

2.9 Hazardous Materials and Solid Waste

2.9.1 Key Issues

As industrial development in the PRB has increased, so too has the use of hazardous materials and the disposal of hazardous waste. Air, water, soils, and biological resources potentially could be affected by an accidental release or misuse of hazardous materials that could occur during transportation, storage, or use for various industrial activities.

2.9.2 Study Area

The baseline study area for hazardous materials and solid waste includes all or portions of Sheridan, Johnson, Campbell, and Converse counties (see **Figure 1-1**). It includes most of the area administered by the BLM Buffalo Field Office, a portion of the area administered by the BLM Casper Field Office, and a portion of the TBNG, which is administered by the FS (see **Figure 1-2**). State and private lands also are included in the study area (see **Figure 1-3**).

2.9.3 Current Conditions

2.9.3.1 Regulatory Framework

Hazardous Materials

"Hazardous materials" are defined in various ways under a number of regulatory programs and include materials regulated by the statutes and regulatory programs listed below. Many of the hazardous materials or substances are regulated under more than one program.

- Substances that are covered under the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200).
- "Hazardous materials" as defined under the U.S. Department of Transportation (USDOT) regulations at 49 CFR, Parts 170-177.
- "Hazardous substances" as defined by the Comprehensive Environmental Response, Compensation, and Liability Act and listed in 40 CFR Table 302.4.
- "Hazardous wastes" are defined in the Resource Conservation and Recovery Act (RCRA). Procedures in 40 CFR 262 are used to determine whether a waste is hazardous waste. RCRA regulations have specific definitions of what constitutes hazardous waste and how such wastes are managed and disposed.
- Any "hazardous substances" or "extremely hazardous substances," as well as petroleum products such as gasoline, diesel, or propane, that is subject to reporting requirements (Threshold Planning Quantities) under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act (SARA).
- Petroleum products defined as "oil" in the Oil Pollution Act of 1990. The types of materials subject to these requirements include fuels, lubricants, hydraulic oil, and transmission fluids.

In conjunction with the definitions noted above, the following lists provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- The SARA Title III List of Lists or the Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(r) of the Clean Air Act.
- The USDOT listing of hazardous materials at 49 CFR 172.101.

Solid Wastes

RCRA governs the handling and disposal of solid wastes (USEPA 2006). Solid wastes comprise a broad range of materials that include garbage, refuse, sludge, non-hazardous industrial waste, municipal wastes, and hazardous wastes. Solid wastes as defined include solids, liquids, and contained gaseous materials. Hazardous wastes exhibit certain characteristics (as defined by laboratory analysis), are generated from specific industrial processes, or are chemical compounds that if abandoned could pose a threat to human health and the environment.

In most cases, hazardous materials consist of products and materials that are used and consumed during industrial activities. Examples of such materials could include cement, fuel, solvents, acids, and many other chemicals and products. Often the hazardous constituents comprise a small percentage of the product being used, with the rest of the material in the product being inert or not defined as hazardous under any of the programs listed above. If these materials are not consumed during ordinary use and are regarded as waste, and if a waste is determined to be a hazardous waste, it must be handled and disposed of according to strict rules under the RCRA. The RCRA program in Wyoming is delegated to the Hazardous and Solid Waste Division of the WDEQ. If the material to be discarded is determined not to be a hazardous waste, the material must be disposed of, or recycled in, a manner according to the applicable statutes and regulations.

Certain types of materials (e.g., used oil), while they may contain potentially hazardous constituents, are specifically exempted from regulation as “hazardous wastes.” The WDEQ also has regulations concerning management of certain types of hazardous materials. Other wastes that otherwise might be classified as hazardous are managed as “universal wastes” and are exempt from hazardous waste regulations as long as those materials are handled in ways specifically defined by regulation. An example of a material that could be managed as a universal waste is lead-acid batteries. As long as lead-acid batteries are recycled appropriately, accumulation, transportation, and disposal requirements for hazardous waste do not apply.

The USEPA has specifically exempted certain waste materials generated in oil and natural gas exploration and production from regulation as hazardous wastes (USEPA 2002). To classify as an exempt exploration and production waste, these materials must be intrinsic or uniquely associated with the production of oil and natural gas. Examples of exempt wastes include produced water, drilling fluids, and drill cuttings. Although specifically exempted from regulation as hazardous wastes, exempt wastes are solid wastes and must be disposed of in ways that are protective of human health and the environment. Disposition of exempt wastes is regulated by the WOGCC, the BLM, or the WDEQ, depending on the particular waste and how it must be disposed.

The BLM does not regulate the handling of hazardous materials or non-exempt solid waste; therefore, they do not maintain a database of the amount of materials consumed or potentially spilled at coal mines or any other industrial sites in the Wyoming PRB study area (Henke 2012). The BLM also does not track the types of wastes that are generated for the same reason. Specific to the oil and gas industry, the WOGCC disclosure rule for hydraulic fracturing requires disclosure of the types of amounts of hazardous materials used in oil and gas well completions. The BLM hydraulic fracturing rules proposed in 2012 would require disclosure of similar information, but only from wells drilled where there is a federal interest.

2.9.3.2 Coal Mining and Other Mining Operations

The primary hazardous materials that are consumed during coal mine operations include petroleum fuels and lubricants. **Table 2.9-1** presents a generic list of potentially hazardous materials typically used in surface coal mining operations. The amounts of these materials would vary considerably from mine to mine based on production methods and overall output from the mine. The fuel used is primarily diesel for excavators, heavy equipment, and haul trucks. The fuels are stored at the various mines in tanks

(aboveground or underground) that have release containment systems and spill contingency plans to handle leaks and larger spills.

In addition to storage of fuels and lubricants in stationary tanks, mobile tanker trucks are used to provide fuel for excavators, haul trucks, and other equipment. Portable tanks and drums also would be stored in a manner to prevent spills from reaching soils or water. Used oil would be recycled through a licensed used oil recycler during the life of the mine.

Table 2.9-1 Potentially Hazardous Materials Used in Typical Surface Coal Mining Operations

Material	
Diesel	Brake fluid
Gasoline	Grease
Explosives	Lead-acid batteries
Gear lubricant	Solvents (i.e., petroleum naphtha)
Engine lubrication oil	Chlorine (for water supply treatment)
Hydraulic oil	Herbicides
Ethylene glycol (antifreeze)	Dewatering well treatment chemicals (i.e., hydrochloric acid)

Source: U.S. Army Corps of Engineers 2002.

During the operational lives of the mines, the probability of minor spills of materials such as fuel and lubricants would be relatively high. These releases could occur during fueling operations or from equipment failure (e.g., hydraulic hose failure). Spills of this nature would be localized, contained, and disposed of in accordance with the applicable laws and regulations. Accidents involving other hazardous materials also could occur during mine operation. Mine operations are required to develop and maintain a site-specific Spill Prevention, Control, and Countermeasure (SPCC) Plan to deal with unplanned releases of petroleum products. They also have Emergency Response Plans that establish procedures for responding to accidental spills or releases of hazardous materials to minimize health risks and environmental effects. The plans include procedures for evacuating personnel, maintaining safety, cleanup and neutralization activities, emergency contacts, internal and external notifications to regulatory authorities, and incident documentation. Proper implementation of the SPCC and Emergency Response Plans has reduced the potential for major impacts associated with potential releases of hazardous materials.

Some of the materials listed above may become hazardous wastes (i.e., spent solvents). Materials that are considered hazardous must be accumulated, transported, and disposed of under very specific requirements. A review of the USEPA's Enforcement and Compliance History Online database indicates that the coal mines in the PRB do not generate large amounts of hazardous waste, and most of the mines are classified as Small Quantity Generators or Conditionally Exempt Small Quantity Generators.

Non-hazardous solid wastes generated at coal mining operations typically consist of floor sweepings, empty containers, scrap metal, tires, filters, office trash, and food waste (BLM 2010). Some of these items may be disposed of within the mine boundaries in accordance with WDEQ-solid waste disposal plans. Other waste is discarded at permitted off-site landfills. Used lubrication oil and batteries are recycled in accordance with applicable regulations.

2.9.3.3 Conventional Oil and Gas, Coal Bed Natural Gas, and Pipelines

Drilling operations for conventional oil and gas, and CBNG are very similar. Many of the potentially hazardous materials used in drilling the wells are the same. However, the amounts of material used for CBNG wells are somewhat less, because the wells generally are shallower. The materials used in these industries include fuels, lubricants, additives, and explosives. **Table 2.9-2** lists the types of hazardous materials that could be used for drilling and completion operations.

In addition to materials used in the drilling of wells, there are materials that are used and consumed in the production operations of oil and natural gas wells. Some of the common materials are listed in **Table 2.9 3**. Some materials may be used exclusively for oil well operations and others used exclusively for gas wells and associated gas processing and compression.

Table 2.9-2 Potentially Hazardous Materials Used in Typical Oil and Gas Well Drilling and Completion Operations

Material	
Diesel	Engine lubricants
Gasoline	Biocides
Drilling fluid additives	Solvents
Caustics	Paint and thinners
Well completion and treatment fluid and additives	Pipe thread sealer
Silica sand	Explosives (for perforating)
Corrosion inhibitors	Compressed gases
Cement	Lead-acid batteries
Cement additives	Ethylene glycol
Hydraulic fluids	

Sources: BLM 2003; FS and BLM 2003.

Table 2.9-3 Potentially Hazardous Materials Used in Typical Oil and Gas Well Production Operations

Material	
Well workover treatment chemicals	Methanol (line freezing prevention, gas wells)
Emulsion breakers (oil wells)	Water treatment chemicals
Corrosion inhibitors	Catalysts (natural gas processing, sulfur recovery)
Triethylene glycol (natural gas dehydration)	Caustics (gas treatment)
Biocides	Paint and thinners
Diesel	Lead-acid batteries
Gasoline	Herbicides
Amines (natural gas processing)	

¹ Includes field gas processing and gathering pipelines.

Source: Interstate Oil and Gas Compact Commission 1999.

Produced water, a RCRA-exempt oil field waste, comprises the largest waste stream that is generated as a result of oil and gas production operations (National Petroleum Council 2011). In the Wyoming PRB study area, disposal of produced water from oil and gas wells is regulated by the WOGCC and WDEQ. Disposal of produced water is accomplished by re-injection into oil and gas zones for pressure maintenance, injected into saline aquifers through the use of saltwater disposal wells, or discharged to the surface. Injection of produced water is regulated by the WOGCC except for areas defined as Indian Country. Discharge to the surface is regulated by the WDEQ for both quantity and quality, with discharge of the groundwater occurring through WDEQ-permitted outfalls in accordance with permit requirements. Most of the water produced in association with CBNG production is discharged to the surface. The produced water volume associated with oil and gas production was 21 billion barrels for the U.S. in 2007. In the Wyoming PRB study area in 2008, approximately 110 million barrels of produced water was attributed to conventional oil and gas production and approximately 660 million barrels to CBNG production (AECOM 2011).

In addition to the potentially hazardous materials that would be used and generated during oil and gas drilling and production operations, the products derived from these activities are considered hazardous. Oil, condensate, natural gas liquids, and methane can be considered hazardous materials either because of their volatility, flammability, or explosive nature. There are standards and regulations that apply as well to the storage and transportation of these products.

Natural gas pipelines also would use potentially hazardous materials. Materials typically used in the construction and operation of transportation pipelines include fuels (diesel, gasoline, methane), lubricants, water treatment chemicals, ethylene glycol, propylene glycol, methanol, sand blast media, and acids.