

BROKEN PROMISE #6

Pollution



Pamela A. Miller

The Promise

Pollution from oil and gas development is insignificant.

The Reality

Oil development activities generate significant pollution.

More than 2,500 chemicals are used by the oil and gas industry.¹ These chemicals in liquid and gas form, together with dust and particulate matter, pollute the environment and can be harmful to people. Noise is also a significant source of oil industry pollution with impacts to wildlife and people. Although laws are in place to regulate hazardous substances found in oil and used in its production, these laws are often violated and the opportunities for accidents, spills and leaks are significant. Furthermore, the oil industry is exempt from many regulations and is not required to report all information about pollution and toxic waste management, making it difficult to document all the sources and full extent of pollutants.

Many types and sources of pollution

In Arctic Alaska drill rigs, pump stations, refineries, compressor plants, production centers, seawater injection plants, sewage treatment plants, operation centers, power stations, turbines, generators, storage tanks, gravel pits, and gas flaring are all sources of pollution. Quantities of other pollution sources, including buses and trucks, bulldozers and seismic vehicles, small incinerators, fuel tanks, airplanes, and dust from gravel pits and roads, are unknown because they do not require permits. Some of the types, sources, and impacts of pollution that can occur throughout the oil development process, from construction to drilling to waste disposal, are described in Table 6.1.

Drilling muds

Drilling muds are a mixture of water, oil, and chemicals, and are used to lubricate drill bits and prevent pressure blowouts during drilling.² When rock cuttings are brought up out of the drill hole they are contaminated with these muds, as well as with hazardous substances found naturally beneath the earth, such as arsenic, mercury, and radioactive materials.³

Seawater may also be used to enhance oil recovery, and it becomes what is known as produced water when it is drawn back up a well with the recovered oil and gas. It carries contaminants including radioactive compounds, carcinogens like benzene, naphthalene and toluene, ammonia and hydrogen sulfide.⁴ Produced water accounts for up to 95% of waste generated in most oil fields.⁵ When spilled on the tundra, produced water kills vegetation and creates long-lasting damage.⁶

In spite of these dangers, drilling muds, produced waters and other wastes resulting from oil and gas exploration or production are exempted from the hazardous waste requirements of the Resource Conservation and Recovery Act (RCRA).⁷ If used by drycleaners, these same substances would be classified as hazardous.⁸

- ▷ The oil and gas industry generates many pollutants, not all of which are regulated.
- ▷ The oil industry enjoys special exceptions to rules regulating drilling wastes and air emissions.
- ▷ Oil industry Clean Air Act and Clean Water Act violations are not uncommon.



Exxon Valdez Oil Spill Trustee Council

Pollution	Impacts	Source
Dust	Can stunt vegetation growth, decrease air quality, and contribute to respiratory problems.	Construction activity, Vehicle traffic
Particulate Matter	Contributes to haze. Inhalation of particulates can cause respiratory ailments and cancer.	Vehicles, engines, machinery, gas venting and flaring
Diesel fuel	Fuel and exhaust contain carcinogenic substances.	Drilling muds, vehicles, engines and machinery
Toxic Metals	Toxic health effects.	Drilling muds, produced water, gas venting and flaring, diesel exhaust
Hydrogen Sulfide	Aggravates respiratory conditions, can cause central nervous system and cardiovascular problems.	Gas venting and flaring
BTEX (benzene, toluene, ethylbenzene, and xylenes)	Benzene is a carcinogen. Toluene may affect reproductive and central nervous systems. Ethylbenzene and xylenes have respiratory and neurological effects.	Gas venting, produced water, off-gassing from waste storage
Nitrogen oxides	React with other compounds to form ground level ozone and particulate pollution, and other toxins. Can affect lungs, heart, and central nervous system. May cause biological mutations.	Engine and vehicle exhaust, gas flaring
Polycyclic aromatic hydrocarbons	May be carcinogenic and cause reproductive problems in animals.	Diesel exhaust, gas flaring and off-gassing of stored waste
Methane	A greenhouse gas that contributes to climate change.	Gas venting
Sulfur dioxide	Reacts with other chemicals to form particulate pollution.	Engines, vehicles, gas flaring
Volatile organic compounds	Can combine with nitrogen oxides to form ground-level ozone, which can cause respiratory ailments such as asthma, and decreased lung function.	Gas venting and leaks, off-gassing from stored wastes, gas flaring, vehicles
Noise	Disrupts wildlife behavior and migration.	Air traffic, vehicles, machinery, all operations

TABLE 6.1: Oil Industry Pollution and its Sources ⁹

Air pollution

The oil industry in Alaska has permission from the state to extend the official boundaries of its polluting facilities by as much as 250 meters on each side, creating an “air quality exclusion zone.” This essentially increases the area that an oil company is allowed to pollute by nearly four times,¹⁰ which allows air emissions to become diluted enough to meet federal standards.¹¹

The oil industry on Alaska’s North Slope annually generates more than twice the amount of nitrogen oxides than Washington, D.C. and many other U.S. cities.¹² Thousands of tons of sulfur dioxide, particulate matter,

carbon monoxide and volatile organic compounds are also emitted annually, along with the greenhouse gases methane and carbon dioxide.¹³ The Alaska Department of Environmental Conservation reported in January 2008 that Alaska’s oil and gas industry is the single largest contributor of greenhouse gas emissions in the state, accounting for 15.26 Million Metric Tons of carbon dioxide equivalents.¹⁴

Of all contaminated sites in Alaska, 81% are polluted by petroleum products.¹⁵

Clean Air and Water Act violations

Clean Air and Clean Water Act violations by the oil industry in Alaska are not uncommon. For example, 470 Clean Water Act violations in five years were incurred by ConocoPhillips in Cook Inlet.¹⁶ The same company violated the Clean Air Act at its Alpine oil field as a result of high carbon monoxide emissions exceeding what was permitted by the air quality permit for a year-long period.¹⁷ British Petroleum is also facing millions of dollars in fines for both Clean Air and Clean Water Act violations associated with a series of oil spills that occurred in 2006 as a result of pipeline corrosion and maintenance problems.¹⁸ And the Environmental Protection Agency is still investigating a 2003 incident where toxic drilling muds were dumped into coastal waters at Prudhoe Bay.¹⁹

These and many other examples highlight how pollution is a serious problem for the oil industry in Alaska and compliance remains an issue. Both state and federal agencies have resisted tightening rules²⁰ and oil companies have been permitted to operate with exceptions, exemptions, or in violation of standards.²¹

According to the National Academy of Sciences little research has been done to quantify the effects of air pollution on the North Slope.²² Especially if oil development expands into new and previously undeveloped areas, it will be important to better understand the full scope and extent of pollution caused by oil and gas development activities and curb its impacts.

Exxon Valdez Oil Spill Trustees Council

¹ Rae, Phil. Eliminating environmental risks in well construction and workovers. Presentation to the Society of Petroleum Engineers. Cited in: Earthworks. Industry information on oil and gas chemicals. Retrieved March 20, 2009 from website: (<http://www.earthworksaction.org/Industrychemicals.cfm>).

² Pacific Northwest Pollution Prevention Research Center. (1993) Pollution prevention opportunities in oil and gas production, drilling and exploration. P. 4. Report funded by the Alaska Department of Environmental Conservation. Retrieved from: <http://www.p2pays.org/ref/03/02975.pdf>.

³ Smith, K.P. (1992, December). An overview of naturally occurring radioactive materials (NORM) in the petroleum industry. Argonne National Laboratory, ANL/EAIS-7. Cited in: Mall, Amy. (2007, October). Drilling down: protecting western communities from the health and environmental effects of oil and gas production. Natural Resources Defense Council.

⁴ Wills, J. 2000. Muddied waters: A survey of offshore oilfield drilling wastes and disposal techniques to reduce the ecological impact of sea dumping. *Ekologicheskaya Vahkta Sakhalina* (Sakhalin Environment Watch). p. 139.

⁵ Pacific Northwest Pollution Prevention Research Center. P. 3.

⁶ Rosen, Yereh. (2001, April 17). Pipeline leaks oil on Alaska tundra. Reuters.

⁷ 40 CFR 261.4(b)(5).

⁸ Trustees for Alaska. 2005. Above the law: Oil industry exemptions from federal regulations. Fact sheet. Retrieved from website: http://www.trustees.org/programs/Arctic/Oil_in_the_arctic/FS_Exemptions_index.html.

⁹ Oil & Gas Accountability Project. Oil and gas pollution fact sheet. Retrieved from website: <http://www.earthworksaction.org/publications.cfm?pubID=143>. Last visited August 25, 2009.

¹⁰ Alaska Department of Environmental Conservation Air Quality Construction Permit No. 9973-AC015, section B.11.a-b, at 3.

¹¹ Trustees for Alaska. 2005. Air pollution. Fact sheet. Retrieved from website: http://www.trustees.org/programs/Arctic/Oil_in_the_arctic/FS_Exemptions_index.html.

¹² Environmental Protection Agency. (2000). National air pollutant emissions trends: 1900-1998. Table 2.2. Originally cited in Miller, Pam. Broken promises: the reality of big oil in America's arctic. p. 2.

¹³ U.S. Army Corps of Engineers. (1999, June). Final Environmental Impact Statement Beaufort Sea Oil and Gas development/Northstar project. Vol. III, Table 5.4-7.

¹⁴ Alaska Department of Environmental Conservation. 2008. Alaska greenhouse gas emission inventory. Website: http://www.climatechange.alaska.gov/docs/ghg_ei_rpt.pdf.

¹⁵ Alaska Department of Environmental Conservation. (2007, January). Alaska's legacy of oil and hazardous substance pollution: cleanup and management of Alaska's contaminated sites. P. 17.

¹⁶ U.S. Environmental Protection Agency. (2004, August 13). ConocoPhillips to pay \$485,000 for Cook Inlet wastewater violations. Press release.

¹⁷ Conoco Phillips and Alaska Department of Environmental Conservation. March 2004. Settlement agreement on Alpine central processing facility.

¹⁸ Loy, Wesley. Week of May 31, 2009. BP fights state lawsuit. Petroleum News.

¹⁹ Carlton, Jim. (2005, October 9). EPA pursues report that oil crew dumped polluted mud in Alaska. Wall Street Journal.

²⁰ Planet Hazard's Top Ten Polluters in North Slope Borough, Alaska. www.planethazard.com (last visited March 31, 2009).

²¹ Trustees for Alaska. 2005. Above the law Fact sheet; Van Tuyn, Peter. (2006, September 12). Written testimony for United States Senate Committee on Energy and Natural Resources, Hearing on BP pipeline failure.

²² National Research Council. 2003. Cumulative environmental effects of oil and gas activities on Alaska's North Slope. Washington, DC: National Academies Press. p. 10.