

## Section 16

# Hazardous Materials Profile

### Definition

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Chemicals labeled “hazardous materials” play a valuable role in most aspects of county life. They fuel vehicles, increase farm production, make drinking and waste water safe, serve our health care needs, and form key ingredients in many manufactured products. Considerable quantities of hazardous materials are present throughout the county at any one time without any threat to people and environment. However, accidents do happen occasionally that become “hazardous materials incidents.” Hazardous materials incidents are accidental, not deliberate, and their consequences are unintentional.<sup>1</sup>

Hazardous material incidents occur during the manufacture, transportation, storage, and use of hazardous materials. Hazardous materials cover a broad category of substances that pose a potential risk to life, health, the environment, or property when not properly contained. These materials may be in solid, liquid, or gaseous forms that exhibit explosive, flammable, combustible, corrosive, reactive, poisonous, biological, or radioactive characteristics.

Incidents most often occur due to human error, natural hazards, or a breakdown in equipment or monitoring systems. The widest area of vulnerability to the public occurs during airborne releases of acutely toxic gases while liquid spills create immediate concerns to the environment.

### Description

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There are two main arenas in Grays Harbor County for hazardous materials incidents: fixed facilities and transportation systems.

#### **Fixed Facilities**

Fixed facilities are buildings and other stationary structures on a single site that manufacture, produce, use, transfer, store, supply, or distribute any hazardous material. The term includes railroad yards and truck terminals, but does not include vehicles, vessels, airplanes, or other modes of transportation.

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<sup>1</sup> The term “terrorism” often includes technological hazards that are intentional, criminal, or malicious in intent and are not incorporated into this HIVA.

The Emergency Planning and Community Right-to-Know Act (EPCRA)<sup>2</sup> and the Washington Department of Ecology's Hazardous Wastes and Toxics Reduction Program annually requires fixed facilities with specific threshold quantities of hazardous chemicals to submit an inventory. Federal law entitles fire departments and local emergency planning committees (LEPC) to receive these inventories.

Hazardous materials inventory contains information about chemicals stored or used at the facilities, including:

- The chemical name or the common name as indicated on the MSDS;
- An estimate 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 of the facility elects to withhold location information from disclosure to the public.

The most recent countywide inventory available (2002) reveals that there are 94 different hazardous materials distributed among 81 fixed facilities. Many of these sites involve the storage and use of petroleum products, such as diesel, propane, and gasoline, and other related products. However, some county major manufacturing facilities use or manufacture substances that ranks as "extremely hazardous" under EPCRA.<sup>3</sup>

Of these 81 facilities, only 17 are physically located within unincorporated Grays Harbor County. A list of countywide facilities and their chemical use are included in Table 1 below.

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<sup>2</sup> Also known as Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

<sup>3</sup> The Environmental Protection Agency maintains the "List of Lists – Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(R) of the Clean Air Act." An internet database of these chemicals is available at:

[http://yosemite.epa.gov/oswer/ceppoehs.nsf/EHS\\_Profile?openform](http://yosemite.epa.gov/oswer/ceppoehs.nsf/EHS_Profile?openform)

**Table 106**  
**Fixed facility sites in Grays Harbor County Submitting**  
**Tier II Inventories to the Washington Department of Ecology**

*(\*Indicates locations within unincorporated Grays Harbor County)*

Facility	Location(s)	Chemical(s)
AirGas Nor Pac	4751 SR 12, Elma	Argon, carbon dioxide, nitrogen, oxygen, propane
Amerigas	156 Myrtle St., Aberdeen	Propane
Boise Architectural Products	100 Commerce Lane, Elma*	Diesel fuel #2, heat transfer oil, hydraulic fluid, paint, wood dust
CenturyTel*	<ul style="list-style-type: none"> <li>• 401 W. Young St., Elma</li> <li>• 10 Ogden Ave., Humptulips*</li> <li>• S. Shore Lake Road, Quinault*</li> <li>• 118 S. 3<sup>rd</sup> St., McCleary</li> <li>• 126 s. 1<sup>st</sup> St., Montesano</li> <li>• 11 2<sup>nd</sup> St. S., Pacific Beach*</li> </ul>	Sulfuric acid
City of Aberdeen*	<ul style="list-style-type: none"> <li>• Water shop</li> <li>• Water treatment plant*</li> <li>• Wishkah headworks*</li> <li>• Wastewater treatment plant*</li> <li>• Wynoochee intake*</li> </ul>	Diesel fuel #2, gasoline, liquid propane, caustic soda, chlorine gas, citric acid, phosphonic acid, sodium fluoride, aluminum, chlorhydrate, sulfur dioxide
Ferrell Gas*	<ul style="list-style-type: none"> <li>• 1620 First St., Cosmopolis</li> <li>• 715 S. Bank Rd, Elma</li> <li>• Quinault Resort</li> </ul>	Liquified propane
Grays Harbor Energy Facility	401 Keys Rd., Elma*	Mineral oil
Grays Harbor Paper	801 23 <sup>rd</sup> St., Hoquiam	1,2,4 trichlorbenzene, aluminum sulfate, burner fuel #6, calcium carbonate, calcium oxide, diesel fuel #2
City of Hoquiam	<ul style="list-style-type: none"> <li>• Pumping stations</li> <li>• Equipment rental</li> <li>• Memorial Cemetery shop</li> <li>• Water Treatment Plant*</li> </ul>	Diesel, cleaning solvent, gasoline, lubricating grease, motor oil, aluminum sulfate, chlorine, percol LT 7990, sodium hydroxide
Hoquiam Plywood	• 1000 Wooding St., Hoquiam	Formaldehyde
Lakeside Industries	• 2400 Sargent Rd, Aberdeen	Asphalt, asphalt emulsifier, diesel fuel #2, gasoline, petroleum oil, propane
Masco Petroleum	<ul style="list-style-type: none"> <li>• 112 N. Boone, Aberdeen</li> <li>• 2020 Port Industrial Rd, Aberdeen</li> <li>• 4700 SR 12 S., Elma</li> </ul>	Fuel oil, gasoline

Facility	Location(s)	Chemical(s)
Rohm and Haas	<ul style="list-style-type: none"> <li>4800 SR 12, Elma</li> </ul>	Boric acid, borol solution, carbon dioxide, diesel fuel #2, ethylene glycol, isopropylamine, methanol, nitrogen, orex, potassium borohydride, potassium, sodium, sodium borohydride, sodium hydride dispersion, sodium hydride (60%), sodium hydroxide, sulfuric acid, trimethyl borate, venpure 20/20 solution, water rex, white mineral oil
Ocean Spray Cranberries	1480 SR 102, Aberdeen*	Anhydrous ammonia, diesel fuel #2, urea
Pacific Veneer	100 N. Decatur	Diesel fuel #2, heat transfer oil, hydraulic fluid
Pettit Oil	<ul style="list-style-type: none"> <li>2419 First St W, Aberdeen</li> <li>608 Oakhurst, Elma</li> <li>700 Myrtle St, Hoquiam</li> <li>128 US 101, Hoquiam</li> <li>820 Myrtle St., Hoquiam</li> <li>2630 Industrial Rd, Aberdeen</li> <li>2240 Westhaven, Westport</li> </ul>	Diesel fuels #1 & #2, gasoline, hydraulic fluid, motor oil, transmission fluid, lubrication oil
Grays Harbor PUD 1	2700 Cherry St, Aberdeen	Petroleum hydrocarbon
Qwest Corporation	<ul style="list-style-type: none"> <li>216 N. I St, Aberdeen</li> <li>684 Pt. Brown, Ocean Shores</li> </ul>	Diesel, lead, sulfuric acid
Satsop Development Park	50 Enterprise Lane, Elma*	Diesel fuel #2, gasoline, nitrogen, sulfuric acid
Simpson Door Company	400 Simpson, McCleary	Diesel fuel #2
Tacoma Power & Utilities	Wynoochee Dam*	Diesel fuel #2, gasoline
USCG Station	Westport	Diesel fuel #2
Verizon NW	211 S. Montesano, Westport	Sulfuric acid
WA Army National Guard	298 Clemonds Rd, Montesano*	Diesel fuel #2
WDFW Fish Hatcheries	<ul style="list-style-type: none"> <li>3914 W Fish Hatchery Rd, Elma*</li> <li>1704 Kirkpatrick Rd, Humptulips*</li> <li>4203 Lk. Aberdeen, Aberdeen*</li> </ul>	Diesel, parasite S, formaldehyde
Walsh Distributing	<ul style="list-style-type: none"> <li>361 Dock St, Westport</li> <li>1215 N. Montesano, Westport</li> </ul>	Diesel fuel #1 & #2, gasoline, lubrication oil
Washington Crab Producers	1980 Nyhus N, Westport	Ammonia anhydrous, nitrogen, propane
Westport Shipyard	<ul style="list-style-type: none"> <li>1807 Nyhus, Westport</li> <li>2850 Stevens Way, Hoquiam</li> </ul>	Acetone, styrene
Weyerhaeuser Sawmill	500 N. Custer, Aberdeen	Diesel fuel #2, hydraulic fluid
Weyerhaeuser Co.	425 Perry St, Aberdeen	Diesel fuel #2, lubrication oil

Facility	Location(s)	Chemical(s)
Weyerhaeuser Pulp Mill	1701 First St, Cosmopolis	Ammonia, chlorine dioxide, defoamer, Diesel fuel #2, diethylethanolamin, eco-brite 1500, fuel oil #6, gasoline, grease, hydrochloric acid, hydrogen peroxide, jet fuel, light distillate, magnesium oxide, methanol, molten sulfur, monamide, morpholine, Nalco, nitric acid, oxygen, ploycarboxylic acid, polymer, propane, resin rinse, sodium bisulfite, sodium borohydride, sodium chlorate, sodium hydroxide, sodium, sulfur dioxide, surfactant, talc
Washington Department of Transportation	<ul style="list-style-type: none"> <li>• SR 101, Amanda Park*</li> <li>• 4801 SR 12, Aberdeen*</li> <li>• SR 12, Elma*</li> </ul>	Diesel fuel #2, gasoline, liquid deicer, striping paint

Most hazardous material incidents at fixed facilities are due to equipment failures and human error. Extreme natural hazards, such as earthquakes and tsunamis, can destroy structures with hazardous materials on site.

A new source of hazardous materials in Grays Harbor County is the growing number of illegal methamphetamine laboratories, or as they are more commonly referred to as “meth labs.” The most common hazardous materials found at meth labs include flammable, volatile solvents, such as methanol, ether, benzene, methylene chloride, or trichloroethane, as well as toluene. Other common household chemicals include muriatic acid, sodium hydroxide, table salt, and ammonia.

Because of the typically careless manufacturing process used, many of the chemicals contaminate a property. Some household materials, such as carpeting, wallboard, ceiling tile, or fabric, may actually absorb spilled chemicals. Furniture or draperies may also become contaminated. Soil or groundwater (including nearby drinking water wells) may become contaminated if chemicals are dumped in a septic system or on the ground. A Washington Department of Health study found that of the total number of injuries sustained from meth labs, 38% were law enforcement officers or fire fighters, 33% were members of the general public (most were the manufacturers of the meth), and 29% were employees of a business.<sup>4</sup> The most frequent injuries involved respiratory irritation, eye irritation, and gastrointestinal problems.

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<sup>4</sup> The employees most commonly exposed to meth lab toxics were motel workers (a common meth lab site), refuse collectors, and propane gas delivery workers.

## **Transportation Systems**

Highways, railways, marine routes, and pipelines are the primary transportation corridors for transporting hazardous materials within Grays Harbor County. Each of these transportation corridors is a potential avenue for hazardous materials incidents, especially within the unincorporated areas.

### **Highways**

The principle routes for hazardous materials include US 101, SR 12, SR 8, and SR 105. Most shipments of hazardous materials along these corridors by private trucking carriers terminate in Grays Harbor County, although conceivably there is some traffic continuing to communities beyond county lines to such destinations as Forks to the north and Raymond/South Bend to the south.

The Federal Motor Carrier Safety Administration (FMCSA) and the Washington State Patrol (WSP) Commercial Vehicle Division are the responsible agencies for regulating the carrying of hazardous materials over highways in the county. With the passage of federal legislation in 2004, the FMCSA requires Safety Permits for vehicles carrying the following hazardous materials and quantities:

- Class 7 Radioactive materials – all quantities
- Explosives – greater than 55 pounds
- Materials poisonous by inhalation
  - ◆ Hazard Zone A – one or more liters
  - ◆ Hazard Zone B – 119 or more gallons
  - ◆ Hazard Zone C & D – 3,500 or more gallons
- Compressed or refrigerated liquefied methane, liquefied natural gas, or other liquefied gas with a methane content of at least 85% - 3,500 or more gallons

Under the law, private motor carriers are responsible for tracking and maintaining records of all shipments. These records must include a written route plan, the name of driver, vehicle identification, the hazardous material being transported, and the communication log. The law also requires communication between truck and the carrier at least once every two hours.<sup>5</sup>

Because neither the FMCSA nor the WSP maintains databanks of issued Safety Permits, there is no available resource identifying hazardous materials or private motor carriers that carry these materials on Grays Harbor County highways. Therefore, it is safer to assume that any hazardous materials used at fixed facilities in the county may reach them via the highways.

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<sup>5</sup> The motor carrier must contact local law enforcement if a no contact period exceeds three hours.

Hazardous material incidents along highways typically result from faulty equipment that cause leaks or spills, collisions with other motor vehicles, or crashes caused by human error or weather-related conditions.

## **Railways**

The Puget Sound and Pacific Railroad (PSAP), a subsidiary of RailAmerica, Inc., is the only rail carrier operating within Grays Harbor County. The company operates a 150-mile rail service carrying approximately 14,000 carloads annually. Based at Elma, PSAP has links to the national rail network via connections to the Burlington Northern and Santa Fe Railway (BNSF) at Centralia, Washington and the Union Pacific Railroad (UP) at Blakeslee Jct., WA. PSAP provides significant rail links to manufacturing and port facilities in the county as far west as Hoquiam as well as north to Shelton and the US Naval Facilities at Bangor, Keyport, and Bremerton.

Table 2 below, summarized from the PSAP Hazmat Security Plan, shows which hazardous materials it carries on its railways.

**Table 107**  
**Hazardous materials carried on the Puget Sound and Pacific Railroad (2003).**

Hazardous Materials	No. of Cars	Normal Route
Propane	270	Centralia-Belfair-Silverdale
Ammonia Nitrate	120	Centralia-Elma
Explosives – All Classes	700	Centralia-Banger
Nuclear Material	16	Centralia-Bangor
Sodium	120	Centralia-Elma
Sodium Borohydroxide	300	Centralia-Elma
Sulfuric Acid	75	Centralia-Aberdeen
Sodium Chlorate	100	Centralia-Aberdeen
Caustic Soda	250	Centralia-Aberdeen

*Source: Puget Sound and Pacific Railroad*

PSAP has an extensive emergency response plan that addresses hazardous materials and natural hazards along its rail lines.

Derailments present the greatest threat of creating a hazardous material incident on railroads. These may occur because of a natural hazard (flooding, earthquake, or tsunami), equipment failures, unsuitable tracks, or collision with motor vehicles. Mechanical failures and negligence by operators can also cause rail accidents that result in hazardous material incidents.

## **Marine Traffic**

Grays Harbor County marine waters and the Grays Harbor Estuary are vital transportation conduits for commercial shipping, commercial fishing, and recreation vessels. While the bulk of this traffic is off the Pacific coastline, many vessels use the Grays Harbor Estuary as well. Large commercial vessels rely on a dredged channel to access port facilities within the estuary.

Cargo-handling facilities include the Port of Grays Harbor facilities in Aberdeen and Hoquiam, the Weyerhaeuser facilities in Aberdeen and Cosmopolis, and the Sierra Pacific Industries in Junction City. The Port of Grays Harbor also operates the largest commercial fishing and recreational vessel marina within Westport. The US Coast Guard and other private businesses maintain smaller docking facilities within Westport, Hoquiam, and Aberdeen that serve special or limited vessel traffic. The only county commercial marine fueling facilities are Chevron Fuel Dock and Walsh Distributing in Westport.

The regulation of hazardous materials on commercial vessels falls under the jurisdiction of two bodies. The Hazardous Materials Standards Division of the US Coast Guard (USCG) develops standards and industry guidance to promote the safety of life and protection of property and the environment during marine transportation of hazardous materials. This includes transportation of bulk liquid chemicals and liquefied gases, hazardous bulk solids, and packaged hazardous cargoes as well as hazardous materials used as ships' stores and hazardous materials used for shipboard fumigation of cargo.

The division develops and maintains the safety requirements for marine vapor control systems and establishes occupational health and safety program guidance for maritime and Coast Guard personnel. Other specific functions involve the classification of new bulk liquids, gases and solid hazardous cargoes before their shipment and the issuance of special permits for transport of bulk solids, maintenance of chemical hazards and attributes databases, and publication of the Chemical Data Guide for Bulk Shipment by Water.

The International Maritime Organization Dangerous Goods (IMODG) Code, an agency of the United Nations, also regulates hazardous materials at sea handled by vessels bearing flags of member states. Like the USCG regulations, the IMODG Code covers specific issues relating to handling, packing, container traffic and stowage, and the segregation of incompatible substances.

No state or federal agency keeps a database regarding the type and quantity of hazardous material cargoes of vessels passing through Grays Harbor County coastal or

estuarine waters.<sup>6</sup> None of the cargo facilities within the county regularly handles materials rated as hazardous, although commercial shipping vessels may already have such cargo onboard that is destined for other ports. Likewise, ships navigating waters off the Pacific coast are not required to provide information to any local, state, or federal authorities on their type and amount of cargos.

However, the one known category of hazardous materials always associated with marine traffic is petroleum products. Petroleum products, especially diesel, gasoline, and oil, are common to all ships' stores regardless of size. Barge traffic of bulk petroleum supplies is very common as well.

Weather, collisions, equipment failure, and operator error are the main causes of marine hazardous material incidents. Hazardous material incidents most often involve liquids – diesel and gasoline. Accidents in Washington Pacific coastal areas more frequently involve barges pulled by tugboats. Studies show that when petroleum spills occur, recovery rates seldom exceed 20%.

The Pacific Coast-British Columbia Oil Spill Task Force has identified the Grays Harbor coastline as being of high risk for fishing vessels up to 50 nautical miles, cargo vessels up to 25 nautical miles, and laden tank barges up to 15 nautical miles.

## **Pipelines**

Grays Harbor County has two major underground pipelines that deliver natural gas: 1) the Northwest Pipeline (Williams Companies) Grays Harbor Lateral and the Cascade Natural Gas Vail-to-Aberdeen line.

Northwest Pipeline completed the Grays Harbor Lateral in November 2002 to serve the proposed Duke Energy Combustion Turbine Project at the Satsop Industrial Park. This 20-inch line is 49 miles long and ties into Northwest Pipeline's main interstate line near the town of Rainier in Thurston County. It is capable of transporting 161,500 dekatherms (Dth) of natural gas per day. Although the Duke Energy Plant has yet to use this supply, Northwest Pipeline manages the lateral to stockpile gas, especially in the fall and winter months to satisfy peak demands.

Northwest pipeline also extends its McCleary Lateral into Grays Harbor County for about 30 miles, whereby the gas transfers to the Cascade Natural Gas line.<sup>7</sup> The Cascade natural gas line is 8-inch and provides natural gas to the communities of McCleary, Elma, Montesano, Aberdeen, and Hoquiam. A 4-inch line stems from the

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<sup>6</sup> Vessels serving ports on the West Coast that do not make a call in Grays Harbor typically stay 30 to miles off-shore.

<sup>7</sup> Northwest Pipeline is a transmission company – it uses its pipelines to convey natural gas to distribution companies like Cascade Natural Gas.

main line at Satsop to serve the Satsop Industrial Park to the south. A SCADA system monitors flows and pressures within this line.<sup>8</sup> Cascade Natural Gas maintains a large network of small-diameter distribution lines throughout its service areas.

Due to security concerns, both Northwest Pipeline and Cascade Natural Gas provided limited information for this report.

Natural gas is stable, non-corrosive, and non-polymerizing. However, when released, it readily mixes with air to form a combustible atmosphere. If mixed with some strong oxidizing agents such as chlorine, bromine, pentafluoride, oxygen difluoride, and nitrogen trifluoride in a confined space, natural gas can burn or explode. It will ignite spontaneously when mixed with chlorine dioxide. Natural gas can ignite if there is a heat source from 900 – 1200 degrees Fahrenheit and if it exists at 4% to 16% of the present air by volume. If it exists at proportions below or above those limits, it will not burn or explode.

Explosion and fire are the primary hazards associated with natural gas pipeline incidents. These incidents most frequently happen due to puncture of the line during ground disturbance or construction that causes the rupture of underground lines. Other incidents may result from leaking transmission lines caused by corrosion or faulty equipment utilizing natural gas.

### **History of Hazardous Material Incidents**

Hazardous material incidents occur in Grays Harbor County frequently. However, the vast majority of these incidents involve small quantities and/or happen at a fixed facility with very limited to no impact to people or the environment. For example, the log at the Grays Harbor County Emergency and Risk Management Division (ERMD) for 2003 through 2004 showed 15 separate incidents, 10 at fixed facilities, three involving transportation systems, and two miscellaneous situations. The number of drug labs reported was 50 in 2003 and 24 in 2004.

However, the vast majority of these reports were minor and not what the Department of Transportation's Office of Hazardous Materials Safety (OHMS) would define as a "serious incident," which entails:

- A fatality or major injury caused by the release of hazardous material;

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<sup>8</sup> Supervisory Control and Data Acquisition (SCADA) systems. Industrial accidents cover incidents that occur at fixed site facilities, such as manufacturing plants, or along transportation systems like highways or railway lines. SCADA systems are computer-based apparatus that monitor and control industrial plants, transportation networks, or pipelines typically in large geographic areas. One purpose of SCADA systems is to warn when conditions become hazardous  
<http://www.kenonic.com/18022002/industry/pipe/pipe1.asp>

- The evacuation of 25 or more people as a result of a release of hazardous material or exposure to fire;
- A release or exposure to fire which results in the closure of a major transportation artery;
- The alteration of an aircraft flight plan or operation;
- The release of radioactive materials from Type B packaging;
- The release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant; or
- The release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material.

In fact, “serious” hazardous material incidents on this scale are both rare and infrequent. Most hazardous waste enforcement actions in Grays Harbor County have focused on small, routine, or periodic releases beyond what a state or federal permits allow. For instance, this has happens frequently with several local manufacturing firms who exceed their air and water pollution control permit standards.

Many reported hazardous material incidents involve small-scale spills and atmospheric releases of hazardous materials due to human error or equipment failure that require minimal response. Between 1995 and 2004, the Department of Ecology received reports of over 1,200 such incidents. While the cumulative consequences of small toxic releases into the environment can be extremely dangerous to humans and the environment over the long-term, they are not equivalent to a serious one-time hazardous materials incident.

Information about serious hazardous material incidents in Grays Harbor County is available through the county records, state documents, and archived newspapers. Tables 3 and 4 provides a summary of known incidents.

**Table 108**  
**Fixed Facilities**

Site(s)	Date	Description of Incident
Weyerhaeuser Pulp Mill Cosmopolis	7/11/02	Release of 50-55 pounds of chlorine dioxide into the atmosphere. The cloud eventually dissipated as it traveled southeast of the mill. Portions of the mill as well as the Highlands Golf Course and 10 residents were evacuated for three hours. US 101 was closed between the Cosmopolis-Aberdeen city line and the junction with SR 107. No injuries. Damage estimated at \$10,000. Weyco staff contained the leak. Weyco fined \$10,000.
Weyerhaeuser Pulp Mill Cosmopolis	5/27/04	353 lbs. of sulfur dioxide released into the atmosphere.
Weyerhaeuser Pulp Mill Cosmopolis	7/17/04	Approximately 29,000 gallons of sulfur dioxide leaked into the plant’s sewer system. Contained and no injuries.

Contaminated properties from Clandestine Drug Labs (CDL)	2004	The Washington Department of Health reports that 20 properties in Grays Harbor County, four of which are in the unincorporated areas of the county, are listed as CDL contaminated sites.
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**Table 109  
Transportation Systems**

Site(s)	Date	Description of Incident
United Transportation Barge	3/11/64	A 200-foot fuel barge towed by the Seattle tug Neptune, carrying 2,352,000 gallons of gasoline, diesel, and stove oil, drifted ashore between Moclips and Pacific Beach. Spill of 1.2 million gallons destroyed all beach life for a 10-mile area and severely affected sea life along the beaches to the north on the Quinault Reservation.
Nestucca Barge (Sause Towing)	12/23/88	The Nestucca barge and its tender Ocean Service collided at the mouth of Grays Harbor. 231,000 gallons of fuel oil spilled from the ruptured barge, killing 3,500 sea birds and other sea life from Grays Harbor to Vancouver Island. The total cost of the clean up cost was \$27.68 million (1997 dollars).
Reinhard Petroleum Truck Explosion	11/27/03	A tanker truck carrying 11,000 gallons of gasoline overturned and exploded on Highway 8 mp 1 eastbound. The cause of the accident was driver error due to icy road conditions. The truck and fuel burned for hours, forcing closure of Highway 8 and requiring a detour on county roads.

Of all the serious hazardous material incidents that have occurred in Grays Harbor County, the United Transportation and Nestucca incidents rank as having the most significant impact to the environment and the highest monetary cost. Both incidents account for being in the top five oil spills of all time within Washington waters. The Nestucca case in particular spurred the Washington State legislature soon afterwards to establish an innovative spill prevention and response program.

To date, there have been no serious hazardous material incidents involving railways or pipelines.

### **Asset Vulnerability Analysis for Structures and People**

The presence of hazardous materials in the community does not necessarily mean that the population and the environment are at extreme risk. Risk from serious hazardous materials incidents is a function of many variables, which include:

- The likelihood of a release occurring;

- The inherent hazards of the chemical combined with the quantity released; and
- The potential impact of the release to the public and environment

For instance, the risk of a hazardous material incident is low if a release occurs frequently but the quantity of the material is typically small and does not generally migrate off-site. Such events are frequent within the urban centers of the county, especially at manufacturing plants and in situations involving the use of petroleum products.<sup>9</sup> Similarly, if the probability of a catastrophic release is low, even though it could affect large numbers of people or wide areas of the environment, the overall risk remains low. Relying solely on historic evidence, it suggests that the risk of a serious hazardous material incident within the county overall is relatively low for fixed facilities but slightly higher for some transportation systems.

Regardless of the overall low risk level for hazardous material incidents within unincorporated Grays Harbor County, people, property, and the environment share varying degrees of vulnerability depending on a wide range of highly variable factors.

Fixed facilities present an overall lower vulnerability to the unincorporated county than transportation systems. The very fact that they are “fixed” in a relatively controlled environment is a benefit at reducing vulnerability through containment. Stringent regulations governing hazardous materials at fixed facilities are a mitigation measure that limits overall vulnerability. These regulations establish a thorough system from how to handle hazardous materials on a daily basis to clear and immediate response during emergencies. Fixed facilities also are highly controlled environments that have external emergency response resources immediately available during emergencies.

On the other hand, hazardous material incidents associated with transportation systems do not share the same beneficial attributes, especially containment. Rail or marine routes do not always share the same accessibility to an incident site as fixed facilities. In some situations, incident sites can be quite remote and uncontrollable, as seen in the case of the United Transportation Barge event when heavy seas, surf, and remote location made recovery slow and containment impossible, thereby expanding the vulnerability of the surrounding area. Rail lines can be highly inaccessible in certain locations, slowing recovery, which in turn increases vulnerability. Highway incidents may be more accessible, but the distance of a site from a response team can be much longer than a fixed facility, thereby increasing the potential vulnerability of people, property, and the environment to the incident.

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<sup>9</sup> Records at the Washington Department of Ecology’s Spill Response Program show that of 1,200 reported environmental incidents in Grays Harbor County between 1995 and 2004, 37.5% involved petroleum products.

Complicating the vulnerability analysis process for hazardous material incidents is the lack of specific data associated with risk. Because the US Environmental Protection Agency does not require handlers of hazardous materials to assess the level of risk of an occurrence at fixed facilities or with transportation systems, this makes assessing vulnerability difficult. This is unlike natural hazards such as earthquakes, landslides, and tsunamis, where the production of maps and scientific data clearly delineate affected areas.

For this reason, assessing the vulnerability of people, property, and the environment in the county's unincorporated areas for hazardous material incidents is possible only in more general terms than typical for natural hazards.

### Fixed Facilities

The majority of fixed facilities with significant hazardous materials countywide are within urban areas, thus reducing direct vulnerability of people, property, and environment in the unincorporated areas to a hazardous material incident. Of these fixed facilities, however, the Rohm and Haas plant within the City of Elma and the Cosmopolis Pulp Mill within the City of Cosmopolis present the most vulnerability to the unincorporated areas if a rare, catastrophic serious incident occurred. A minor gas leak require emergency services personnel to take precautionary measures for county residents and livestock up to 0.2 miles during the day and 0.8 miles during the night downwind from the incident site.<sup>10</sup> A major gas leak would increase those distances to 1.5 miles during the day and 4.5 miles during the night. Isolation areas typically range from 100 to 800 feet circumference from the incident site. Rural population levels affected by major incident might number from 500 to 2,500, depending on wind and other weather factors. The transportation networks, especially highways and railways, would be vulnerable to closure at each location for a minor or major leak. Likely highway closures would include SR 12 at locations around Elma and north of Junction City. Closure of the rail line near these areas would disrupt commerce.

An accident involving significant quantities of hazardous materials in a liquid state potentially could reach unincorporated groundwater resources or waterways if on-site containment systems fail. A large diesel or gasoline storage facility collapse would be such an example. This includes any fixed facility in a city or the unincorporated areas. Unincorporated vulnerability may include wells serving rural properties, endangered livestock, and extensive damage to environmental resources affecting fish and wildlife. Short- and long-term economic impacts could be extensive, with the most significant losses focused on agricultural operations, potable water supplies, and fish and wildlife resources that support tourism.

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<sup>10</sup>Based on chlorine or similar material; data from the 2004 Emergency Response Guidebook, which is available via: <http://www.chemicalspill.org/FIRST/ref.html>

An explosion at any fixed facility site may create collateral off-site damage. Adjacent structures and properties are most vulnerable. Explosions may increase vulnerability if they lead to a release of gaseous or liquid hazardous materials.

### Transportation Systems

The majority of highway, marine, and pipeline transportation systems pass through the unincorporated areas of Grays Harbor County. Any asset, whether it involves people, property, or the environment, is vulnerable along each corridor. The extent of the vulnerability is highly variable, given the type and quantity of the material, the accessibility of the site, on-board containment systems or abilities, surrounding environmental conditions, local land uses, and weather conditions. Because of so many variables, it is safer to assume that any person in a structure or vehicle, any land use, any public infrastructure, and the environment as a whole located adjacent to a transportation corridor, is highly vulnerable to a hazardous material incident at any moment in time.

Highways and railways present the greatest range of vulnerabilities – they can pass through rural areas that are quite remote with low densities, such as north of Humptulips on US 101, to areas with large populations like Central Park. Any residences adjacent to these corridors are vulnerable to hazardous material incidents, especially involving gaseous, flammable, or explosive materials. Depending on the cargo, a worst-case scenario may involve an isolation area 1,000 feet in circumference and an area to take precautionary measures up to five miles downwind of a gas-based incident.

Rural areas that pass by highways and rail lines are especially vulnerable to liquid releases. Livestock, commercial and noncommercial fish and wildlife resources, and contamination of groundwater that supply rural residents with potable water supplies, are extremely vulnerable to liquid spills. Moving water bodies or topography can increase the distribution of hazardous liquids in some areas, which in turn can increase vulnerability to a larger area.

Properties and people near natural gas pipelines are vulnerable to explosion and/or fire at any location where a rupture occurs. Because no information is available on risk factors for either the Grays Harbor Lateral or Cascade Natural Gas pipelines, it is difficult to assess vulnerability of pipelines of this size.

Hazardous material incidents along the marine waters are unique from those shared by fixed facilities and other transportation systems. The marine coastline is particularly vulnerable to hazardous materials spilled by cargo ships and barges. This is especially true of fuel and oil spills. Spills off the Grays Harbor coastline can contaminate beaches and marine environments as far north as Vancouver Island, British Columbia. Valuable

and sensitive marine environments critical to fish and wildlife, commercial fin and shellfish businesses, property values, and tourism are all vulnerable to the impacts of spills. Because only 20% of spill material is typically recoverable in marine waters, it can take many years for these environments to recover. Average cost estimates<sup>11</sup> for oil spills run as follows:

- Clean up - \$369 per gallon
- Natural resource damage - \$112 per gallon
- Economic claims - \$429 per gallon

## **Asset Vulnerability Analysis for County and Critical Facilities**

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### **County Facilities At-Risk to Hazard Materials Incidents**

All county facilities are potentially at-risk to hazardous materials incidents.

### **Critical Facilities Serving County Government & Residents At-Risk to Hazard Materials Incidents**

All critical facilities are potentially at-risk to hazardous materials incidents.

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<sup>11</sup> 1997 US \$ equivalents, 2002 West Coast Offshore Vessel Traffic Risk Management Project, West Coast States – British Columbia Oil Spill Task Force, Appendix C.