penetrate the fine sediments, but they can pool on the surface and in burrows.
- Light oils can penetrate the top few centimeters of sediment and deeply into burrows and cracks (up to one meter); once incorporated into the sediment, oil can persist for years.

#### Response Considerations

- Marshes are very sensitive environments and highly vulnerable to mechanical damage from clean up activities; highest priority for shoreline protection.
- Cleanup is generally not recommended for light oiling, or oiling confined to the outer fringe; natural flushing, especially in higher energy areas, is best strategy.
- Activities in marsh should be kept at minimum to prevent damage to marsh plants and mixing oil into the soft sediments.
- With heavy oiling, combination of manual removal of oiled wrack and debris, low-pressure flushing, passive absorption, and vacuum collection using small boats can be effective; due to the potential for stirring up the sediment and mixing it with the oil, these activities are generally limited to the edge of the marsh.

## Special Considerations

The above shoreline types may also have associated sensitive biological resources and human-use areas, which include:

### Subtidal Habitats

- Submerged aquatic vegetation
- Kelp beds
- Worm beds

### Birds

- Rookeries and nesting sites
- Waterfowl overwintering concentration areas
- High concentration migration stopovers
- High concentration resident bird colonies

### Marine Mammals

- Migration corridors
- Population concentration areas

### Terrestrial Mammals

- Concentration areas

### Terrestrial Plants

- Threatened and endangered plants adjacent to the shoreline

### Fish and Shellfish

- Anadromous fish spawning streams
- Sites important to beach- and kelp-spawning fish
- Estuarine areas that are important fish nursery areas
- Special concentration areas for estuarine and demersal fish
- Shellfish seed beds, leased beds, high concentration areas
- Crab and shrimp nursery areas

### Recreation

- High-use recreational beaches
- Marinas and boat ramps
- High-use boating, fishing, and diving areas

### **Management Areas**

- **Nature preserves and reserves**
- **Privately developed lands/facilities (Nature Conservancy Areas)**
- **Research natural areas**
- **State marine parks/Federal marine sanctuaries**
- **Wildlife management areas and refuges**

### **Resource Extraction**

- **Commercial fishing areas, including finfish, crabs, and mollusks**
- **Water intakes**
- **Aquaculture sites**
- **Intertidal and subtidal mining leases**
- **Subsistence harvest sites**
- **Log storage sites**

### **Cultural Resources**

- **Archaeological and other historically significant sites**
- **Native American reservations**

### 3 Shoreline Countermeasure Methods Using Conventional Response Technology

The following section lists and describes those shoreline countermeasure methods that utilize conventional response technology to mitigate the environmental impact and enhance the recovery of a shoreline or habitat resulting from stranded oil. Methods and equipment currently in use for these conventional shoreline treatment methods are described in some detail below. These methods, when used according to the guidelines in this manual, may be used on most sites as part of the OSC-directed response. It should be noted that some of these methods may require other authorizations or permits before work begins.

- 1 No Action
- 2 Manual Removal of Oil
- 3 Passive Collection of Oil(Sorbents)
- 4 Oiled Debris Removal
- 5 Trenching/Recovery Wells
- 6 Oiled Sediment Removal
- 7 Ambient-Water Flooding (Deluge)
- 8a Ambient-Water/Low-Pressure Washing < 50psi
- 8b Ambient-Water/High-Pressure Washing < 100psi
- 9 Warm-Water < 90°/Moderate-to-High-Pressure Washing 50-100psi
- 10 Hot-Water > 90°/Moderate-to-High-Pressure Washing 50-100psi
- 11 Vacuum Removal of Oil
- 12 Sediment Reworking
- 13 Sediment Removal, Cleansing, and Replacement
- 14 Cutting Oiled Vegetation

#### 1. No Action

##### Objective

No attempt is made to remove stranded oil, because there is no proven effective method for cleanup, there is unacceptable risk to response workers, or presence of extremely sensitive environment or resource.

### Description

No action is taken. However, the OSC continues to monitor the incident.

### Applicable Shoreline Types

Can be used on all shoreline types.

### When To Use

If the shoreline is extremely remote or inaccessible, the amount and type of oil does not justify a clean-up effort, when natural removal rates are very fast, or cleanup actions will do more harm than leaving the oil to be removed naturally.

### Biological Constraints

This method may be inappropriate for areas where high numbers of mobile animals (birds, marine mammals, crabs, etc.) use the intertidal zone or adjacent nearshore waters.

### Environmental Effects

Intertidal — The same as the oil.

Subtidal — The same as the oil.

## 2. Manual Removal of Oil

### Objective

Removing stranded surface oil with hand tools and manual labor.

### Description

Removing surface oil accumulations with a minimum of sediment by manual means (hands, rakes, shovels, etc.) and placing in containers for removal from the shoreline.

No mechanized equipment is used.

### Applicable Shoreline Types

Can be used on most shoreline types; not generally recommended on soft mud substrates where mixing of oil deeper in the sediment might occur.

### When To Use

Generally used on shorelines where the oil can be easily removed by non-mechanical means. Most appropriate for light to moderate oiling conditions. Method may need to be closely monitored or may not be appropriate in archaeological and/or culturally sensitive areas.

### Biological Constraints

Foot traffic over sensitive areas (shellfish beds, alga mats, bird nesting areas, dunes, etc.) is to be restricted. May be periods when shoreline access is restricted (e.g., bird nesting, mammal pupping).

## Environmental Effects

Intertidal — Minimal if surface disturbance by cleanup activities and work force movement is limited.

Subtidal — None.

### 3. Passive Collection of Oil (Sorbents)

#### Objective

Removal of oil by adsorption onto oleophilic material placed in the intertidal zone.

#### Description

Sorbent material is placed on the surface of the shoreline substrate allowing it to absorb oil as it is released by tidal or wave action. Oiled sorbent material is then collected and removed from the shoreline. Oil removal is dependent on the capacity of the particular sorbent, energy available for lifting oil off the shoreline, and degree of oil weathering.

#### Applicable Shoreline Types

Can be used on any shoreline type.

#### When to Use

When the shoreline oil is mobile and transport of oil is expected on or off the site. The oil must be of a viscosity and thickness to be released by the substrate and absorbed by the sorbent. Often used as a secondary treatment method after gross oil removal, and along sensitive shorelines where access is restricted.

#### Biological Constraints

None, although this method can be slow, thus allowing oil to remain in critical habitats during sensitive periods of time.

#### Environmental Effects

Intertidal — There may be physical impact of placing the sorbent material in a sensitive area. If all absorbents are not recovered, they will become non degradable, oily debris.

Passive absorbents in the mid or lower intertidal should be monitored for entrapment of small crustaceans.

Subtidal — None.

### 4. Oiled Debris Removal

#### Objective

Removal of contaminated debris and logs.

### **Description**

Manual or mechanical removal of debris from the upper beach face and the zone above high tide beyond the normal wash of waves. Can include cutting and removal of oiled logs. Care should be taken to prevent any possible erosion of beach area and oil penetration into substrate due to foot traffic.

### **Applicable Shoreline Types**

Can be used on most shoreline types where safe access is allowed; not generally recommend on soft mud substrates where mixing of oil deeper in the sediment might occur.

### **When to Use**

When driftwood and debris is heavily contaminated and either a potential source of chronic oil release, an aesthetic problem, or a source of contamination for other organisms on the shoreline.

### **Biological Constraints**

Disturbance to adjacent upland areas should be minimized. Foot traffic over sensitive intertidal areas (shellfish beds, alga mats, bird nesting areas, dunes, etc.) is to be restricted. May be periods when shoreline access is restricted (e.g., bird nesting, mammal pupping).

### **Environmental Effects**

Intertidal — Reduction of habitat's structural complexity.  
Subtidal — None.

## **5. Trenching/Recovery Wells**

### **Objective**

Remove subsurface oil from permeable substrates.

### **Description**

Dig trenches or wells (pits) to the depth of the oil and remove oil floating on the water table by vacuum pump or skimmer. Water flooding or high-pressure spraying at ambient temperatures can be used to flush oil to the trench.

### **Applicable Shoreline Types**

Can be used on beaches ranging in grain size from fine sand to gravel.

### **When To Use**

When large quantities of oil penetrate deeply into permeable sediments and cannot be removed by surface flooding. The oil must be liquid enough to flow at ambient temperatures. Method may need to be closely monitored or may not be appropriate in archaeological and/or culturally sensitive areas.

## Biological Constraints

Trenches should not be dug in the lower intertidal where attached algae and organisms are abundant.

## Environmental Effects

**Intertidal** — On gravel beaches, there may be a period of beach instability as the sediments are redistributed after the trenches are filled in.

**Subtidal** — None.

## 6. Oiled Sediment Removal

### Objective

Removal of surface oiled sediments (without replacement).

### Description

Oiled sediments are removed by either manual use of hand tools or mechanical use of various kinds of motorized equipment. The oiled material must be transported and disposed of off-site.

### Applicable Shoreline Types

Can be used on any shoreline with surface sediments; not generally recommend on soft mud substrates where mixing of oil deeper in the sediment might occur. On rocky coasts, only manual removal is feasible. Heavy equipment should only be used with special supervision to minimize sediment removal.

### When to Use

When only very limited amounts of oiled sediments have to be removed. Should not be considered in areas of low natural replenishment and where beach erosion may result. Care should be taken to limit siltation and to remove the sediments only to the depth of oil penetration, which can be difficult with heavy equipment. Method may not be appropriate in archaeological and/or culturally sensitive areas.

### Biological Constraints

Excavating equipment must not intrude upon sensitive habitats. Only the upper intertidal and supratidal areas should be considered for sediment removal to minimize disturbance of biological communities in the lower intertidal and subtidal. There may be site-specific constraints limiting placement of equipment and temporary sediment storage piles. Such operations would generally be restricted in fish-spawning areas. Adjacent sensitive areas potentially impacted by released oil sheens must be protected during operations.

## **Environmental Effects**

**Intertidal** — The equipment is heavy, and required support personnel is extensive. May be detrimental if excessive sediments are removed without replacement. All organisms resident in the beach will be affected, though the need for removal of the oil may be determined to be the best overall alternative.

**Subtidal** — Release of oil and fine-grained oily sediments to the water during sediment removal activities and tidal flushing of the excavated beach surface.

## **7. Ambient-Water Flooding (Deluge)**

### **Objective**

To wash surface oil and oil from crevices and rock interstices to water's edge for collection.

### **Description**

A large diameter header pipe is placed parallel to the shoreline above the oiled area. A flexible perforated header hose is used during deluge of intertidal shorelines to better conform to their profiles. Ambient seawater is pumped through holes in the header pipes and flows down the beach face to the water. On porous beaches, water flows through the substrate pushing loose oil ahead of it (or floats oil to the water's surface) then transports the oil down slope for pickup. Flow is maintained as long as necessary to remove the majority of free oil. Oil is trapped by booms and picked up with a skimmer or other suitable equipment.

### **Applicable Shoreline Types**

Beaches with sediments coarser than sand, and gently sloping rocky shorelines. Generally not applicable to mud, sand, vegetated, or steep rocky shorelines.

### **When to Use**

On heavily oiled shorelines when the oil is still fluid and loosely adhering to the substrate; and where oil has penetrated into cobble or boulder beaches. This method is frequently used in combination with other washing techniques (low or high pressure, ambient or warm water).

### **Biological Constraints**

Not appropriate at creek mouths. Where the lower intertidal contains rich biological communities, flooding should be restricted to tidal stages when the rich zones are under water, to prevent secondary oiling.

## Environmental Effects

**Intertidal** — Habitat may be physically disturbed and smothered as sand and gravel components are washed down slope. Organisms may be flushed into lower tidal zones.

**Subtidal** — Oiled sediment may be transported to shallow subtidal areas, contaminating them and burying benthic organisms.

## 8a. Ambient-Water/Low-Pressure Washing < 50psi

### Objective

Mobilize liquid oil that has adhered to the substrate or man-made structures, pooled on the surface, or become trapped in vegetation to water's edge for collection.

### Description

Low-pressure washing (<50 psi) with ambient seawater sprayed with hoses is used to flush oil to the water's edge for pickup. Oil is trapped by booms and picked up with skimmers or sorbents. Can be used with a deluge system on beaches to prevent released oil from re-adhering to the substrate. Care must be taken not to drive the oil into the substrate and to prevent erosion and siltation.

### Applicable Shoreline Types

On heavily oiled rock shores, gravel beaches, rip rap, and seawalls where the oil is still fresh and liquid. Also, in marshes and mangroves where free oil is trapped.

### When to Use

Where adhered oil is still fresh and must be removed due to continued release of oil. Need to closely monitor for excessive siltation and erosion when flushing mixed sand and gravel beaches.

### Biological Constraints

May need to restrict use of flushing to certain tidal elevations so that the oil/water effluent does not drain across sensitive low tide habitats. In marshes, use only at high tide under conditions where sediments will not be disturbed and either from boats or the high-tide line to prevent foot traffic in vegetation.

### Environmental Effects

**Intertidal** — If containment methods are not sufficient, contamination may be flushed into lower intertidal zone. Foot traffic, hoses and the need for compressors will increase the physical impact to the environment.

**Subtidal** — Oiled sediment may be transported to shallow subtidal areas, contaminating them and burying benthic organisms.

## **8b. Ambient-Water/High-Pressure Washing <100psi**

### **Objective**

Mobilize oil that has adhered to hard substrates or man-made structures to water's edge for collection.

### **Description**

Similar to low-pressure washing except that water pressure is up to 100 psi. High-pressure spray will better remove oil that has adhered to rocks. Because water volumes are typically low, may require placement of sorbents directly below treatment areas or use deluge to carry oil to water's edge for collection.

### **Applicable Shoreline Types**

Rock shores, rip rap and vertical hard manmade structures. Can be used to flush floating oil or loose oil out of tide pools and between crevices on rip rap.

### **When To Use**

When low-pressure washing is not effective for removal of adhered oil, which must be removed due to continued release of oil. When directed water jet can remove oil from hard-to-reach sites. To remove oil from man-made structures for aesthetic reasons.

### **Biological Constraints**

May need to restrict use of flushing to certain tidal elevations so that the oil/water effluent does not drain across sensitive low-tide habitats.

### **Environmental Effects**

**Intertidal** — May dislodge many organisms from the substrate surface. May drive oil deeper into the substrate if water jet is improperly applied. Foot traffic, hoses and the need for compressors will increase the physical impact to the environment. If containment methods are not sufficient, contamination may be flushed into lower intertidal zone.

**Subtidal** — Oiled sediment and dislodged organisms may be transported to shallow subtidal areas, contaminating them and burying benthic organisms.

## **9. Warm-Water < 90°F/Moderate Pressure Washing 50- 100psi**

### **Objective**

Mobilize thick and weathered oil adhered to rock surfaces prior to flushing it to the water's edge for collection.

### **Description**

Heated seawater (ambient to 90°F) is applied at moderate pressure to mobilize weathered oil that has adhered to rocks. If the warm water is not sufficient to flush the oil down the

beach, "deluge" flooding or additional low- or high-pressure washing can be used to float the oil to the water's edge for pickup. Oil is trapped by booms and picked up with skimmers or sorbents.

#### **Applicable Shoreline Types**

Heavily oiled gravel beaches, rip rap and hard, vertical, manmade structures such as seawalls, bulkheads, and docks.

#### **When To Use**

When the oil has weathered to the point that low-pressure washing with ambient water is not effective for removal of adhered oil, which must be removed due to continued release of oil. To remove oil from man-made structures for aesthetic reasons.

#### **Biological Constraints**

Must restrict use to certain tidal elevations so that the oil/water effluent does not drain across sensitive low-tide habitats (damage can result from exposure to oil, oiled sediments, and warm water). Should be restricted adjacent to stream mouths, tide pool communities, and similar rich intertidal communities.

#### **Environmental Effects**

**Intertidal** — Temperature change can kill attached organisms. May drive oil deeper into substrate if water jet is not properly applied. Foot traffic, hoses and the need for compressors and heaters will increase the physical impact to the environment. If containment methods are not sufficient, contamination may be flushed into lower intertidal zones that would otherwise not be oiled.

**Subtidal** — Oiled sediment may be transported to shallow subtidal areas, contaminating them and burying benthic organisms.

### **10. Hot-Water > 90°F/Moderate Pressure Washing 50-100psi**

#### **Objective**

Dislodge and mobilize trapped and weathered oil from inaccessible locations and surfaces not amenable to mechanical removal prior to flushing oil to water's edge for collection.

#### **Description**

Water heaters mounted offshore on barges or small land-based units heat water to temperatures from 90°F up to 170°F, which is usually sprayed by hand with moderate-pressure wands. Used without water flooding, this procedure requires immediate use of vacuum (vacuum trucks or super suckers) to remove the oil/water runoff. With a deluge system, the oil is flushed to the water's surface for collection with skimmers or sorbents.

### **Applicable Shoreline Types**

Heavily oiled manmade, vertical structures such as seawalls, bulkheads and docks.

### **When To Use**

When the oil has weathered to the point that even warm water at high pressure is not effective for removal of adhered oil, which must be removed due to continued release of oil. To remove oil from man-made structures for aesthetic reasons.

### **Biological Constraints**

Restrict use to certain tidal elevations so that the oil/water effluent does not drain across sensitive low-tide habitats (damage can result from exposure to oil, oiled sediments, and hot water). Should be restricted near stream mouths, tide pool communities, etc.

Released oil must be recovered to prevent further oiling of adjacent environments.

### **Environmental Effects**

**Intertidal** — All attached organisms in the direct spray zone will be dislodged or killed, and significant mortality (temperature impact) of the lower intertidal communities may result even when used properly. May drive oil deeper into substrate if water jet is improperly applied. Foot traffic, hoses and the need for compressors will increase the physical impact to the environment. Where the intertidal community is rich, the tradeoff between damage to the intertidal community from the hot-water washing versus potential damage from leaving the oil has to be weighed.

**Subtidal** — Oiled sediment may be transported to shallow subtidal areas, contaminating them and burying benthic organisms.

## **11. Vacuum Removal of Oil**

### **Objective**

Remove free oil pooled on the substrate or from the water's surface in sheltered areas.

### **Description**

Use of a vacuum unit with a suction head to recover free oil. The equipment can range from small portable units that fill individual 55-gallon drums to large supersuckers that are truck-mounted and can lift large rocks. Can be used with water spray systems to flush the oil towards the suction head.

### **Applicable Shoreline Types**

Can be used on any shoreline type if accessible; not generally recommend on soft mud substrates where mixing of oil deeper in the sediment might occur. May be mounted offshore on barges, onshore on trucks, or as individual units on boats or ashore at low tide.

### When to Use

When free, liquid oil is stranded on the shoreline (usually along the high-tide line) or trapped in vegetation that is readily accessible.

### Biological Constraints

Special restrictions should be identified for areas where foot traffic and equipment operation should be limited, such as rich intertidal communities. Operations in wetlands are to be very closely monitored, with a site-specific list of restrictions.

### Environmental Effects

Intertidal — Minimal impacts if used properly and minimal substrate is removed.  
Subtidal — None.

## 12. Sediment Reworking

### Objective

Rework oiled sediments to break up the oil deposits, increase its surface area, and mix deep subsurface oil layers that will expose the oil to natural removal processes and enhance the rate of oil degradation.

### Description

Beach sediments are rototilled or otherwise mechanically mixed with the use of heavy equipment on gravel beaches. The oiled sediments in the upper beach area may also be relocated lower on the beach to enhance natural cleanup during reworking by wave activity (berm relocation).

### Applicable Shoreline Types

Should be used only on beaches exposed to significant wave activity. Tilling-type activities work best on beaches with a significant sand fraction; large equipment can be used to relocate sediments up to boulder size.

### When to Use

On beaches with significant amounts of subsurface oil, where sediment removal is unfeasible (due to erosion concerns or disposal problems); also where surface oil deposits have started to form pavements or crusts. Method may not be appropriate in archaeological and/or culturally sensitive areas.

### Biological Constraints

Should not be used on beaches near shellfish-harvest or fish-spawning areas, or near bird nesting or concentration areas because of the potential for constant release of oil and oiled sediments. Sediment reworking should be restricted to the upper part of the beach, to prevent disturbance of the biological communities in the lower intertidal area.

## **Environmental Effects**

**Intertidal** — Due to the mixing of oil into sediments, this process could further expose organisms living below the original layer of oil. Repeated mixing over time could delay the re-establishment of organisms. Relocated sediments would bury and kill organisms. There may be a period of beach instability as the relocated sediments are redistributed.

**Subtidal** — There is a potential for release of contaminated sediments to the nearshore subtidal habitats.

## **13. Sediment Removal, Cleansing, and Replacement**

### **Objective**

To remove oiled sediment and replace them with cleaned or new material.

### **Description**

Oiled sediments are excavated using heavy equipment on the beach at low tide. The sediments are loaded into a container for washing. Cleansing methods include hot water wash or physical agitation with a cleansing solution. After the cleansing process, the rinsed materials are returned to the original area. Cleaning equipment must be placed close to beaches to reduce transportation problems. If not possible to clean oiled sediment replace with new material of similar composition.

### **Applicable Shoreline Types**

Sand- to boulder-sized beaches including rip rap. The beaches must be exposed to wave activity, so that the replaced sediments can be reworked into a natural distribution.

### **When to Use**

Applicable on beaches with large amounts of subsurface oil, where permanent removal of sediment is undesired and other cleanup techniques are likely to be ineffective. Method may not be appropriate in archaeological and/or culturally sensitive areas.

### **Biological Constraints**

Excavating equipment must not intrude upon sensitive habitats. Only the upper and supratidal areas should be considered. Generally restricted in spawning areas. There may be site-specific constraints limiting placement of temporary sediment storage piles. Replaced material must be free of oil and toxic substances. The washing must not change the grain size of the replaced material, either by removal of fines or excessive breakage of friable sediments. If new material is used, it must have a similar composition and grain size distribution as removed sediment.

## Environmental Effects

**Intertidal** — All resident organisms will be affected, though the need for removal of the oil may be determined to be the best overall solution. Equipment can be heavy, large, and noisy; disrupting wildlife. Transportation to site may entail aircraft, land vehicles, or barges, contributing to environmental disruption. There may be a period of beach instability as the replaced sediments are redistributed.

**Subtidal** — May release oil and fine-grained oily sediments into the water during excavation. This is a concern due to tidal flushing of beach sediments and exposed excavations.

## 14. Cutting Vegetation

### Objective

Removal of oiled vegetation to prevent oiling of wildlife.

### Description

Manual cutting of oiled vegetation and removal of cut vegetation with rakes. The cut vegetation is bagged immediately for disposal.

### Applicable Shoreline Types

Marshes, protected rock, boulder beaches, and low vegetated river bank.

### When to Use

Use when large quantities of potentially mobile oil is trapped in vegetation or when the risk of oiled vegetation contaminating wildlife is greater than the value of the vegetation that is to be cut, and there is no less destructive method to remove or reduce the risk to acceptable levels.

### Biological Constraints

Strict monitoring of the operations must be conducted to minimize the degree of root destruction and mixing of oil deeper into the sediments. For plants attached to rock boulder or cobble beaches sources of population recruitment must be considered. Access to bird nesting areas should be restricted during nesting seasons.

### Environmental Effects

**Intertidal** — Removal of the vegetation will result in loss of habitat for many animals. Cut areas will have reduced plant growth for up to two years. Along exposed section of shoreline, the vegetation may not regrow, resulting in erosion and permanent loss of the habitat. Trampled areas (which are inevitable) will recover much slower.

**Subtidal** — Long-term impacts would include increased sediment load in the subtidal area as a result of increased erosion in the intertidal area.

## 4 Shoreline Countermeasure Methods Using Alternative Technology

Shoreline countermeasure based on conventional technology are not always successful in effectively minimizing impacts or speeding up recovery of shorelines impacted by stranded oil. Research and development is ongoing for both new and improved oil spill treatment methods. Various chemical, thermal and biological techniques are currently being tested for effectiveness and toxicity, and may be approved for use in certain situations. Methods considered to be of potential use in this area are described below.

- 15 In-situ Burning on Shoreline
- 16a Chemical Oil Stabilization with Elastomizers
- 16b Chemical Protection of Beaches
- 16c Chemical Cleaning of Beaches
- 17 Nutrient Enhancement
- 18 Microbial Addition

### 15. *In Situ* Burning on Shorelines

#### Objective

Removal of oil from the shoreline by burning.

#### Description

Oil on the shoreline is burned, usually when it is on a combustible substrate such as vegetation, logs, and other debris. Oil can be burned off of nonflammable substrates with the aid of a burn promoter. Appropriate air quality agencies must be notified prior to burn.

#### Applicable Shoreline Types

On any shoreline type except tidal flats.

#### When to Use

Early in the spill event, after ensuring that the product is ignitable. Must comply with Northwest Area Plan *In Situ* Burning Policy.

#### Biological Constraints

Should only be considered for use in the upper intertidal or supratidal zones since destruction of plants and animals from heat and burn promoters will be extensive. This

technique is subject to restrictions and permit requirements established by federal, state and local laws. It should not be used to burn PCBs, wastes containing more than 1,000 parts per million (ppm) of halogenated solvents, or other substances regulated by the U. S. Environmental Protection Agency (EPA).

#### Environmental Effects

Little is known about the relative effects of burning oiled wetlands compared to other techniques or natural recovery. Burning may cause significant air pollution, which must be considered when weighing the potential benefits and risks of the technique. The combustion products may travel great distances before deposition.

### 16a. Chemical Oil Stabilization with Elastomizers

#### Objective

Solidify or gelatinize oil on the water's surface or a beach to keep it from spreading or escaping, and to speed recovery rate and efficiency.

#### Description

Chemical agent enhancing polymerization of the hydrocarbon molecules applied by semi-liquid spray or as a dry chemical onto the oil in the proper dosage. Depending on the nature and concentration of the polymerizing agent, the oil can be rendered viscoelastic, but still fluid, gelatinous, or semisolid. The primary purpose is to stabilize the oil, keeping it from spreading or escaping, causing oiling elsewhere. May reduce the solubility of the light (and more toxic) fractions, by locking them into the polymer. This reduces both air and water exposure. Depending on the beach type and equipment used, recovery may be enhanced.

#### Applicable Shoreline Types

Suitable on shorelines of low permeability where heavy oil has pooled on the surface, except vegetated shorelines.

#### When to Use

When heavy concentrations of liquid oil are on the substrate and adjacent water body, and physical removal can not be completed prior to the next tide so that the oil is likely to move to a more sensitive shoreline type. Should be used in conjunction with booming or other physical containment. Must comply with National Contingency Plan and Northwest Area Plan.

#### Biological Constraints

Not suitable for vegetated or rip rap shore types. Should be avoided when birds or other wildlife that may be more adversely impacted by the congealed oil can not be kept away

from the treated shoreline. The congealed oil may stick to vegetation and wildlife, increasing physical damage to both. On rip rap the congealed oil may remain in crevices where it may hamper recovery and prolong the release of sheens.

#### **Environmental Effects**

May enhance the smothering effect of oil on intertidal organisms. Thus, the treatment should be considered only for heavily oiled beaches where smothering effects are already maximal. The congealed oil may stick to vegetation and wildlife increasing physical damage, such as impaired flight in birds or impaired thermoregulation in mammals and birds whose feathers or fur become oiled.

### **16b. Chemical Protection of Beaches**

#### **Objective**

Pretreat shoreline to prevent oil from adhering to the substrate.

#### **Description**

Certain types of water-based chemicals, some of which are similar in composition to dispersants, are applied to beaches in advance of the oil.

#### **Applicable Shoreline Types**

Coarse- and fine-grained sand beaches, seawalls and piers (particularly piers or waterfront facilities that are of historical significance), eroding bluffs, wave-cut platforms, and rip rap.

#### **When to Use**

When oil is projected to impact an applicable shoreline, particularly those that have high recreational or aesthetic value. Must comply with National Contingency Plan and Northwest Area Plan.

#### **Biological Constraints**

May not be suitable for nutrient-rich environments, particularly in confined waters. The toxicity of shoreline treatment products is reportedly much less than that of oil, but the toxicity of each product should be evaluated prior to consideration for use.

#### **Environmental Effects**

The long-term environmental effects of these procedures are unknown. A toxic effect of the chemical can be anticipated. Additionally, the nutrient load to nearshore and interstitial waters may lead to eutrophication. Whether the predicted reduced residence time of the oil on the beach will increase the survival rate for sessile and interstitial organisms is unknown.

## 16c. Chemical Cleaning of Beaches

### Objective

To increase the efficiency of oil removal from contaminated areas.

### Description

Special formulations, which can be characterized as weak dispersants, are applied to the substrate, as a presoak and/or flushing solution, to soften weathered or heavy oils to aid in the efficiency of flushing treatment methods. The intent is to be able to lower the temperature and pressure required to mobilize the oil from the substrate.

### Applicable Shoreline Types

On any shoreline where deluge and water flushing procedures are applicable.

### When to Use

When the oil has weathered to the point where it will not flow using warm to hot water. This approach may be most applicable where flushing decreases in effectiveness as the oil weathers. Must comply with National Contingency Plan and Northwest Area Plan.

### Biological Constraints

Will require extensive biological testing for toxicity and water quality sampling prior to receiving approval for use. The concern is that the treated oil will be dispersed in the water column, and thus impact water column and subtidal organisms. Field tests will be required to show that use of a beach cleaner does not reduce overall recoverability of the oil. Use may be restricted where suspended sediment concentrations are high, adjacent to wetlands and tidal flats, and near sensitive subtidal resources.

### Environmental Effects

If more oil is dispersed into the water column, there could be more oil sorbed onto suspended sediments and transferred to subtidal habitats, particularly along sheltered shorelines. Intertidal habitats might survive better, if cooler water temperatures are possible.

## 17. Nutrient Enhancement

### Objective

To speed the rates of natural microbial degradation of oil by addition of nutrients (specifically nitrogen and phosphorus). Microbial biodegradation is the conversion by microorganisms of dissolved and dispersed hydrocarbons into oxidized products via various enzymatic reactions. Some hydrocarbons are converted to carbon dioxide and cell material, while others are partially oxidized and/or left unaltered as a residue.

## **Description**

Nutrients are applied to the shoreline in one of several methods: soluble inorganic formulations that are dissolved in water and applied as a spray at low tide, requiring frequent applications; slow-release formulations that are applied as a solid to the intertidal zone and designed to slowly dissolve; and oleophilic formulations that adhere to the oil itself, thus they are sprayed directly on the oiled areas.

## **Applicable Shoreline Types**

Could be used on any shoreline type where safe access is allowed.

## **When to Use**

On moderately to heavily oiled shorelines, after other techniques have been used to remove as much oil as possible; on lightly oiled shorelines where other techniques are not effective; and where nutrients are a limiting factor in natural degradation. Potentially for the treatment of subsurface oil. Must comply with National Contingency Plan and Northwest Area Plan.

## **Biological Constraints**

Not applicable in shallow water, poorly flushed, restricted embayments where nutrient overloading may lead to eutrophication, or where toxicity of nutrients, particularly ammonia, is of concern. There must be no risk of oxygen depletion. Use is to be restricted adjacent to stream mouths, tide pools, etc. Contact toxicity of oleophilic formulations may restrict areas of direct application. Bioassay test results should be carefully evaluated, as other chemicals in the formulations could be toxic to aquatic organisms.

## **Environmental Effects**

Tests in Alaska showed that interstitial oxygen concentrations did not decrease to such an extent that it limited the supply of oxygen available to the bacteria. The fertilizer applications that increased nutrient concentrations and microbial activity did not harm the nearshore environment. About 99 percent of butoxyethanol, a toxic component of the Inipol formulation, (the fertilizer commonly used in Alaska) degraded to nontoxic compounds within 24 hours after Inipol treatments of cobble shorelines. Inipol was initially toxic to intertidal organisms directly contacted during application. Researchers also found no evidence that the nutrients released from the treated shorelines stimulated algal blooms.

## 18. Microbial Addition

### Objective

To speed the rates of natural microbial degradation of oil by addition of nutrients and microbial products. Microbial biodegradation is the conversion by microorganisms of dissolved and dispersed hydrocarbons into oxidized products via various enzymatic reactions. Some hydrocarbons are converted to carbon dioxide and cell material, while others are partially oxidized and/or left untouched as a residue.

### Description

Formulations containing hydrocarbon-degrading microbes and fertilizers are added to the oiled area. The argument is made that indigenous organisms will be killed by the oil, so new microbial species need to be added to begin the process of biodegradation. To date, microbial addition has not been shown to work better than fertilizer alone in field tests.

### Applicable Shoreline Types

Could be used on any shoreline type where safe access is allowed.

### When to Use

On moderately to heavily oiled shorelines, after other techniques have been used to remove as much oil as possible; on lightly oiled shorelines where other techniques are not effective; and where oil degrading bacteria are a limiting factor in natural degradation. Potentially for the treatment of subsurface oil. Must comply with National Contingency Plan and Northwest Area Plan.

### Biological Constraints

Not applicable in shallow water, poorly flushed, restricted embayments where nutrient overloading may lead to eutrophication, or where toxicity of nutrients, particularly ammonia, is of concern. There must be no risk of oxygen depletion. Use is to be restricted adjacent to stream mouths, tide pool communities, etc. Bioassay test results should be carefully evaluated, as other chemicals in the formulation could be toxic to aquatic organisms.

### Environmental Effects

Yet to be evaluated for full-scale field applications.

## 5 Matrices of Recommended Countermeasure Methods by Oil and Shoreline Type

The matrices included in this chapter show which shoreline countermeasure techniques have been considered for the fourteen shoreline types described in Chapter 2. Four matrices have been constructed for the major categories of oil (very light, light, medium, heavy).

Countermeasure methods are described in Chapters 3 and 4. Countermeasures in Chapter 3 are traditional or conventional techniques that the OSC can use without any additional concurrence. However, the cutting of vegetation countermeasure should be used only during specific seasonal windows under specific conditions and with landowner approval. Countermeasures in Chapter 4 are described under a separate section called "Shoreline Countermeasure Methods Using Alternative Technology" may be useful in certain situations. These methods are considered more experimental and controversial in their application and potential impacts and require more formal review and consultation before implementing. The exact requirements are spelled out in the National Contingency Plan and the Northwest Area Plan. The Shoreline Countermeasures Matrices are a particularly dynamic component of the manual and should continue to be revised as the existing techniques are used and evaluated, and as both old and new techniques are refined.

Each matrix has a written explanation of how it is to be used as a countermeasure advisability matrix. The matrix is only a general guide for removing oil from shoreline substrates. It must be used in conjunction with the entire "Shoreline Countermeasures Manual" plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the State OSC operating with the FOSC's authorization has the responsibility for and authority to determine which countermeasure(s) are appropriate for the various situations encountered.

Selection of countermeasure techniques to be used in each spill is based upon the degree of oil contamination, shoreline types, and the presence of sensitive resources. Extremely sensitive areas are generally limited to manual cleanup methods. It is important to note that the primary goal of countermeasure implementation is the removal of oil from the shoreline with no further

**injury or destruction to the environment. The three categories of guidance used in the matrices are defined as follows:**

- |          |                    |   |
|----------|--------------------|---|
| <b>R</b> | <b>Recommended</b> | <b>May be the preferred method that best achieves the goal of minimizing destruction or injury to the environment</b> |
| <b>C</b> | <b>Conditional</b> | <b>Viable and possibly useful but may result in limited adverse effects to the environment</b>                        |
|          | <b>Shaded</b>      | <b>Not applicable or not generally recommended.</b>   |

# Appendix A

## Guidelines For Treatment Operations

### General Guidelines

Ensure familiarity and compliance with approved treatment methods, approved shoreline segment work plans, advisories, and special instructions. Restrict all access to wetlands and tidal flats, except with special authorization.

### Conditions to avoid

- Treatment techniques (such as high pressure and hot water) that dislodge intertidal vegetation and invertebrates, e.g., mussels, barnacles, snails
- Clearing marshes and vegetated shorelines (the presence of algae does not characterize a vegetated shoreline)

### Actions to encourage

- Boom off mud/grass flat adjacent to treatment areas to prevent further contamination.
- Boom off tidal creeks to prevent further contamination.
- Minimize impact to uncontaminated lower intertidal zones, including:
  - land crews during tides that cover the lower intertidal zone
  - avoid high-/low-pressure washing where possible
  - work heavily oiled upper beach zone when lower intertidal zones are covered by high tides
  - employ sorbents along riprap and below oiled upper beach to protect lower intertidal zone from oiling

Ensure that all signs of human activity are removed when cleanup is completed. Ensure that all trash and wastes are removed daily:

- Oil trapped in booms must be picked up before the next tide cycle
- All food and associated trash must be removed each day to minimize attracting wildlife into contaminated areas

## **Guidelines Specific to Biological Resources**

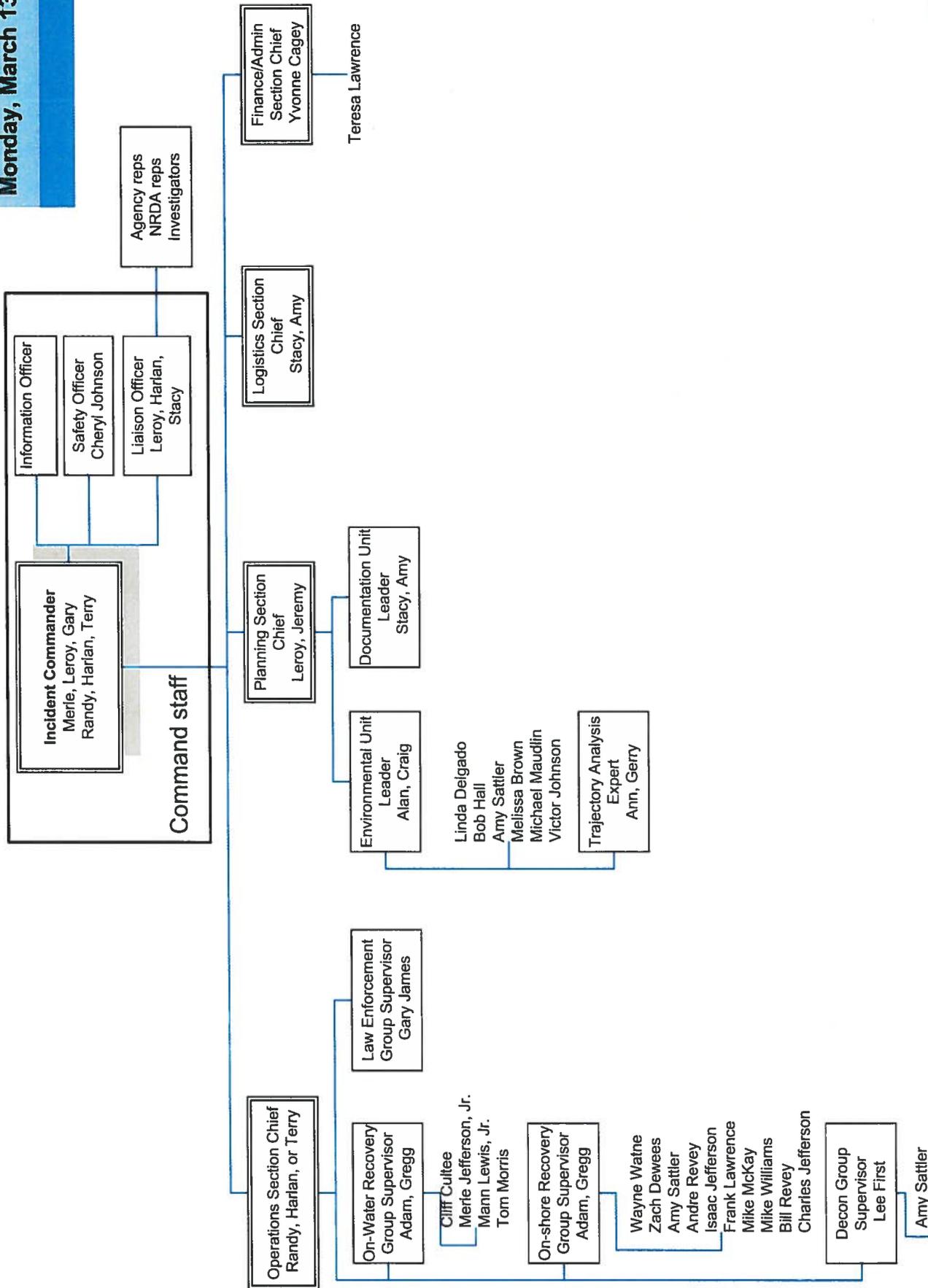
**Advisories and special instructions may address:**

- **bird concentration areas (nesting sites, colonies, rookeries, etc.)**
- **live/dead animal collection policy**
- **protection of cultural resources**
- **marine mammal haulouts**
- **collection of eagle feathers and marine mammal parts**
- **cutting bull kelp**
- **cutting oiled fucus**

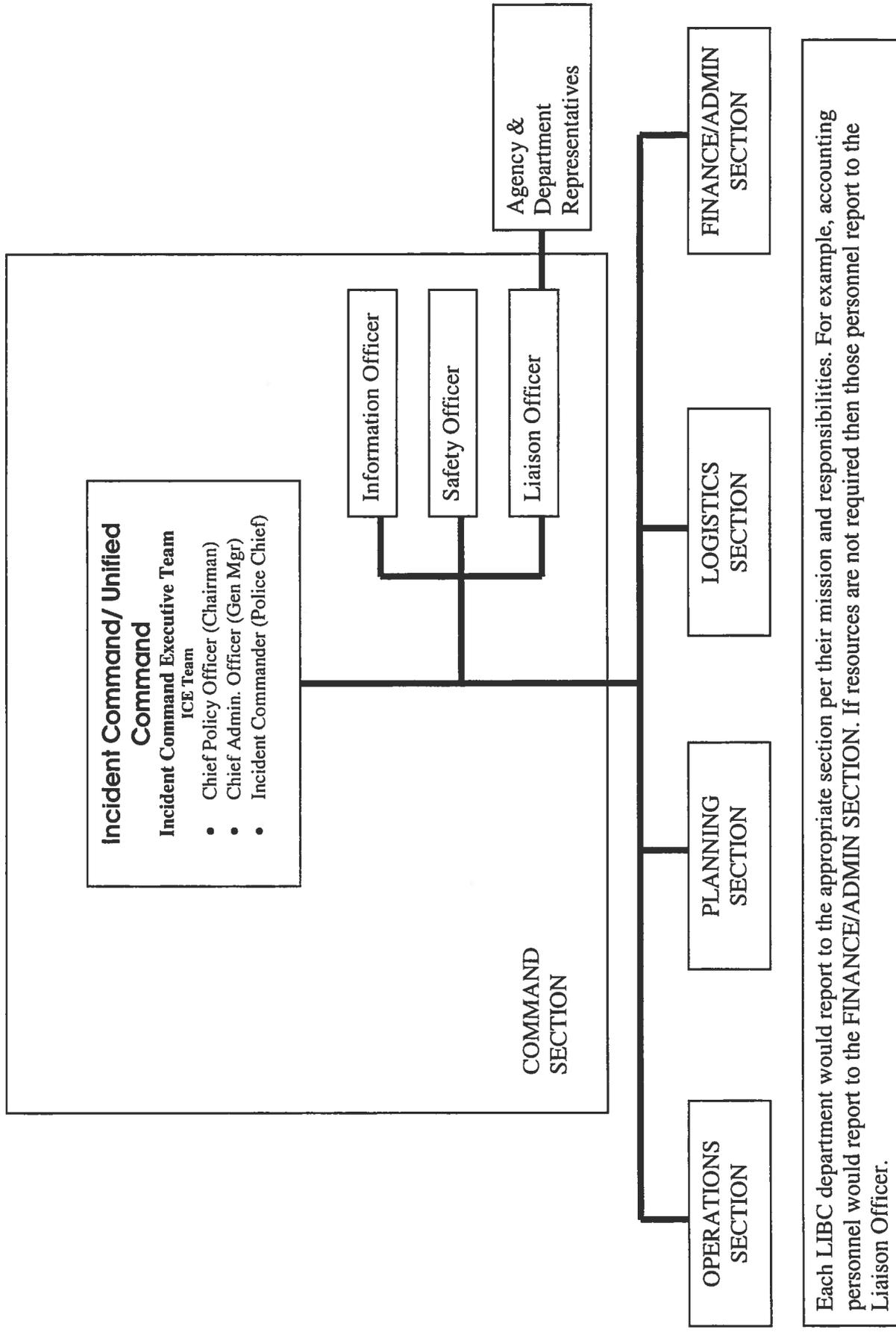
**Appendix B includes existing “best management practices” for specific issues addressed during previous spills, which can be used as the basis for developing regional guidelines.**

# Proposed LNR ICS Structure

Monday, March 13, 2006





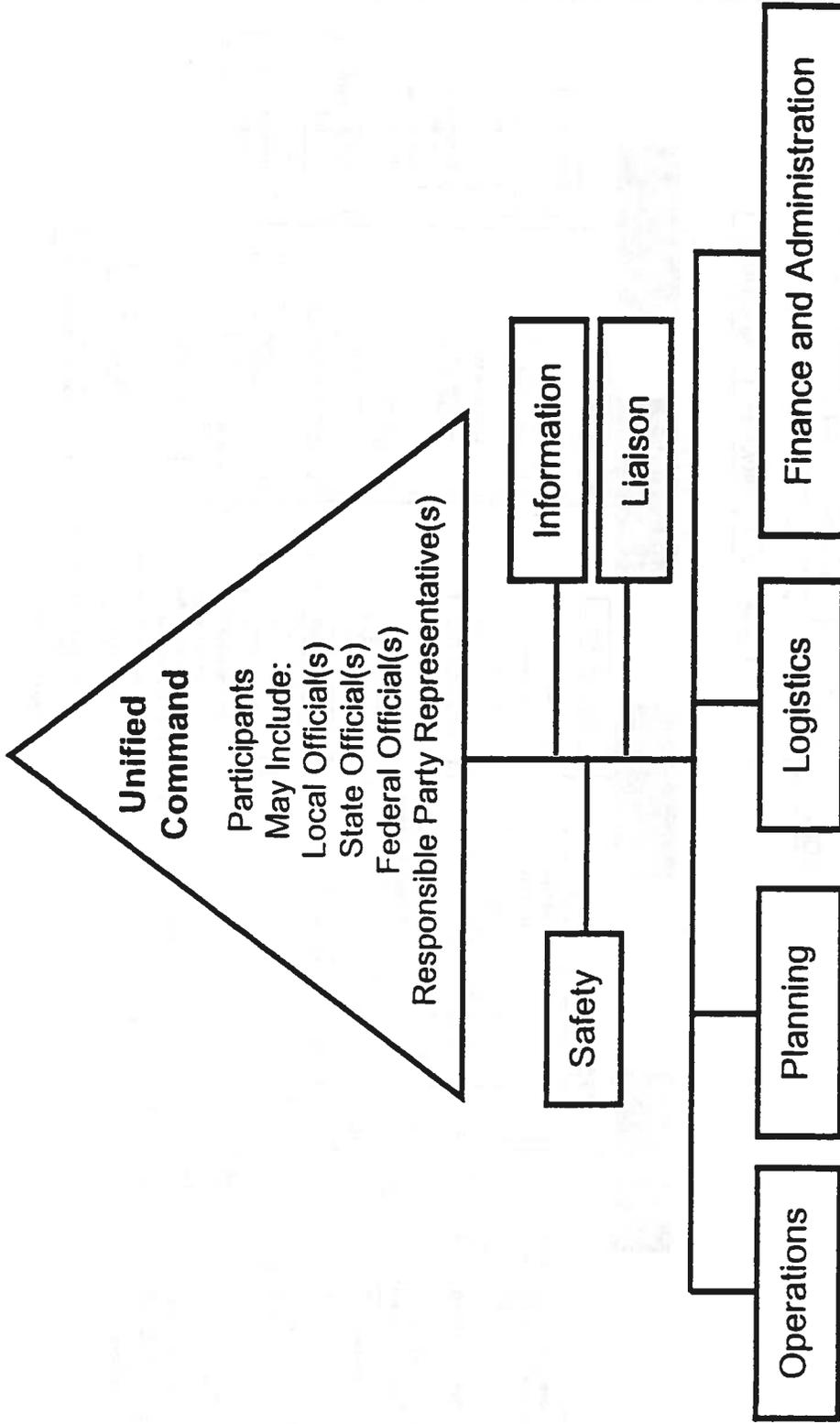


Each LIBC department would report to the appropriate section per their mission and responsibilities. For example, accounting personnel would report to the FINANCE/ADMIN SECTION. If resources are not required then those personnel report to the Liaison Officer.

Figure 4.1 Lummi Nation Comprehensive Emergency Response Command Structure



**Figure 2 — Relationship between ICS and UC**



# EXAMPLE RESPONSE ORGANIZATION

