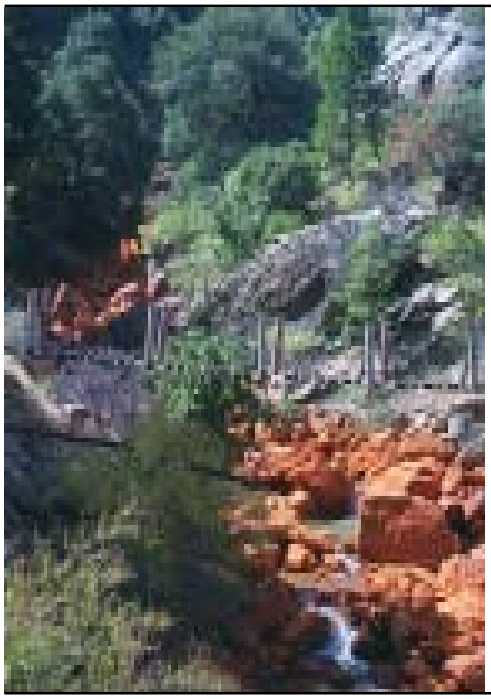
U.S. Environmental Protection Agency

Abandoned Mine Lands Team



Reference Notebook

September 2004

Front Cover Photos, top to bottom: Lower retention pond at Libby Asbestos Mine, Libby, Montana; Rocks stained by acid mine drainage in Squaw Creek, Mammoth Mine, California; Mine tailings piles in residential areas of Eureka, Utah.

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Chapter 1

Introduction

This reference document is intended to illustrate the extent of the abandoned mine lands (AML) contamination problems across the U.S. and the range of actions that EPA's AML Team intends to take in addressing this problem. Its aim is to provide assistance to EPA staff in better coordinating their AML functions. *The policies and procedures set forth herein are intended as guidance for employees of the U.S. Environmental Protection Agency. They do not constitute rulemakings by the Agency and may not be relied on to create a substantive or procedural right enforceable by any person. The Government may take action that is at variance with the policies and procedures in this reference document. This is a living document and may be revised periodically without public notice. Nothing in this document constitutes a regulatory determination nor does the use of definitions reflect official Agency policy.*

Waste rock pile and warning sign at Mammoth Mine, California.

This document is divided into six parts:

- Chapter 1, an introduction to EPA's AML Team;
- Chapter 2, an overview of the cause and extent of the AML problem;
- Chapter 3, an overview of EPA's AML Programs;
- Chapter 4, a summary of federal AML Programs;
- Chapter 5, a review of state AML Programs; and
- Chapter 6, a look at AML site reuse and redevelopment.

As this document provides an overview of many topics, numerous appendices and tables supplement the text by offering a deeper examination of individual chapter components.

1.1 The Scope of Abandoned Mine Lands

As a first step in understanding the AML problem, the AML Team created the following scope:

> *"Abandoned mine lands" are those lands, waters, and surrounding watersheds contaminated or scarred*

by the extraction, beneficiation or processing of ores and minerals (excluding coal). Abandoned mine lands include areas where mining or processing activity is determined to be temporarily inactive.

For purposes of this reference document, "abandoned mine lands" are those lands, waters, and surrounding watersheds contaminated or scarred by the extraction, beneficiation or processing of ores and minerals (excluding coal). Abandoned mine lands include areas where mining or processing activity is determined to be temporarily inactive.

This scope is intended to focus the AML Team on the chemical and physical contamination problems at hardrock mines. Although this scope does not specifically state it, mining operations associated with coal, oil, natural gas, gravel, sand, and stone are not included as abandoned mine lands. However, mining sites associated with phosphate extraction are included as abandoned mine lands, even though they are categorized as "leasable minerals" in the glossary.

1.2 Role of EPA's Abandoned Mine Lands Team

EPA's AML Team has been created to provide EPA Headquarters and regions access to expertise on issues at abandoned mine sites. The team is a subgroup to the already existing EPA National Mining Team (NMT) and will address issues related to abandoned mine sites. The AML Team will also serve as a focal point for coordinating and facilitating EPA policy, funding, process, and technical issues with stakeholders such as, but not limited to, National Mining Association, Mineral Policy Center, Bureau of Land Management (BLM), U.S. Department of Agriculture (USDA) Forest Service, Western Governors Association (WGA), states, tribes, and others on abandoned/inactive mine research, characterization, cleanup, and redevelopment activities.

A goal of the AML Team is to set priorities for the evaluation, cleanup, and redevelopment of abandoned mine sites to reduce federal government financial liabilities in addressing these sites. This group has also been established to identify and resolve key EPA technical and policy issues at abandoned mine sites to promote a nationally consistent and fiscally sound decision-making process for AML sites across the country. In addition, the AML Team will work to identify opportunities to prevent future AML problems in active mining operations. This team will work with and support existing Office of Superfund Remediation and Technology Innovation (OSRTI) teams and national teams (e.g., remedy selection, sediments, National Mining team). The AML Team is composed of regional and Headquarters technical and policy staff from EPA's Office of Enforcement, OSRTI, Office of Solid Waste (OSW), and Office of Radiation and Indoor Air (ORIA).

For more information on EPA's Abandoned Mine Lands Program, visit: http://www.epa.gov/superfund/programs/aml.

Chapter 2

Background

To set the stage for discussing the problems associated with abandoned mines, this document will first present how ore and mineral extraction and beneficiation of specific minerals and metals occurs. The nature and extent of the abandoned mine lands problem is discussed, followed by a general overview of the estimated costs of addressing the problem.

2.1 The Processes of Hard Rock Mining

Metals are mined from two basic types of deposits, lode and placer deposits. Lode deposits are concentrated mineral deposits in solid rock. Iron, copper, lead, gold, silver, and zinc are mined mainly from lode deposits. Placer deposits are alluvial deposits of sand, gravel, and rock, containing valuable metals. They usually contain metals that were once part of a lode deposit. Only a small percentage of domestic gold and silver is derived from placer deposits.

Metal mining processes include extraction and beneficiation. Extraction removes the ore from the ground; beneficiation concentrates the metal in the ore by removing unwanted constituents.

2.1.1 Mining and Ore Extraction

Most ore-bearing rock lies beneath unwanted "overburden." Accessing the ore may be as environmentally destructive as the beneficiation and processing of the ore.

Historical mine portal at Elizabeth Mine, Strafford, Vermont.

The following describes three basic approaches to mining/ extracting ore:

- Surface or open-pit mining, which requires blasting rock, soil movement, and vegetation removal to reach lode deposits. Open pit mining is the primary domestic source of iron, copper, gold, and silver. Open pit mining was also once the principal means of uranium mineral extraction.
- Underground mining entails sinking a shaft to reach the main body of ore. Underground mines do not create the volume of overburden waste associated with surface mining. Lead, antimony, and zinc mining are solely underground operations in the U.S.
- Solution or fluid mining entails drilling into intact rock and using chemical solutions to dissolve lode deposits. During solution mining, the leaching solution, usually a dilute acid, penetrates the ore and dissolves soluble metals. This pregnant leach solution is then retrieved for recovery at a solvent extraction and electrowinning plant. This method of mining is used to recover copper, gold, and uranium.

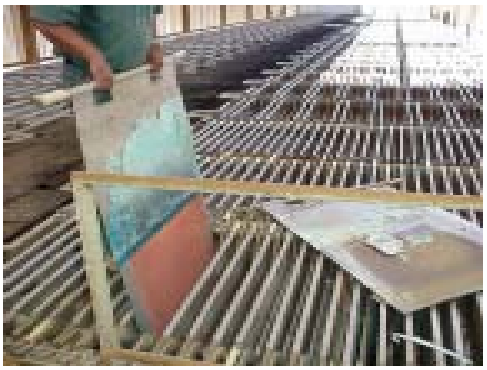
2.1.2 Beneficiation

Beneficiation is the process of concentrating or enriching ores. Under regulations promulgated pursuant to the Resource Conservation and Recovery Act (RCRA) , (40 CFR §261.4) beneficiation of ores and minerals is defined as including the following activities: crushing, grinding, washing, dissolution, crystallization, filtration, sorting, sizing, drying, sintering, smelting, pelletizing, briquetting, calcining to remove water and/or carbon dioxide, roasting, autoclaving, and/or chlorination in preparation for leaching, gravity concentration, magnetic separation, electrostatic separation, flotation, ion exchange, solvent extraction, electrowinning, precipitation, amalgamation, and heap, dump, vat, tank and in situ leaching.

Some of the more commonly used practices of beneficiation include the following:

- **Milling** extracts ore to produce uniform-sized particles using crushing and grinding processes.
- **Magnetic separation** is used to sort magnetically susceptible minerals from gangue minerals by applying a magnetic field. Iron ores are commonly separated this way.
- **Flotation** uses a chemical reagent to make minerals adhere to air bubbles for collection.
- **Gravity concentration** separates minerals based on differences in their gravity.

- **Thickening/filtering** removes most of the liquid from slurried concentrates and mill tailings.
- **Leaching** is the process of extracting a soluble metallic compound from an ore by selectively dissolving it in a solvent such as water, sulfuric or hydrochloric acid, or cyanide solution. The desired metal is then removed from the "pregnant" leach solution by chemical precipitation or another chemical or electrochemical process. Leaching methods include dump, heap, and tank operations.
- **Smelting** requires melting down the metallic ore concentrate, and the metal is separated from other substances in the concentrate.
- **Electrowinning** mixes a metal-bearing solution with chemicals that transfer the metal to a more concentrated solution called an electrolyte. The electrolyte is pumped to steel tanks. Starter sheets hang in the solution and, using an electric current, the metal is plated from the electrolyte onto the sheet, forming purer metal on the plates.



Former copper leachate collection, concentration, and electrowinning operations at Anaconda Mine, Yerington, Nevada.

2.1.3 Mineral Specific Operations

The following summaries describe the extraction and beneficiation processes used for mineral-specific mining operations and the associated wastes generated during these processes:

- **Iron** ore is almost exclusively surface mined. Typical beneficiation steps applied to iron ore include: milling, washing, sorting, sizing, magnetic separation, flotation, and agglomerations. Milling followed by magnetic separation is the most common beneficiation sequence used, according to the American Iron Ore Association. Agglomeration generates byproducts such as carbon dioxide, sulfur compounds, chlorides, and fluorides. Primary wastes are overburden/waste rock and tailings.
- **Copper** is generally extracted from surface, underground, and increasingly, from in situ operations (the practice of percolating dilute sulfuric acid through ore to extract copper). Beneficiation of copper consists of crushing and grinding; washing; filtration; sorting and sizing; gravity concentration; flotation; chlorination; dump and in situ leaching; ion exchange; solvent extraction; electrowinning; and precipitation. The methods vary according to the particular copper ore characteristics and economic factors. Approximately half of copper beneficiation occurs through dump leaching, while the other half uses flotation. Typical leaching agents include hydrochloric and sulfuric acids.

Mining operations are performed throughout the U.S., but the concentration of metal mining is in the western region of the country.

Solvent extraction requires impure leach solutions containing copper, iron, and other base-metal ions to be mixed with an active organic extractant, usually kerosene, forming a copper-organic complex. Primary wastes include overburden/waste rock, tailings, spent ore and spent or escaped leach solutions.

- **Lead** and **zinc**, which are typically found together in common ores, are extracted from underground operations. Beneficiation of lead and zinc includes crushing and grinding; filtration; sizing; flotation; and sintering of concentrates. Flotation is the most common method for concentrating lead-zinc minerals. Lead-zinc ores are conditioned to prepare for flotation; common conditioners include lime, soda ash, caustic soda, or sulfuric acid. Reagents used in the flotation processes typically include sulfur dioxide, zinc sulfate, coal tar, copper sulfate, and sodium or calcium cyanide. Primary wastes consist of overburden/waste rock and tailings.
- **Gold** and **silver**, also typically found together in common ores, are extracted from surface, underground, and in situ (experimental) operations. Beneficiation consists of three principal techniques: cyanide leaching, flotation of base metal ores followed by smelting, and gravity concentration. Cyanide leaching generated 88 percent of all domestic lode gold in 1991. Over half of the silver produced in 1991 was from smelting concentrates produced by flotation. Gravity concentration is used primarily for gold and silver placer deposits. Primary wastes include overburden/waste rock, spent process solutions, tailings, slag, and spent ore.
- **Uranium** has been extracted from surface, underground, and in situ operations, and quite commonly produced along with either precious metals, copper, vanadium, or phosphate from the same geologic deposit. The mining of uranium ores by both underground and surface methods produces large amounts of bulk waste material, including bore hole drill cuttings, excavated top soil, barren overburden rock, weakly uranium-enriched waste rock, and subgrade ores (or protore). At some abandoned mine sites, ore enriched with uranium was left on site when prices fell, while transfer stations at some distance from remote mines may contain residual radioactive soil and rock without any visible facilities to mark their location. Beneficiation enrichment of ores and chemical processing to yield "yellowcake" takes place at mills, which place their finely ground waste rock byproducts in tailings impoundments. In situ operations have moved the chemical processing steps from the mill to plants at the solution well field site and directed spent leachate solutions and produced

water to evaporation ponds; the evaporite and any disturbed soil and drill cuttings are either buried on site or trucked to other disposal locations.

2.1.4 Diversity of the Mining Industry

Mining operations are performed throughout the U.S., but the concentration of metal mining operations is in the western region of the country. Copper deposits are found primarily in Utah, Michigan, New Mexico, and Arizona. The majority of gold and silver production in the U.S. is concentrated in Nevada, Montana, Idaho, and Colorado. The Viburnum area of Missouri is the center of U.S. lead production. Alaska is the largest producer of zinc; central Tennessee and northern New York are also major zinc sources. Phosphate is mined primarily in Florida. Additional large-scale phosphate operations are also located in North Carolina, and smaller operations are located in Idaho, Montana, and Utah. More than 90 percent of the U.S. uranium production has come from sandstone deposits located in western states. Most of those deposits occur in Wyoming, Colorado, Utah, New Mexico, Arizona, and Texas.

Ore extraction pit at Anaconda Mine, Yerington, Nevada.

2.1.5 The End Result of Mining Activities

Due to fluctuating market value and depleted concentrations of ore, mines are often abandoned after they are no longer profitable. As a result, inactive and abandoned mines often contain significant environmental and public safety hazards. If market prices increase and ore processing technologies allow for greater metal recovery, mines may become active again as low-grade ores become profitable to reprocess. In other instances, abandoned mine lands and their environs may be reused and redeveloped for other purposes beyond mining (e.g., golf courses and wind farms).

2.2 Nature of the Problem

The extraction and beneficiation of ores to produce metals result in significant waste generation and unwanted byproducts. Initial site preparation creates erosion due to the removal of vegetation. Blasting and excavation of the overburden to allow access to the ore or mineral body may produce acid mine drainage (AMD), erosion of sediments, and waste rock. Blasting and exploration drill holes may alter natural patterns of ground water flow providing new and unsuspected migration paths for mine contaminants into surface and ground water bodies. Crushing and ore concentration generates waste rock, additional tailings, and possible AMD from drainage of waste rock or tailings piles. Beneficiation and mineral processing may produce spent process and leach solutions, spent ore, slag, sludge from neutralization of contaminated water, and

particulate and gas emissions including compounds such as carbon dioxide, sulfur compounds, chlorides, and fluorides.

The extraction and beneficiation of ores to produce metals result in significant waste generation and unwanted byproducts.

2.2.1 Contaminant Origins

Mine contamination can originate from any number of source areas at an abandoned or inactive mine. The following describes typical sources:

- **Waste rock and overburden dumps** are generally constructed on unlined terrain or backfilled in previously excavated areas.
- **Tailings** are created by most beneficiation processes and usually leave the mill as a slurry. They contain a mixture of impurities, trace metals, and residue of chemicals used in the beneficiation process. Typically, tailings consist of 40 to 70 percent liquid mill effluent and 30 to 60 percent solids. (Liquids are commonly used in the milling processes.) Most mine tailings are disposed of in on-site impoundments. However, slurried tailings are sometimes disposed of as backfill into underground mines to provide ground or wall support.
- **PCB-containing electrical equipment** may be found in mines throughout the world because electrical systems in mines follow the same general patterns as any other industry. This threat is particularly prevalent in the mining industry because mines generally penetrate the water table. When polychlorinated biphenyls (PCBs) are spilled or PCB equipment is abandoned underground, the PCBs can be expected to be released into the ground water with no possibility of source retrieval. This can result in water pollution for which there may be no solution.
- **Surface impoundments** are created to de-water tailings and as a holding area for the tailings. They are also used as evaporation ponds for process waters or waste water cleanup of in situ leach operations.
- **AMD**, or highly acidic water rich in metals, forms as a result of a chemical reaction of surface water and/or shallow subsurface water with rocks that contain sulfur-bearing minerals (e.g., pyrite). This reaction causes oxidation to produce ferrous ions and sulfuric acid, which can cause metals to be leached from rocks that come in contact with the acid. When mixed with ground water, surface water, and soil, AMD may have harmful effects on humans, animals, and plants as it poisons ground and drinking water and destroys aquatic life and habitat. AMD is accentuated and accelerated by mining activities such as extraction and beneficiation.

Wind and water erosion of tailings piles at Anaconda Mine, Yerington, Nevada.

1960s photo of mine effluent in Davis Mill Creek and the Ocoee River and, at center, the acid production facility: Copper Basin Mining area, Ducktown, Tennessee.

These mining activities increase the rate of these chemical reactions by exposing increased surface area of sulfide rock material, which would have otherwise been protected in the host rock where oxidation occurs very slowly. Increased erosion of the surrounding areas is an additional AMD impact that feeds into its destructive cycle. Acid drainage can and does occur naturally when sulfide minerals are exposed to weathering and react with water and oxygen to produce sulfuric acid. This natural process is acid rock drainage.

- **Heap leaching** produces spent ores, spent leach and process solutions, sludge, and slag.

Unlined leachate and contaminated ground water evaporation ponds at Anaconda Mine, Yerington, Nevada.

2.2.2 Environmental Hazards

Sedimentation and Sediment Contamination

Surface runoff can carry AML-originated silt and debris downstream, eventually leading to stream clogging. Sedimentation results in the blockage of the stream and can cause flooding of roads and/or residences and pose a danger to the public. Sedimentation may also cause adverse impacts on fish.

Another sediment concern is the large area of land that is disturbed during mining operations. As a result, erosion can be a major concern at mining sites. This type of erosion can cause significant loading of sediments and pollutants into nearby water bodies. The sediments are then deposited in naturally low-lying lands, impacting surface water, ground water, and terrestrial systems. Minerals associated with deposited sediments may lower the pH of surface runoff, mobilizing metals that can infiltrate into the surrounding subsoil or can migrate to nearby waters. Contaminated sediments may lower the pH of soils enough to destroy suitable habitat for vegetation and wildlife.

Acid mine drainage leaking from the Stowell portal at Mammoth Mine, California.

Water Pollution

AMD is a serious problem at many abandoned mines. Abandoned mines can produce AMD for more than 100 years and, consequently, pose significant risks to surface water and ground water. AMD can lower the pH of surrounding surface water, making it corrosive and unable to support many forms of aquatic life and vegetation. Humans may also be affected by consuming water and fish tissue with a metal content.

Inactive copper leachate collection pond adjacent to heap leach pile (left) at the Anaconda Mine, Yerington, Nevada.

Acid leaching operations are a potential source of water pollution. The leaching process itself resembles AMD, but is conducted using high concentrations of acids to extract metals from the ore. The leaching process produces large volumes of metal-bearing acid solutions. Most of the environmental

damage associated with leaching is caused by leakage, spillage, or seepage of the leaching solution. Therefore, the leach dumps and associated extraction areas need to be designed to prevent releases.

Mercury contaminated waters at the Sulfur Bank Mercury Mine at Clear Lake, Califorina.

Surface water can be contaminated by runoff containing AMD, metals, acid solutions from leaching, and sediment loading due to erosion. In the past, overburden and tailings were sometimes placed in the stream beds because they were natural depressions. This loaded the stream with metals and AMD. The lowered pH and increased metal content may damage aquatic animals and vegetation, as well as humans and other organisms that drink from the streams or eat plant and animals that have bioaccumulated hazardous substances from the stream.

Ground water can be contaminated when there is a hydraulic connection between surface and ground water, when there is mining below the water table, and when waters infiltrate through surface materials (including overlying wastes or other material) into the ground water. Blasting, underground mine excavations and collapse, and exploration drilling all can create pathways for water seepage through mines into ground water. Ground water is also affected by the pumping of mine water that creates a cone of depression in the ground water table increasing infiltration. It can take decades or centuries for ground water to return to its pre-mining level after pumping stops.

Air Pollution

Air pollution occurs at mining sites during excavation and transportation. Blowing dust from AML sites is a common concern, as many mines are in arid western states. Some sources of dust may be from road traffic in the mine pit and surrounding areas, rock crushers located in pits and in mills, and tailings ponds. The toxicity of the dust depends on the proximity of environmental receptors and the type of ore being mined. High levels of arsenic, lead, and radionuclides tend to pose the greatest risk, according to EPA's 1997 "National Hardrock Mining Framework" and radiation guidance from EPA's Office of Radiation and Indoor Air.

Exhaust fumes from diesel engines and blasting agents may also be a serious hazard in underground mines. These exhausts produce carbon monoxide and nitrogen oxide gas, which collect in underground areas. Radon gas from the decay of naturally occurring radioactive materials is present in all rocks and mines and may accumulate to hazardous levels in underground mines, or be vented from unclosed air shafts resulting in high concentrations in surface air in some mine districts.

2.2.3 Public Safety Hazards

In addition to numerous environmental hazards, abandoned mine sites present many threats to public safety. In response to the dozens of injuries resulting from individuals exploring or playing on mine property, the U.S. Department of Labor's Mine Safety and Health Administration (MSHA) created "Stay Out - Stay Alive," a public safety campaign to educate children and adults about the existing hazards at active and abandoned mine sites. The following describes some of the public safety hazards that can exist at abandoned mine sites:

- Vertical mine shafts - Usually hundreds of feet deep, they may be completely unprotected at the surface, hidden by vegetation or covered by rotting boards;
- Horizontal openings - Rotting timbers and unstable rock formations can make cave-ins a real danger;
- Deadly gases - Lethal concentrations of gases can accumulate in underground passages;
- Unused or misfired explosives - Vibrations from a touch or footfall can trigger an explosion;
- Highwalls, or excavated vertical cliffs - Highwalls in open pit mines and quarries can become unstable and prone to collapse;
- Stockpiles - Hills of loose material or refuse heaps can unsuspectingly collapse;
- Hidden rock ledges and mining debris - Water-filled quarries and pits can hide rock ledges, old machinery, and other hazards.

Irrigation and mine runoff drainage ditch near Anaconda Mine, Yerington, Nevada.

Erosion on mine tailings ponds at Kennecott Copper Mine, Magna, Utah.

2.2.4 Who is Affected?

The historic impact of mining on the environment is significant. Contaminants from mining affect the biological, recreational, industrial, and municipal use of watersheds for many miles. AMD and metals affect waterbodies and water supplies and the aquatic organisms, vegetation, and humans that rely on them for survival purposes. Modern mines are required to more fully address environmental concerns through the permit process.

In addition to numerous environmental hazards, abandoned mine sites present many threats to public safety.

The following overview provides examples of the environmental impacts that mining activities have caused:

- Environmental problems and liabilities have resulted from cyanide heap-leach gold mining operations at the Zortman-Landusky Gold Mine in Montana. Now bankrupt and abandoned, the mining operations impacted surrounding communities, water and cultural resources. Numerous cyanide spills from the mine have contami-

Warning sign near Anaconda Mine, Yerington, Nevada

Contaminants from mining affect the biological, recreational, industrial, and municipal use of watersheds for many miles.

nated local tap water with cyanide concentrations above drinking water standards and contaminated nearby streams.

- Surface water and ground water contamination resulted from numerous sources of the Summitville Mine in Colorado. Cyanide-bearing processing solutions mixed with acidic ground water as they began leaking into an underdrain system beneath the heap leach pad. Several times over the course of mining operations, cyanide solutions also leaked from transfer pipes directly into the Wightman Fork of the Alamosa River. Due to extensive downstream use of the Alamosa River water for livestock, agricultural irrigation, and wildlife habitat, the environmental problems at Summitville have been of particular concern. A 1990 disappearance of stocked fish from Terrace Reservoir and farm holding ponds along the Alamosa River was suspected to have been caused by increased acid and metal loadings from Summitville.
- In 1990, nearly 11,000 fish were killed over an 80-kilometer stretch of the Lynches River in South Carolina when rains caused an earthen dam to collapse and release more than 10 million gallons of a cyanide solution.
- In 1969, an uncontrolled release of contaminated water from Iron Mountain Mine (mined for copper, gold, silver, and zinc) in California killed approximately 200,000 salmon. Due to discharges with rates as high as 1,500,000 gallons per day from Iron Mountain Mine, AMD and metal contamination caused a decline in King Salmon as well.
- At the East Helena Smelter in Montana (smelted lead and zinc), blood tests in children residing in the adjacent community had shown blood-lead levels twice the national average. The sources of contamination were primary and fugitive emissions and seepage from process ponds and process fluids.
- The Plant City Chemical Complex (produced phosphoric acid) in Florida had contaminated aquifers beneath the plant. Elevated levels of fluoride, sodium, gross alpha radiation, metals, sulfate, and total dissolved solids were detected in wells in excess of applicable guidance concentrations and/or state and federal drinking water standards.
- A 1972 aerial radiation survey of selected western state communities found over 500 habitable buildings had been constructed with uranium mine waste rock. In 2001, EPA removed a Utah house constructed with uranium waste, due to radiation levels in the living area 500 times greater than the maximum permissible level.

2.3 Extent of the Problem

There is little agreement on the number of abandoned mine lands and what constitutes or defines an AML. For example, individual mine "features" are sometimes used to delineate individual AML sites, whereas in other instances, collections of mine features for an individual mining operation are defined as an AML site. This has resulted in varying methods for conducting AML inventories among agencies, states, and mining-related associations. For instance, the 1997 EPA "National Hardrock Mining Framework" estimates over 200,000 inactive and abandoned mines nationwide, although a 1993 estimate by the Mineral Policy Center puts the number of hardrock abandoned mines at 557,650 nationwide.

Multiple inventories exist for various agencies, states, and mining-related associations across the country. Each entity possesses their own methods of designation, identification, and prioritization for AML sites within their universes making comparisons and coordination difficult for AML response, reclamation, and policy development managers. However, with the emergence of multi-agency, state, and association collaborations in developing AML inventories, hope exists of producing standardized, complete, and comparable AML universes to help in AML response and reclamation efforts as well as the development of useful, worthwhile and consistent AML policy. A compilation of other programs and organizations involved in the AML reclamation process can be found in Appendix D of this document. A more detailed look into the various inventory studies conducted by the agencies and programs involved in addressing AML can be found in Table 2-1.

Large tailings pile at the Elizabeth Mine, Strafford, Vermont.

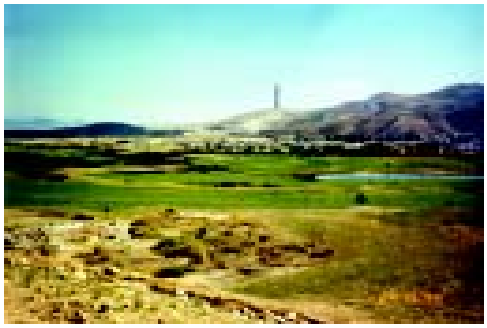
Highwall at Golden Sunlight Mines near Whitehall, Montana.

2.4 Magnitude of Cleanup Costs

Information on the actual cost of AML site cleanup is not readily available to the public. However, several major studies have been conducted in the past regarding the possible cost associated with addressing AML sites.

Information developed by the Department of Energy for inclusion in an international report on remediation of uranium production facilities found that for 22 U.S. mines, the cost for cleanup per metric ton of ore produced ranged from a low of $0.24 to a high of $33.33. A median was approximately $3.00 and the average costs for all mines was $5.07. The cleanup costs did not include long term maintenance and water treatment.

As of April 2002, EPA's estimated and actual cleanup costs at 88 NPL mining sites were over $2.8 billion.



Anaconda smelter (smokestack in background) and reclaimed wetlands in foreground, Anaconda, Montana.

A 2001 study conducted by Resources for the Future (RFF), *Superfund's Future: What Will It Cost?*, determined that the average cost of addressing a mining site under the Superfund program is approximately $22 million per site. The study also found that the problem of cost is further compounded by increasingly insufficient financial assurance amounts being provided by mining companies. As a result, western states could face unfunded reclamation bonding liabilities exceeding $1 billion.

According to the General Accounting Office (GAO) 1996 report, *Federal Land Management: Information on Efforts to Inventory Abandoned Hard Rock Mines*, the Forest Service estimates about $4.7 billion and the National Park Service (NPS) about $165 million in costs to reclaim AML sites on the public lands that they manage.

In 1993, the Mineral Policy Center estimated that the worst 363,000 (out of 557,650) AML sites would require between $32 and $72 billion for reclamation.

In the 1991 scoping study, *Inactive and Abandoned Noncoal Mines*, by the Western Interstate Energy Board, estimates for the cost of reclamation were presented for 31 states. The estimated costs ranged from $1.3 billion in Missouri to $2.5 million in Nevada. Table 2-2 provides a summary of the estimated reclamation costs per state as presented in the 1991 Western Interstate Energy Board report.

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Chapter 3

EPA's Abandoned Mine Lands Programs

As environmental policies became increasingly focused on the integration of multi-media, multi-statute approaches in dealing with environmental concerns posed by hardrock mining, EPA recognized the need to develop a framework to improve the understanding of the use of existing authorities and the role of other stakeholders. In 1997, EPA developed the *Hardrock Mining Framework*. The primary purpose of the framework was to promote a coordinated approach at mining sites, which would lead to the protection of human health and the environment over the long-term. The Framework presents recommendations and action items to assist the Agency in meeting these goals at mining sites. One of the recommendations from the Framework included that "the Agency should promote use of a geographic/risk-based approach to determining priorities for Inactive and Abandoned Mine (IAM) reclamation. Setting priorities and selecting appropriate cleanup strategies (including tools for implementation) should be conducted in cooperation with appropriate stakeholders."

Setting priorities and selecting appropriate cleanup strategies (including tools for implementation) should be conducted in cooperation with appropriate stakeholders.

In response to the Hard Rock Mining Framework and its recommendations, the National Mining Team was formed in 1998. The NMT is composed of Regional and Headquarters technical and policy staff from EPA's Office of Water, Office of Enforcement, Office of Air and Radiation, and OSRTI. This group has been established to identify and resolve key technical and policy issues at active, inactive, and abandoned mine sites to promote a nationally consistent decision making framework for mine sites across the country. In 2001, the AML Team, reporting to EPA's Office of Emergency and Remedial Response (OERR) (now OSRTI) Director, was created as a subgroup to the National Mining Team. The primary goal of the AML Team is to facilitate evaluation and cleanup of abandoned mine sites and to find ways to reduce federal government financial liabilities at these sites.

3.1 Current AML Team Initiatives

In an effort to provide a general scope of the AML problem, the AML Team has developed this document to act as an internal EPA reference document. It is intended to illustrate the extent

of AML contamination problems across the U.S., the regulatory complexity inherent with AML issues, and the course that EPA's AML Team intends to take in addressing this problem.

Since its inception, the AML Team has been active in forming collaborations with other agencies and programs, as well as private organizations involved in addressing AML. One goal of the AML Team in forging such collaborations is to develop an inventory of AML sites that are located on private lands and pose serious threats to human health and the environment. In an attempt to begin building the foundation for such a multi-agency AML inventory, the AML Team has started by assessing and compiling information from EPA data sources.

An initial AML inventory of 562 sites was compiled primarily from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database and information gathered by EPA Regional staff. The result is the CERCLIS and EPA Regional AML Inventory, presented in Appendix A of this report. However, it should be noted that this is an initial step toward a more collaborative and complete inventory as envisioned by the AML Team. Next steps may include further research and assessment into other available EPA resources, as well as initialization of outreach efforts to other entities for future AML inventory collaborations.

Each abandoned mine site faces a somewhat unique set of regulatory requirements, depending on federal and state statutes or regulations; whether it is on federal, state, tribal, or private land; local regulations; and site-specific environmental considerations.

3.2 CERCLA Statute Discussion

Each abandoned mine site faces a somewhat unique set of regulatory requirements, depending on federal and state statutes or regulations; whether it is on federal, state, tribal, or private land; local regulations; and site-specific environmental considerations. When an AML is located on public or private lands, it may be addressed under EPA authorities. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, provides the primary tools available to EPA project managers in developing strategies for assessment, investigation, and cleanup of environmental risks from abandoned mine sites. The law authorizes two kinds of response actions: removal and remedial actions. CERCLA provides funding for cleanups, either through payment for or by direct implementation of cleanups by responsible parties or by the government; it also provides for site-specific approaches to environmental problems and is not limited to particular media.

However, the use of CERCLA authorities is not limited to EPA. Other federal agencies, under the authority of Executive Order 12580, have used CERCLA to implement cleanup activities on their lands. Executive Order 13016 expanded the ability of

other federal agencies to use CERCLA authority to achieve mine site cleanups. Other federal authorities used to address AML are discussed in Chapter 4 of this document.

3.3 Overview of the National Priorities List (NPL) Process

The National Priorities List (NPL) was established by CERCLA §105(a)(8)(B) to provide a guide to EPA in determining which sites warrant further investigation, to assess the nature and extent of the public health and environmental risks associated with the site, and to determine what CERCLA-financed or Responsible Party (RP) financed remedial action(s), if any, may be necessary. Inclusion of a site on the NPL does not establish that EPA will undertake response action. Moreover, listing does not require any action of any private party, nor does it determine the liability of any party for the cost of cleanup of the site. A site need not be on the NPL to be CERCLA-financed as a removal action, an action brought pursuant to CERCLA §106 or 107(a)(4)(9b), or a Remedial Investigation/Feasibility Study (RI/FS).

Section 300.425(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the federal regulation by which CERCLA is implemented (55 FR 8845, March 8, 1990), provides the following three mechanisms for placing sites on the NPL:

- Hazard Ranking System (HRS) - the scoring system EPA uses to assess the relative threat associated with the release or potential release of hazardous substances from a waste site. An HRS score of 28.50 or above is used to determine if a site is eligible for the NPL;
- "Each State can nominate one site to the NPL as a State top priority regardless of its HRS score; and
- Sites may also be added in response to a health advisory from the Agency for Toxic Substances and Disease Registry (ATSDR)" [51532 Federal Register, Vol. 55, No. 241].

The current policy approach to NPL listing has evolved as the federal Superfund program and state programs have matured. In recent years, requests from states or tribal governments or affected communities have played a more important role in listing decisions. EPA's current approach results in the following:

- Listing sites where there are no potentially responsible parties (PRPs);
- Listing sites where cleanup is beyond a state's ability to fund or oversee a remedial action and that lack a PRP;

and

- Listing sites where non-NPL response options have not proved viable, primarily due to recalcitrant PRPs.

Although formal governor's concurrence is no longer statutorily required for NPL listings, as a matter of policy, EPA requests states and, where appropriate, tribal concurrence before all NPL listing proposals.

In addition to the NPL process, there is another commonly used approach termed "Superfund Alternative (SA)." EPA regions and other stakeholders (e.g., PRPs) may initiate this SA approach when there is adequate documentation to demonstrate that the site scores 28.5 or higher, requires long-term action, and has a willing and viable PRP. An enforcement agreement must be in place (e.g., Consent Decree) by the time the site is in remedial action to be an SA site. Fro more information regarding SA sites policy, see OSWER 9208.0-18, "Revised Response Selection and Settlement Approach for Superfund Alternative Sites," dated December 17, 2003.

3.4 Components of the NPL

The success of the EPA AML program is connected to routine coordination with federal, state, and private groups due to the complexity of mining and cleanup of private, federal, and mixed land use sites.

Since the NPL was established in 1982, 1,499 sites have been listed on the NPL and 278 have been deleted, resulting in a current NPL of 1,305 sites. As of March 2004, 65 additional sites were proposed for listing, although many of the sites may not be finalized. Out of these sites the number of mining sites include the following (current as of March 8, 2004):

- NPL Final Mining Sites - 70
- NPL Proposed Mining Sites - 8
- NPL Deleted Mining Sites - 10

The following two categories are not components of the NPL but comprise a large segment of Superfund work and, therefore, need to be recognized:

- Removal Mining Sites - 74
- Superfund Alternative Mining Sites - 10 (The Superfund Alternative approach is another tool besides the NPL for cleaning up a site according to the NCP without going through the lengthy NPL proposal and listing process and avoids the possible stigma of the NPL.)

It is important to note that the number of sites in all of the previous categories is constantly changing.

3.5 EPA Coordination in Addressing AML Sites

The success of the EPA AML program is connected to routine

coordination with federal, state, and private groups due to the complexity of mining and cleanup of private, federal, and mixed land use sites. Coordination begins with EPA Headquarters staff. EPA Regions 8 and 10 have established mining teams that meet with federal, state, and industry representatives. Region 8's mining program resides in the Office of Ecosystem Protection and Remediation (EPR) and contact information is available at: http://www.epa.gov/region08/land_waste/mining/minewho.html.

3.6 Other Statutes that Potentially Impact AML Sites

Historically, EPA has relied on other regulatory tools to address AML sites. The following provides overviews of other statutes that have or can potentially impact AML sites.

3.6.1 Clean Water Act

After CERCLA, the Clean Water Act (CWA) of 1972 is probably the most widely used regulatory tool for addressing environmental problems at mining sites. Section 402 of the CWA authorizes EPA or delegated states to regulate "point source discharges" of "pollutants" to "waters of the United States." Each discharge must be permitted. Section 404 of the CWA provides authority for regulating the discharge of "dredged or fill material." Many mine sites suffer from the uncontrolled discharge of acidified water, which becomes contaminated as it flows through abandoned mine workings. Section 402, in particular, may be of use as EPA or states try to control this flow. If a mine site is discharging contaminated waters, and if a responsible party can be identified, EPA or a delegate of the state may be able to address the problem under Section 309.

In 1987, Congress amended the CWA by adding provisions concerning the control of point source discharges composed entirely of storm water by directing EPA to publish permit application regulations for "discharges of storm water associated with industrial activity." EPA defines "storm water" as storm water runoff, snow melt runoff, and surface runoff and drainage. It also defined "[s]torm water discharge associated with industrial activity" to include the discharge of pollutants from any conveyance that is used for collecting and conveying storm water, which is directly related to manufacturing, processing, or raw materials storage area at an industrial plant. This includes conveyances at mining facilities from active or inactive mining operations that discharge storm water contaminated by contact with, or that has come into contact with, overburden. EPA noted that "a permit application will be required when discharges of storm water runoff from mining operations come into contact with any overburden. . . ."
In 1987, Congress amended the Clean Water Act by adding

section 319, which established a national policy that states develop and implement programs for the control of non-point source pollution. Non-point source pollution causes or contributes to beach closures, destroyed habitat, unsafe drinking water, fish kills, and many other severe environmental and human health problems. States were to address non-point source pollution by conducting statewide assessments of their waters; developing non-point source management programs; and implementing their EPA-approved non-point source management programs. For example, a 319 project in 1991 consolidated five tailings piles to a location just below the Mary Murphy mill ruins in central Colorado. The consolidated tailings were stabilized and revegetated with grasses, forbs, and trees. The drainage from the mine works was diverted around the consolidation pile into a constructed wetland between the consolidated tailings and Chalk Creek. Sampling in subsequent years found that the recovery zone had moved upstream from 12 miles to just approximately 4 miles below the mining activity.

Per the CWA, the NCP was revised in 1973 to include a framework for responding to our Nation's hazardous substance spills and oil discharges. The NCP has been revised repeatedly, including broadening under CERCLA in 1982 to cover emergency removal actions at hazardous waste sites. It is by such broadening of existing statutes that a multitude of statutes and programmatic authorities exist and are applicable for use in responding to AML sites.

The Clean Water Act gives EPA authority to implement pollution control programs such as:

- Setting wastewater standards for industry;
- Setting water quality standards for all contaminants in surface waters;
- Making it illegal for any person to discharge any pollutant from a point source into navigable waters without a permit; and
- Addressing nonpoint sources.

3.6.2 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires that federal agencies consider the environmental consequences of their actions and decisions as they carry out their mandated functions. EPA has been actively involved in NEPA as a lead agency, a cooperating agency, and a reviewer of NEPA environmental impact statements. The NEPA process offers an opportunity to understand potential, indirect, direct, and cumulative impacts of mining projects and to identify permit conditions that may be appropriate to manage or mitigate environmental

concerns.

The purposes of NEPA are to declare a national policy that will encourage productive and enjoyable harmony between humans and their environment; promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate human health and welfare; enrich the understanding of the ecological systems and natural resources important to the Nation; and establish a Council on Environmental Quality. More information regarding the purpose of NEPA is available at: http://ceq.eh.doe.gov/nepa/regs/nepa/nepaeqia.htm.

Under NEPA, the federal government must consider environmental impacts when approving a federally funded project, and the NEPA document is used to meet that requirement. Depending on the potential for significant impacts one of three NEPA documents would be used: an Environmental Impact Statement (EIS), an Environmental Assessment (EA), or a Finding of No Significant Impact (FONSI). The document would describe the proposed project, characterize the existing environmental conditions at the site, describe how the project will affect environmental resources, and identify any unavoidable significant impacts. The significance of the proposed action determines which type of NEPA document would be utilized.

3.6.3 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous wastes. In October 1980, Congress amended RCRA through the Solid Waste Disposal Act, which included the Bevill Amendment. The Bevill Amendment excluded "solid waste from the extraction, beneficiation, and processing of ores and minerals" and required EPA to study mining wastes to determine if regulation under RCRA Subtitle C was warranted. In 1986, EPA issued a regulatory determination that certain hardrock mining wastes (i.e., those wastes generated by the removal and treatment of the ore to concentrate its valuable constituents) should not be regulated as hazardous wastes under Subtitle C at that time. As a consequence of EPA's analysis and subsequent regulatory interpretations and rulemakings, relatively little mining waste is currently subject to RCRA regulation as hazardous waste.

3.6.4 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) of 1974, is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers

who implement those standards. Implementing regulations for 40 CFR 141 includes the establishment of national primary drinking water standards, which currently include maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for radiation and radionuclides, metals, pesticides, total dissolved solids, and other contaminants.

Enacted under the SDWA, the Underground Injection Control (UIC) program works with state and local governments to oversee the use of underground injection wells in order to prevent contamination of drinking water resources. Because a number of minerals are mined by using injection wells, this program is of particular importance.

In general, this type of mining technology involves the injection of a fluid, usually called lixiviant, which contacts an ore that contains minerals that dissolve in the fluid. The pregnant fluid is pumped to the surface where the mineral is removed from the fluid.

The following practices are examples of mining operations that use mining wells:

- Salt solution mining - fifty percent of the salt used in the U.S. is obtained this way;
- In-situ leaching of uranium - eighty percent of the uranium extracted in the U.S. is produced this way; and
- Sulfur production using the Frasch process - super heated steam is injected in order to recover a sulfur solution.

Through the UIC program, EPA protects drinking water from contamination from mining wells by implementing regulations. Of the five classes of injection systems defined and regulated by the UIC program, mining wells are addressed under Class III. Among other things, the regulations under the UIC program require mining well operators to perform the following:

- Case and cement their wells to prevent the migration of fluids into an underground drinking water source;
- Never inject fluid between the outer-most casing and the well bore; and
- Test the well casing for leaks at least once every five years.

3.6.5 Atomic Energy Act

The Atomic Energy Act (AEA)(1954) provides for the control of source materials - uranium and thorium - used for the produc-

tion of atomic energy and weapons. With the exception of in situ uranium production facilities, the Nuclear Regulatory Commission (NRC), (and its predecessor, the Atomic Energy Commission) was not authorized to permit or regulate uranium, radium, or thorium mines. Oversight of these facilities falls to the land management agencies, EPA, and the states. Standard setting for radiation protection under the AEA was transferred to EPA in 1970 through government reorganizations. Recognition of this authority served as the precedent for EPA's establishment of radionuclide and radiation protection limits. The Office of Air and Radiation recently released a guidance titled "Potential for Radiation Contamination Associated With Mineral and Resource Extraction Industries." This guidance informs EPA personnel of the potential for radioactive contamination associated with a list of specific minerals and certain resource extraction, processing, or manufacturing industries. The identification of listed minerals and materials at an inspection or investigation site should serve as cause for EPA personnel to contact EPA regional radiation staff to help implement radiation safety measures, and conduct radiation surveys as appropriate.

3.6.6 Toxic Substances Control Act

Section 6(e) of the Toxic Substances Control Act (TSCA) regulates the use and disposal of polychlorinated biphenyls (PCBs) by manufacturers. PCB-containing electrical equipment may be found in mines throughout the world because electrical systems in mines follow the same general patterns as any other industry. This threat is particularly prevalent in the mining industry because mines generally penetrate the water table. When PCBs are spilled or PCB equipment is abandoned underground, the PCBs can be expected to be released into the ground water with no possibility of source retrieval. This can result in water pollution for which there may be no solution. It should be emphasized that surface mines and the attendant crushing and milling facilities of both surface and underground mines may use PCB-containing electrical equipment. Depending on the cost effectiveness of removal and salvage, mines may be abandoned without removing any of the underground mining, haulage, hoisting, or electrical equipment. Underground mines are emphasized here because abandoned PCB-containing equipment is likely to cause water pollution that can affect the environment and the health of downstream fish, wildlife, and human populations.

3.6.7 Clean Air Act

The Clean Air Act (CAA) regulates area, stationary, and mobile source air emissions and authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect human health and the environment by setting maximum pollutant standards.

The CAA was amended in 1990 primarily to address problems that were not sufficiently considered in previous versions of the CAA, such as air toxics, acid rain, and ground-level and stratospheric ozone depletion. Under the amended CAA, Title II of Section 234 *Provisions Related to Mobile Sources, Fugitive Dust*, requires EPA to review and revise "the accuracy of the Industrial Source Complex (ISC) Model and AP-42 emission factors for estimating fugitive emissions of PM-10 from surface coal mines." Mining sites can produce substantial amounts of air pollution during excavation and transportation, particularly through fugitive and windblown dust. The sources of these air pollution types at mine sites include tailings ponds, rock clusters and road traffic in the mine pit and surrounding areas. The fugitive emissions reviews on surface mines required by CAA Section 234 are conducted in order to demonstrate surface coal mine compliance with NAAQS or for purposes of new source review.

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Chapter 4

Coordinating with Federal AML Programs

AMLs exist under private, mixed, and federal land uses adding to the complexity of the issue. A number of federal statutes address environmental contamination issues associated with AML. Federal statutory authority is spread among several agencies with no one agency having overall statutory responsibility. Ensuring that appropriate authorities are used at AML sites will work to facilitate cleanup.

This chapter discusses possible federal regulatory and programmatic authorities that have been or could be used for cleaning up AML. However, the following descriptions only summarize the key aspects of their programs. For additional information about their statutes, programs, or activities, please contact your local Bureau of Land Management, National Park Service, or Forest Service office. A review of federal regulatory and programmatic authorities can be found in Table 4-1.

Federal statutory authority is spread among several agencies with no one agency having overall statutory responsibility. Ensuring that each of these regulations is enforced at AML sites will facilitate cleanup.

4.1 Department of the Interior

4.1.1 Bureau of Land Management

The Federal Land Policy and Management Act of 1976 (FLPMA) authorizes the Secretary of the Interior through the Bureau of Land Management (BLM) to control mining to the extent that the Secretary can, by regulation or otherwise, take actions necessary to prevent unnecessary or undue degradation of the land. In conjunction with other laws, FLPMA provides the authority to remediate abandoned mine lands created in 1981 or later to meet the principles of the Act including reasonable safety of the general public. BLM regulations also require financial assurances for all sites except for those sites having negligible land disturbances.

The BLM works in partnerships with EPA, state agencies, tribes, private parties, and other groups to accelerate the rate of cleanup of watersheds affected by abandoned hard rock mines. With special emphasis on ensuring that viable responsible parties contribute their share of cleanup costs, federal land managers will add three to five watersheds or major mine

cleanup actions to the program each year from 1999 through 2005. Because BLM manages roughly 264 million acres in eleven western states and Alaska, collaborations would be openly welcomed for mine sites located on these BLM-managed lands. BLM is attempting to identify, prioritize, and take appropriate actions on those historic mine sites that pose safety risks to the public or present serious threats to the environment.

Inventory

BLM has developed an inventory based on data collected during a 1993-1995 on-the-ground survey of BLM-managed public lands. The resulting data were compiled into a database system that bears the same name as the Office of Surface Mining (OSM) AML inventory system, Abandoned Mine Lands Inventory System (AMLIS). Through the BLM AMLIS, a user can locate a site entry, print reports, and create Geographic Information System (GIS) maps, all via the Internet. The original inventory efforts were directed toward physical safety hazards. Presently, the emphasis has shifted toward a watershed approach. As of 2002, 10,200 records were posted on the AMLIS database. Individual states included in the BLM inventory and the resulting state AML inventory estimates are discussed according to each individual state in Chapter 5 of this document. The BLM AMLIS system and further information on sites currently undergoing cleanup can be found at: http://www.blm.gov/aml/amlis.htm.

Cleanup

In 1997, BLM, the States of Colorado and Montana, the USDA Forest Service, and other watershed partners leveraged their combined resources to generate $7 million in funding and technical support for watershed-based cleanup pilot projects in Montana and Colorado. Removal of tailings and mine wastes from stream beds, stabilization of flood plains, and capture of acidic drainage in priority watersheds were all accomplished through the reclamation work of the collaborative partners.

Additional information regarding sites addressed by BLM in fiscal year 2001 is provided in Table 4-2.

Funding

For fiscal year 2003, $10 million in 1010 (soil, water, and air) funding has been allocated for AML activities, of which $8.9 million will be provided to the field and the remainder will support information technology activities, National Science and Technology Center (NSTC), and the Washington, D.C. BLM office. BLM sets its own priorities on how sites are selected for cleanup based on the following factors:

- If unreclaimed land presents a danger to public health or safety; or
- If unreclamied land causes the degradation of environmentally sensitive areas such as wilderness study areas.

4.1.2 National Park Service

Although mineral operations are generally prohibited on National Park Service (NPS) lands, as stated in the Mineral Leasing Act of 1920, it does have some statutory and regulatory authority for controlling allowed mineral development, including mineral development rights such as valid mining claims that had vested before designating the lands as protected areas.

In addition to eliminating the location of mining claims in NPS lands under the 1872 Mining Law, the Mining in the Park Act of 1976 directed the Secretary of the Interior to develop regulations to control all activities resulting from the exercise of valid existing mineral rights on patented and unpatented mining claims in any area of the National Park System to preserve the pristine beauty of these areas. The NPS also has extensive regulations governing exercise of valid existing mineral rights (36 CFR Part 9 Subpart A) including restrictions on water use, limitations on access, and requirements for complete reclamation. These reclamation requirements and restrictions are enforceable on all mining operations within NPS lands established after September 28, 1976.

As part of NPS's Disturbed Lands Restoration Program, the Abandoned Mineral Land Restoration Program encourages the full restoration of lands affected by mining activities, addresses environmental concerns (metals contamination, acid mine drainage), safety hazards (vertical mine openings, unstable slopes), and the sustainability of bat species, which may rely on mine shafts for habitat.

Inventory

The NPS maintains an inventory of AMLs for reclamation projects on NPS lands through its Disturbed Lands Restoration Program. As of February 2001, a total of 3,199 AML sites were listed in the NPS inventory of AML reclamation sites. A complete list of NPS's AML Reclamation Sites can be found at http://den2-s11.aqd.nps.gov/grd/distland/amlreports/AMLinventory02-23-01.pdf.

Cleanup

Summaries of AML reclamation conducted and ongoing on NPS administered lands is provided in Table 4-3.

Funding

In 1993, the estimated cost of reclamation of all remaining AML sites in the National Park System was $200 million.

4.2 U.S. Department of Agriculture – Forest Service

As early as 1897, the Organic Act gave the USDA Forest Service power to manage mining impacts by making rules to preserve America's forests from destruction. The National Forest Management Act of 1976 (NFMA), the primary statute governing the administration of the national forests, is the broader statutory authority for the Secretary of Agriculture's resource management of the national forests. NFMA reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. It requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use and sustained-yield principles, and implement a resource management plan for each unit of the national forest system. It is the primary statute governing the administration of national forests and can be found at: http://ipl.unm.edu/cwl/fedbook/nfma.html. Forest Service regulations also require financial assurances for all mine sites.

Inventory

The Forest Service has based its own inventory off the lower limit on the number of abandoned and inactive mines on or near national forests (1,800 total) as listed in the Minerals Availability System/Mineral Industry Location System (MAS/MIL) developed by the U.S. Department of the Interior's U.S. Geological Survey. The Forest Service is no longer conducting inventories. A detailed estimate for total number of abandoned mines and features is not publicly available at this time; however, a CD of the MAS/MIL database can be purchased at: http://minerals.er.usgs.gov/sddp/html/mrdsorder.html.

Cleanup

Collaboration with state and federal agencies and other AML stakeholders aids the Forest Service in addressing AML on their administered lands. For example, the Forest Service, in partnership with BLM, the States of Colorado and Montana, and other watershed partners, combined their resources to generate $7 million in funding and technical support for the Interdepartmental Abandoned Mine Lands Watershed Cleanup Initiative, a series of watershed-based cleanup pilot projects in Montana and Colorado as previously described in section 4.1.1.

Additional summaries of AML reclamation conducted and ongoing on Forest Service administered lands are provided in Table 4-4.

Funding

For fiscal year 2004, the President's Budget request for the Forest Service totaled $4.8 billion. Of this total, approximately $1.3 billion would be appropriated to Minerals and Geology Management, under which the Forest Service addresses abandoned mine lands. The Forest Service sets its own priorities on how sites are selected for cleanup based on the following factors:

- If unreclaimed land presents a danger to public health or safety; or
- If unreclaimed land causes the degradation of environmentally sensitive areas such as wilderness study areas.

4.3 Other Federal Programs that Impact AMLs

4.3.1 Surface Mining Control and Reclamation Act

The Surface Mining Control and Reclamation Act (SMCRA) is aimed at mining operation controls and allows specifically for AML cleanups. SMCRA taxes coal mined today and distributes the money to states and Indian tribes for reclamation activities at coal mine sites abandoned before 1977 and their associated waters. After reclamation is completed at abandoned coal mine sites, a state or tribe can also use the funds to remediate environmental hazards at abandoned hardrock mine sites. The States of Montana, Louisiana, Wyoming, and Texas have been certified as having substantially addressed abandoned coal mines and are therefore released to do reclamation on other mineral mines and to fund public facilities projects in communities that are eligible under the regulations.

Established and funded by SMCRA's AML fund, the AML program is administered primarily by the DOI's Office of Surface Mining Reclamation and Enforcement (OSMRE) and funds the reclamation of eligible mine sites abandoned prior to the act's passage. Under its AML program, OSMRE has granted 23 states and two Indian tribes authority for reclaiming sites within their borders. Funding for reclamation within state or tribal authority is appropriated from 50 percent of the fees collected from mining operations in any state or Indian lands. The remaining 50 percent may be spent largely at the discretion of the Secretary of the Interior, typically for reclaiming

problem sites that pose an imminent hazard to public safety and well being and require a rapid response.

In addition, SMCRA's AML fund also provides resources to the Rural Abandoned Mine Program (RAMP), which is administered by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). RAMP provides assistance to landowners and land users for reclamation, conservation, and development of rural abandoned mine lands. Differing from OSMRE directed projects, RAMP projects involve a contract or "partnership" directly with the landowner, who must apply to the Soil Conservation Service (SCS) for RAMP assistance.

A national coalition of states and tribes, in cooperation with OSMRE, has grown out of SMCRA and has been very effective in promoting good reclamation science and engineering and publicizing the many AML program successes. This coalition, the National Association of AML Programs, is led by state agencies and is a major player in the remediation of all types of abandoned mine sites throughout the country.

In Fiscal Year 1999, SMCRA grants totaling $145,252,000 were distributed to 26 states and tribes for traditional AML cleanup and the Appalachian Clean Streams program. Fee collections are currently authorized until the end of fiscal year 2004, and at this time there is about $1.4 billion in the fund carried over from previous years.

4.3.2 Uranium Mill Tailings Radiation Control Act

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 allows the U.S. Department of Energy (DOE) to regulate cleanup activities at inactive uranium tailings disposal sites. The statute provided for the Uranium Mill Tailings Remedial Action Project, which identified 24 inactive uranium sites (two of which have been delisted) at which the DOE monitored the contamination, ground water, and maintenance. These sites also will be part of the Long-Term Surveillance and Maintenance Program, which provides for surveillance, ground water monitoring, and maintenance of sites cleaned up under the UMTRCA Program. In addition, DOE cleaned up properties in the vicinity of the sites contaminated with residual radioactive materials. DOE's Office of Environmental Management now calls it "DOE's oldest and most successful environmental restoration project."

UMTRCA amended the Atomic Energy Act by directing EPA to set generally applicable health and environmental standards to govern the stabilization, restoration, disposal, and control of effluents and emissions at both active and inactive uranium and

thorium mill tailings sites. The standards limit air emissions and address soil and ground water contamination at both operating and closed facilities (42 USC 2022 et seq.).

Title I of the Act covers inactive uranium mill tailing sites, depository sites, and vicinity properties. Under this Act, EPA must set standards that provide protection as consistent with the requirements of RCRA as possible. The standards must include ground water protection limits. Title II of the Act covers operating uranium processing sites licensed by the NRC. EPA was directed to promulgate disposal standards in compliance with Subtitle C of the Solid Waste Disposal Act, as amended, to be implemented by NRC or the Agreement States. The 1993 Amendments to UMTRCA further directed EPA to promulgate general environmental standards for the processing, possession, transfer, and disposal of uranium mill tailings. The NRC was required to implement these standards at Title II sites.

In 1983, EPA developed standards to protect the public and the environment from potential radiological and nonradiological hazards at abandoned processing sites. These standards include exposure limits for surface contamination and concentration limits for ground water contamination. DOE is responsible for bringing surface and ground water contaminant levels at the 22 sites (two sites were delisted) into compliance with EPA standards. DOE is accomplishing this through the UMTRCA Surface and Ground Water Projects.

4.3.3 U.S. Army Corps of Engineers Reclamation of Abandoned Mine Sites (RAMS) Program

The U.S. Army Corps of Engineers (USACE) RAMS program was developed for the restoration of abandoned and inactive non-coal mines where water resources (ecosystems/habitat) have been degraded by past mining practices. The purpose of the USACE RAMS program is to "support activities and priorities of Federal, State, Tribe, and nonprofit entities and as such provide a support role rather than a lead in addressing this national environmental clean-up need." The USACE RAMS program was authorized for approximately $45 million on remediating mine sites. It is not clear how much money will be spent on mine sites by this program.

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Chapter 5

State AML Programs

Compared to EPA and other federal AML programs, state AML programs may have a farther reaching capacity to address AML due to their ability to be involved with issues on both private and public lands. Many states have their own statutes protecting the same CERCLA and other federal resources discussed earlier in this document. Although the degree of protection varies among states, many of these statutes are designed to mirror federal regulations and allow states to respond to environmental degradation independently, in conjunction with, or prior to federal actions. Although a detailed discussion of specific state statutes is beyond the scope of this document, the following provides a list of examples of some state statutes and regulations affecting mining activities:

Bi-phasic chemical treatment system of acid mine drainage at Leviathan Mine, California.

- State Voluntary Cleanup Programs;
- California Environmental Quality Act (CEQA);
- California Surface Mined Land Reclamation Act (SMLRA);
- California Chap. 15 Discharges of Waste to Land, Article 7, Mine Waste Management;
- Colorado Mined Land Reclamation Act;
- Montana Metal Mine Reclamation Act;
- Montana Environmental Protection Act (MEPA);
- Nevada Water Pollution Control Law;
- Nevada Mined Land Reclamation Act;
- South Dakota Mined Land Reclamation Act;
- Utah Mined Land Reclamation Act;
- Wisconsin Metallic Mining Reclamation Act; and
- Wisconsin Metallic Mineral Mining and Regulation of Metallic Mining Waste.

Table 5-1 provides a summary of 11 states and their requirements for hardrock mine sites.

The complexity and maturity of AML programs vary greatly among the states: some are just starting their inventory; others are doing site assessments; and others have very sophisticated programs to address abandoned mine cleanup. The States of Montana, Wyoming and Colorado possess the most successful AML programs due to their relatively high levels of funding and broad statutory authorities.

Further information on individual state and tribal AML programs and inventory resources is provided in Table 5-2 including Web addresses for AML programs.

5.1 State AML Inventories

Many agencies and programs involved in addressing AML have conducted AML inventories at the state level. The following sections provide a brief overview of individual state-level inventories. Internet Web searches were conducted to identify AML inventories developed by federal agency and state AML programs. Although information presented for the AML inventory summaries below reflects the sources found as of July 22, 2003, many sources are out of date and have not been updated.

In addition, state AML inventory information as listed in the Western Interstate Energy Board's 1991 "Inactive and Abandoned Noncoal Mines: A Scoping Study," is also provided in the following summaries.

More recently, the Mineral Policy Center (MPC) conducted its own research of state AML programs. In a report released in May 2002, the MPC provided general program, AML inventory, and funding information for 13 state AML programs, including Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming. EPA further assessed the state AML programs researched in the MPC study and reached their own conclusions. The results of both research efforts regarding state AML inventories and program funding are also summarized in the following sections.

When reviewing the overviews of state AML inventories provided in the following sections, it is important to keep in mind that a universally applied definition of an AML site does not exist at present. Therefore, the various agencies and state-developed AML inventories presented below may possess inconsistencies and are not intended for exact quantitative comparisons. They have been presented within this document for reference purposes only.

Alabama

According to the Alabama Department of Industrial Relations, approximately 15,000 acres of abandoned mine lands existed in the State as of 1991.

Alaska

According to a 1991 literature search conducted by the Alaska Department of Natural Resources (DNR)/Division of Mining, Land, and Water, 432 non-coal abandoned mine sites were identified in Alaska; however, the inventory was deemed incomplete for state, private and native lands. The State is currently working to computerize its database of non-coal AML. Further information can be found at: http://www.dnr.state.ak.us/mlw/mining/aml/. According to BLM efforts, 106 abandoned mine lands exist on BLM administered lands in Alaska and have been funded or await future funding for AML related activities.

The Alaska DNR/Division of Mining, Lands, and Water's AML program has an annual budget of approximately $200,000 for use in addressing non-coal abandoned mine sites, according to MPC and EPA studies.

It is important to keep in mind that a universally applied definition of an AML does not exist at present. Therefore, the various agencies and state-developed AML inventories presented below may possess inconsistencies and are not intended for exact quantitative comparisons.

Arizona

According to MPC and EPA research, state estimates of AML in Arizona are between 8,000 and 10,000 sites. The Arizona Abandoned Mines Program, under the direction of the Arizona Mine Inspector, is now conducting an inventory of abandoned mines on state lands known as the Arizona Abandoned and Inactive Mine (A.I.M.) survey. As of 2002, the survey had identified a total of 8,787 mines, of which 288 mines were found to present environmental hazards and 1,149 mines contained significant public health hazards. The A.I.M. survey is available in a database version, which includes digitized maps and photos. Further information regarding the Arizona Abandoned Mines Program can be found at: http://www.asmi.state.az.us/abandoned.html.

An additional Arizona AML inventory is maintained by the Arizona Department of Mines and Mineral Resources. Its site-specific database, AzMILS, includes 4,000 mines and is available, by request, on disk. Further information about AzMILS can be found at: http://www.admmr.state.az.us/mingen.htm.

According to BLM efforts, approximately 2,008 abandoned mine lands exist on BLM administered lands in Arizona.

As discovered during MPC and EPA research, the Abandoned Mine Safety Fund, created through State legislature in 1998, was approximately $15,000 at the end of fiscal year 2001.

Funding is uncertain for fiscal year 2003 due to budget shortfalls in the State. The fund can be used only to abate physical hazards, not for environmental projects. Because all active coal operations lie on the Hopi and Navajo Reservations in the northeast portion of the State, Arizona receives no funding from OSM and relies on State appropriations and contracts with BLM and NPS.

Arkansas

The Arkansas Department of Environmental Quality/Division of Surface Mining and Reclamation has developed an open-cut mining database of Arkansas mines, which is available via the Internet at: http://www.adeq.state.ar.us/home/pdssql/pds.asp. The database can be queried according to permit ID, county, mine name, mine operator, and mineral of interest. A detailed estimate of the total number of abandoned mines is not publicly available at this time.

According to the Arkansas Department of Pollution Control and Ecology, Arkansas contained 5,000 acres of disturbed land as a result of mining activities as of 1991.

California

According to MPC and EPA studies, the California State AML inventory contains between 40,000 and 47,000 sites. Fifty percent of the sites are on private lands, 48 percent on federal lands, and 1.5 percent on State lands.

In addition, a three-year effort conducted by the California Department of Conservation (DOC) to determine "the magnitude and scope of the abandoned mine problem in California" produced an inventory of abandoned mines, which is included and further described in the resulting report "California's Abandoned Mines: A Report on the Magnitude and Scope of the Issue in the State." Inventory information was collected through examination of existing literature and data and spatially analyzed through the implementation of a GIS. Field investigations were used to fill in any identified data gaps and acquire site-specific information. A detailed estimate of total number of abandoned mines is not publicly available at this time. A downloadable copy of the California DOC report and further information can be found at: http://www.consrv.ca.gov/OMR/abandoned_mine_lands/california_abandoned_mines/index.htm.

In 1991, California State Water Resources Control Board/Division of Clean Water Programs estimated a total of 2,400 inactive and abandoned mine sites.

According to BLM efforts, approximately 688 abandoned mine lands exist on BLM administered lands in California. However, BLM AML records for the state are far from complete and the detail and quality vary considerably. AML data for the desert area of Southern California are very much under-represented.

State legislature appropriated funding to the California DOC's AML program ranges from $125,000 to $450,000, according to MPC and EPA sources.

Colorado

According to MPC and EPA efforts, Colorado State estimates identify between 8,000 to 23,000 AML sites in the State. Additionally, the Colorado Department of Natural Resources/Division of Minerals and Geology has developed an on-line database of mining data that identifies 23,000 mine openings in the State. The database can be queried according to county, mine operator, permit number, permit status, mine name, and commodity. Further information about the Colorado Abandoned Mines Program and its database of mining data can be found at: http://mining.state.co.us/dmginactive.html.

In 1991, Colorado Inactive Mine Reclamation Program estimated 22,000 mine openings existed in the State.

According to BLM efforts, a total of 2,600 abandoned mine lands exists on BLM administered lands in Colorado. Because Colorado's BLM has made inventory and record keeping a high priority from the outset, their records are highly detailed and reliable with new AML sites added as they are reported.

Funding for Colorado DNR/Division of Minerals and Geology's Inactive Mine Reclamation Program is received from various avenues. SMCRA funds, of approximately $2 million per year, are the greatest contribution of funding to the program. Colorado has been certified as having substantially addressed abandoned coal mines in the State and is therefore released to do reclamation on other mineral mines and to fund public facilities projects in communities that are eligible under the regulations. Limited-stakes gambling to safeguard hazardous openings in the Central City, Blackhawk, and Cripple Creek areas provides an additional $111,655 per year. Clean Water Act Section 319 funds also provide approximately $750,000 per year for abandoned mine projects. Approximately $200,000 to $300,000 per year is acquired through State abandoned mine cleanup agreements with the BLM and Forest Service. Finally, the State is in the early stage of a cleanup project with the National Mining Association (NMA) in which the NMA has committed $100,000.

Florida

Florida's Department of Natural Resources/Bureau of Mine Reclamation estimated that 49,000 acres (clay settling ponds) and 13,000 acres (non-clay settling ponds) of phosphate mine dumps existed in the State as of 1991.

Idaho

The number of AML sites in Idaho ranges between 8,000 and 16,000 sites, according to State estimates provided in MPC and EPA research efforts. According to BLM efforts, Idaho possesses approximately 400 priority abandoned mine lands. However, BLM records for the State are far from complete because records reflect a mixture of data from U.S. Geological Survey (USGS) databases, a State database, and BLM records.

Idaho's Department of Health and Welfare/Division of Environmental Quality estimated 8,700 mineral exploration sites existed in the State in 1991.

As provided in MPC and EPA studies, funding for Idaho Department of Lands' AML program is received from a mine license tax, created by the State as a source of funds for abandoned mine reclamation. Due to legislature-enforced tax reductions and a drop in ore production, the mine license tax yields approximately $40,000 per year.

Illinois

According to the Illinois Department of Mines and Minerals in 1991, 35,000 acres of AML existed in the State.

Indiana

Indiana's Department of Natural Resources/Bureau of Mine Reclamation estimated, in 1991, that 1,200 AML sites existed in the State.

Louisiana

In 1991, Louisiana's Department of Natural Resources/Injection and Mining Divisions estimated 900 AML sites existed in the State.

Maine

According to the Maine Department of Environmental Protection, 700 mine openings existed in the State as of 1991.

Maryland

According to the Maryland Water Resources Administration, a total of 200 AML sites existed in the State as of 1991.

Minnesota

In 1991, Minnesota's Department of Natural Resources/Minerals Division estimated 650 AML sites existed in the State.

Missouri

According to the Missouri Department of Natural Resources and Department of Environmental Quality, a total of 48,000 affected acres, as measured from USGS, Soil Conservation Service, and Forest Service aerial photos, existed in the State as of 1991.

Montana

Within its Web site, the Montana Department of Environmental Quality's Mine Waste Cleanup Bureau (MWCB) presents five downloadable databases pertaining to Montana's inactive mine sites (http://www.deq.state.mt.us/rem/mwc/download.asp). The databases include: MWCB Priority Site Rank List, MWCB Priority Cleanup Sites, Montana Inactive Mine Sites, Water Sampling Sites for Montana Inactive Mines, and Sediment Sampling Sites for Montana Inactive Mines. Approximately 6,000 hardrock abandoned mines were identified through the MWCB survey. BLM AML inventory efforts also identified approximately 6,000 abandoned mine lands on BLM administered lands in Montana.

An additional inventory was developed by the Montana Bureau of Mines and Geology (MBMG). Its abandoned-inactive mines database contains more than 8,000 records and includes several data tables that include information on location (latitude/longitude and cadastral as determined from 1:24,000-scale maps, Global Positioning System (GPS), or other sources), ownership, office and field screening results, and water/soil sampling (sample-ID, location, and field parameters). Information contained in the inventory was collected first by obtaining an accurate location, followed by determining the ownership of the site, assessing the relationship of the site to Forest Service or BLM land, and finally assessing the potential impact of sites on or affecting federal land. Additional information about the MBMG inventory can be found at: http://www.mbmg.mtech.edu/env-abldbms.htm#database.

In 1991, Montana's Department of State Lands/Reclamation Division estimated 19,000 mine sites, 1,200 mill sites, and 1,000 smelters existed in the State.

According to MPC and EPA sources, SMCRA money is the primary funding mechanism used to address AML sites in Montana. Montana has been certified as having substantially addressed abandoned coal mines in the State and is therefore released to do reclamation on other mineral mines and to fund public facilities projects in communities that are eligible under the regulations. If a site is only partially eligible for SMCRA

funds, the State supplements with State funds, obtained by taxes on oil, gas, coal, metal mines, and other mineral extractions. The tax money is placed in a Resource Indemnity Trust Fund and disbursed via grants to up to three abandoned mine projects each grant cycle, at up to $300,000 per project.

Nevada

A 1999 Nevada Abandoned Mine Land Environmental Task Force report estimates 200,000 to 500,000 AML sites are present in the State. Presently, the task force has cataloged and verified 8,000 of these sites. Additional information can be found at: http://www.nbmg.unr.edu.

Nevada's Department of Minerals identified approximately 50,000 mines in the State as of 1991.

Through research of USGS, former Bureau of Mines, Nevada Division of Mines and Geology, and Nevada Division of Minerals inventory records, BLM AML efforts have identified a total of approximately 165,000 abandoned mine lands on BLM administered lands in Nevada. Of these, 1,550 have been visited and verified by BLM.

Approximately $2 million in State bonds is spent on AML reclamation each year, according to Alan Coyner, Abandoned Mine Program, Nevada Division of Minerals. Funding for the State's "Stay Out and Stay Alive" program is generated from industry fees of $1 per mining filing and $20 per acre of newly permitted mining disturbance on public lands for a total of approximately $200,000 per year, depending on the level of mining industry. Additionally, Nevada receives funding through Western Governors' Association and BLM grants.

New Mexico

According to MPC and EPA studies, State estimates place the number of AML sites in New Mexico between 10,000 to 20,000 sites; the BLM estimates that approximately 595 abandoned mine lands exist on public lands administered by the BLM in New Mexico. However, the BLM inventory reflects roughly 40 percent of the estimated hardrock AML sites on BLM land in New Mexico.

In 1991, New Mexico's Energy, Minerals, and Natural Resources/Mining and Minerals Division estimated 7,200 AML sites existed in the State.

Approximately $1.8 million per year of funding is allocated to the state under SMCRA, as provided in MPC and EPA sources. In addition, New Mexico has entered into various partnerships with BLM, Forest Service, State Land Offices, and other entities in an effort to coordinate reclamation activities on public lands.

New York

According to the New York Department of Environmental Conservation/Division of Mineral Resources, 30,000 mine-affected acres existed in the State as of 1991.

North Carolina

As of 2001, the North Carolina Geological Survey Minerals Resources Division had estimated the total number of inactive mines in North Carolina as 150. Further information about the North Carolina AML program and its annual mining inventory estimates can be found at: http://www.geology.enr.state.nc.us/Mineral%20resources/Mineral_Resources.html.

Ohio

According to the Ohio Department of Natural Resources/Division of Reclamation, 6,000 acres of AML existed in the State as of 1991.

Oklahoma

In 1991, the Oklahoma Conservation Commission estimated 26,000 acres of AML in the State.

Oregon

According to the Oregon Department of Environmental Quality (DEQ) and Department of Geology and Mineral Industries (DOGAMI), the number of AML sites in Oregon is estimated to be between 94 to 120 sites.

The Oregon Department of Geology and Mineral Industries/Mined Land Reclamation estimated 3,500 AML sites existed in the State as of 1991.

According to initial BLM efforts, 323 AML sites were identified on public lands managed by BLM in Oregon and Washington. Of these, 50 sites have been determined to be in need of some form of remediation. To date, this inventory information for Oregon and Washington has not been completely entered into BLM's AMLIS database. AMLIS data entry continues to be a priority task for fiscal year 2003 in these states.

Funding to address AML sites comes from the State's Orphan Site Account, which is used to address orphaned contamination at landfills and industrial sites. According to DEQ's Abandoned Mine Land Coordinator, the fund allocates $1 million to AML sites every two years. Additional funds are received through collaborations with the BLM and Forest Service. For instance, the Forest Service recently provided the State with a $50,000 grant.

Pennsylvania

According to the Pennsylvania Department of Environmental Resources/Bureau of Mining and Reclamation, 1,300 AML sites exist in the State.

South Carolina

The South Carolina Geological Survey maintains a database, which contains information on more than 1,000 sites in South Carolina, including metallic and nonmetallic deposits. The database is a collaboration of the USGS Mineral Resources Data System (MRDS) and the Mineral Availability System (MAS). Further information about the South Carolina AML inventory database can be found at: http://water.usgs.gov/pubs/FS/FS-040-96/.

According to the South Carolina Land Resources Conservation Commission/Mining and Reclamation Division, 19,000 acres of AML existed in the State as of 1991.

South Dakota

Through a study conducted by the South Dakota Department of Natural Resources in conjunction with the South Dakota School of Mines and Technology, approximately 900 non-coal mines were identified, of which 700 were on private lands and 200 on Forest Service administered lands. Additional information can be found at: http://www.state.sd.us/denr/DES/mining/acidmine.htm.

According to MPC and EPA research efforts, no funding for abandoned mine cleanup is allocated by the State, and South Dakota does not receive funds under SMCRA. Therefore, most of the sites remain unclaimed, except for voluntary efforts completed by industry, Forest Service, and the State. A mine reclamation fund exists under State mine reclamation laws and may receive monies to reclaim lands previously affected by mining as allocated by the South Dakota Board of Minerals and Environment. Contributions to the fund have been very limited, mainly consisting of bond forfeitures.

Texas

In 1991, the Railroad Commission of Texas/Surface Mining and Reclamation Division estimated 20,000 sites existed in the State. Funding for the Texas AML program is primarily obtained by AML grants through the OSM. Texas has been certified as having substantially addressed abandoned coal mines in the State and is therefore released to do reclamation on other mineral mines and to fund public facilities projects in communities that are eligible under the regulations. According to funding levels as of 1998 that totaled $1.5 million annually, the State estimated that its AML program could complete all of its remaining uranium and hardrock AML sites by 2007.

Utah

Through reviews of mining industry and State mineral occurrences databases, USGS maps, and mining district information, the State estimates that there are 20,000 mine openings in Utah, according to MPC and EPA research. Additional information on Utah's Abandoned Mine Reclamation Program can be found at: http://dogm.nr.state.ut.us/AMR/.

According to the BLM efforts in Utah, approximately 478 AML have been identified throughout the State. However, these records represent only a fraction of the State, but the information they contain is highly reliable and detailed.

As of 1991, Utah's DNR/Division of Oil, Gas, and Mining estimated that 25,000 acres had been affected by mining activities in the State.

As provided in MPC and EPA studies, the Utah DNR/Division of Oil, Gas, and Mining's Abandoned Mine Reclamation Program receives approximately $1.5 million per year of funding from SMCRA and approximately $30,000 per year of funding from the State legislature. State legislature funding is typically applied to the federal partnership projects. Utah also works cooperatively with NPS and BLM in addressing AML in the State.

Virginia

According to the Virginia Department of Mines/Minerals and Energy, approximately 2,000 AML sites existed in the State as of 1991.

Washington

Washington DNR/Division of Geology and Earth Resources and the Department of Ecology estimate that there are approximately 3,800 sites in Washington. According to MPC and EPA efforts, no dedicated funding source to address problems of abandoned mines exists in Washington. However, there is a State law that allows that "fines, interest, and other penalties collected by the department [DNR]...shall be used to reclaim surface mines abandoned prior to 1971." (Revised Code of Washington 78.44.045.) Pursuant to this statute, a few thousand dollars per year has been collected and spent on the inventory study. Washington DNR has also applied for EPA grant funding to reclaim three small abandoned operations that are on State lands.

Additional information about the Washington AML inventory effort can be found at: http://www.dnr.wa.gov/geology.

Wisconsin

Wisconsin's DNR estimated that 200 acres had been affected by mining activities in the State as of 1991.

Wyoming

Presently, the Wyoming Department of Environmental Quality's Abandoned Mine Reclamation Program AML inventory lists 3,371 records; however, some of these may be duplicates because the database has not been field-checked after being converted into an ARC/GIS system last year. Through the combined efforts of BLM and OSM, approximately 931 AML have been identified in Wyoming. More than 530 of the records are from the database maintained by the State AML Division, of which the quality of the data varies widely. Another 320 records are from the OSM AMLIS tracking system and represent multiple "problem areas" associated with 36 AML sites on BLM land. The remaining records are the result of BLM inventory efforts.

The Wyoming Abandoned Mine Reclamation Program is primarily federally funded based on SMCRA funds, as determined during MPC and EPA research efforts. Wyoming has been certified as having substantially addressed abandoned coal mines in the State and is therefore released to do reclamation on other mineral mines and to fund public facilities projects in communities that are eligible under the regulations. The State relies on bonding and reclamation fees collected from the coal industry by the State as additional funding sources and has worked cooperatively with BLM, Forest Service, and NPS in addressing AML in Wyoming.

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Chapter 6

Reuse and Redevelopment of AML

The reuse of hazardous waste sites, including AMLs, is an Agency-wide priority at EPA. Most recently, the Agency has implemented the Land Revitalization Agenda, which seeks to ensure that cleanups integrate the protection of public health, welfare, and the environment with consideration of future land use. While land use planning and regulation remain the responsibility of local governments, EPA recognizes that site cleanups directly impact the future use of these sites, and that thoughtful Agency decisions and activities can help to mitigate these impacts. In addition, the AML Team recognizes that reuse opportunities at AMLs may provide the critical impetus to expedite environmental cleanup. Examples of Agency actions that can support reuse include: deferring the listing of a site in order to avoid stigma and accelerate cleanup; choosing and designing remedies that do not prohibit the likely future use of a site; implementing policies that encourage site reuse; and providing communities with general information about potential site reuse opportunities, resources, and lessons learned.

EPA's AML Team is dedicated to providing tools and resources to support the reuse of AMLs. As part of this effort, the AML Team serves as a focal point for: 1) coordinating and facilitating collaborative efforts with other organizations; 2) developing technical and policy guidance for the reuse of AMLs; and 3) exploring options for the reuse of AMLs. In addition to its own undertakings, the AML Team seeks to leverage the activities of other programs that support reuse of contaminated properties. Through programs such as the Superfund Redevelopment Initiative and the Brownfields program, the AML Team has identified a number of projects that have supported AML Team goals and serve as examples for parties interested in seeking reuse options for AML sites. The following sections describe these efforts in greater detail, provide several anecdotes that illustrate the successful reuse of AMLs, and detail the ongoing work of the AML Team in support of reuse.

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6.1 Superfund Redevelopment and Brownfield Programs

Through the Superfund Redevelopment Initiative and the Brownfields program, the Agency has been working with communities since the late 1990s to actively reclaim AML sites through reuse projects.

6.1.1 Superfund Redevelopment Initiative

EPA's Superfund Redevelopment Initiative (SRI) is a coordinated national effort to facilitate the return of the country's most hazardous waste sites (NPL sites) to productive use by providing communities and key stakeholders with the tools they need as they seek to reuse these lands. SRI has undertaken a wide variety of projects to support NPL site reuse including a pilot program to provide funding for community based reuse planning efforts. Since 1999, SRI has contributed nearly $5 million in grants and in-kind services to support reuse planning efforts in approximately 70 communities across the country, including communities with AMLs.

The Initiative's grants and in-kind services have frequently been used to support community-based reuse planning processes, which bring together a wide range of stakeholders, including community residents, local government representatives, site owners, and potentially responsible parties. These community stakeholders work together to develop reuse recommendations for sites, which can then be taken into consideration by EPA site managers to make appropriate decisions about remedy selection and design. Integrating a site's reasonably anticipated future land use as a criteria in remedial decisions helps to ensure the effectiveness of EPA cleanups, while the reuse of sites provides communities with a wide range of economic, environmental and social benefits.

The following section summarizes several examples of successful reuse outcomes at NPL sites contaminated by mining waste that have been supported or documented by EPA's Superfund Redevelopment Initiative.

California Gulch - Leadville, CO

Through collaboration between EPA, the State of Colorado, local communities, and mining companies, the California Gulch Superfund site is being remediated and reused. Due to metal contamination in area soils and the Arkansas River from abandoned mine tailings, the site was added to EPA's NPL in 1983. In an effort to enhance the area's growing tourism industry, a unique bike path was developed. The 12-mile Mineral Belt Bike Path, inspired by the area's significant mining heritage, loops around the historic mine tailing piles and mining artifacts

within the site and the City of Leadville. A year-round attraction, the bike path is used in the winter as a trail for recreational skiers. Future public access to open space on the site has been finalized through two agreements signed by EPA and the State of Colorado, allowing the Colorado Division of Parks and Outdoor Recreation and the City of Aurora to purchase ranches along the Arkansas River. The ranches will be used as parks, wildlife habitat, and for recreational activities.

Anaconda Smelter - Anaconda, MT

Once a copper smelting facility, the Anaconda Smelter is now an award-winning golf course designed by Jack Nicklaus. Following the closure of the smelting facility, the Town of Anaconda experienced severe economic impacts from the loss of local jobs and revenue that the facility had provided. The landscape of the area was also left heavily contaminated. Successful cleanup and reuse of the site were achieved through collaboration between EPA, the community, and current owners of the smelter in the development of a cleanup design that allowed for redevelopment of the property. The resulting golf course has provided local jobs and a foundation for the community's plan to redefine itself as a recreational resort town.

Silver Bow Creek/Butte Area - Butte, MT

Multiple innovative reuse methods have been employed at the Silver Bow Creek/Butte Area site. Once a copper smelter, the site was added to the NPL in 1983 by the EPA to begin addressing its severely polluted ponds and soil. EPA and Atlantic Richfield Company (ARCO) formed a partnership and have cleaned up and redeveloped portions of the site into a sports complex including youth baseball fields, a driving range, and volleyball courts. Through restoration of many of the site's ponds and wetlands, fly-fishermen have been attracted from neighboring towns. Additional uses for the cleaned property are being developed by the local residents. Plans include walking trails and a playground.

Oronogo-Duenweg Mining Belt - Jasper County, MO

Contaminated ground water, surface water, and soil, including at least 2,700 residential yards, were the result of mining, milling, and smelting of lead and zinc ores that occurred at the Oronogo-Duenweg Mining Belt site. Through the collaborative efforts of EPA, the State of Missouri, and the local community, reuse is ongoing at the site. A scrap metal recycler bought and cleaned up 40 acres of the site in exchange for a release from liability for preexisting contamination. The recycler opened a scrap metal recycling center in 1995 and has provided permanent jobs to 20 local residents. Additionally, EPA in partnership with the Missouri Highway and Transportation Department is planning to build a highway bypass through part of the site as

well as use the mine wastes as fill in the construction of the highway. This will provide a dual purpose by providing the Highway Department with the fill it needs to construct the bypass as well as providing containment of the mine waste to prevent future exposures to the contaminants. Further negotiations are underway for other contaminated portions of the site to be cleaned up and redeveloped for commercial purposes, which would provide increased annual incomes and tax revenues for the local community.

Bunker Hill Mining & Metallurgical Complex - Silver Valley, ID

The area of Silver Valley is experiencing new commercial development through the reuse of the Bunker Hill lead smelter site. Redevelopment of the site includes Motel 8, McDonalds, and the Silver Mountain Resort, now a popular ski resort. The new businesses have created approximately 225 new jobs, and more than 800 acres have been recovered for reuse. Fifteen years ago, the Bunker Hill lead smelter and several other area mines closed, leaving the Silver Valley economy close to collapse and its landscape poisoned with metals. After adding the site to the NPL, EPA in partnership with the Panhandle Health District and the State of Idaho worked to restore the area's ecology and residential soils through cleanups of lawns and parks, containment of tons of mine tailings, and the planting of hundreds of trees. Institutional controls were also developed to ensure the protection of the area residents from remaining contaminated soil on site.

Additional information about redeveloped Superfund sites and ongoing efforts to support reuse is available at http://www.epa.gov/superfund/programs/recycle/.

6.1.2 Brownfields Program

On November 9, 1994, EPA initiated its Brownfields program. The purpose of the program is to help communities develop innovative ways to overcome the current obstacles to the cleanup and reuse of potentially contaminated urban properties in a sustainable, environmentally sound manner. Through the Brownfields program, communities identify and work with developers to restore abandoned sites, thereby supporting new jobs and economic growth, increasing property values, stimulating tax revenues, and rejuvenating neighborhoods.

Most recently, new brownfields legislation was signed by President Bush in January 2002. In Section 104(k) of the 2002 Small Business Liability and Brownfields Revitalization Act, the term "brownfield" includes, for the first time, "mine-scarred lands," thus making AMLs eligible for brownfields revitalization funding. The implications and applicability of this new legislation in addressing AML are currently under EPA review.

This section provides several examples of how AML sites have been and currently are being reused with support from the Brownfields program.

Murray City, UT

Murray Smelter exemplifies a successful collaborative effort between Superfund and Brownfields. The former Murray Smelter in Murray City is a 141-acre site surrounded by single-family and multiple-unit residential areas, schools, and office buildings. Concerns regarding residual contamination, as a result of operations at the smelter, coupled with potential environmental liability concerns have prevented the redevelopment of the site.

Today, the Murray Smelter site contains a Utah Transit Authority (UTA) light rail station with a 300-space parking lot, a designated connector road, and a major retail membership warehouse club. Groundbreaking for a one-million-square-foot hospital facility began in 2003. The site is being redeveloped as several multi-use properties that address Murray City's need for regional health care facilities, public transit access, and diversified economic development. Redevelopment is being supported in part through a $176,000 Brownfields program grant, which was used to pay for a seismic analysis and a real estate consultant to advise on potential reuse opportunities. Murray Smelter was eligible for brownfield funding because interested parties worked with EPA to keep the site off of the NPL. In addition, cooperative efforts between EPA and site stakeholders, including Murray City, interested developers, the PRP, and others allowed the site's remedial project manager (RPM) to integrate the site's remedy with identified reuse opportunities.

Summit County, CO

The hardrock mining industry left Summit County with a legacy of contaminated and abandoned mine sites that lay idle and continue to degrade the environment. Mining and its associated AMD have significantly impacted Peru Creek. The 15-square mile Peru Creek Basin is located 70 miles west of Denver and is a tributary of the Snake River. About 3,000 people live year-round in the Snake River watershed in Summit County, though seasonal resort use swells that number to over 20,000.

Through the Brownfields program, the community hopes to restore the natural ecosystem and thereby enhance recreational opportunities and create economic benefit to the county. Presently, the following preliminary steps have been planned for addressing the site:

- Gather existing data and conduct preliminary environmental site assessments;

- Prioritize sites on the basis of the preliminary assessments;
- Conduct Phase I and Phase II environmental site assessments for the highest priority sites;
- Develop a cleanup plan; and
- Engage the community in brownfields decisions through the county's web site, local newspapers, and public meetings.

For more information on the Brownfields program, visit EPA's brownfields web site: http://www.epa.gov/epahome/hi-brownfields.htm.

6.2 AML Team – Pursuing Innovative Reuse Opportunities

Over the last several years, significant progress in the innovative reuse of mining sites has been achieved. Examples of innovative reuses include wind farms, conservation areas, recreational parks, historical parks, resorts, hotels, retail stores and highway bypasses. In addition, the AML Team is exploring other creative reuse options for AMLs such as wetland banking, water quality trading credits, and carbon sequestration.

The AML Team has investigated and published reports on two of these innovative uses, and is currently working on the creation of additional reports. These reports can be found on the AML Team Web site at http://www.epa/gov/superfund/programs/aml/revital/index.htm. *Wind Energy at Former Mining Sites* describes the reuse of AMLs as wind farms, provides anecdotal examples of former mining sites used as wind farms, and discusses benefits and limitations associated with wind energy. *Recreational Opportunities at Abandoned Mine Lands* describes active and passive recreation opportunities at AMLs and provides examples highlighting the successful reuse of AMLs as ski resorts, parks, and golf courses. Additional reports will describe opportunities associated with reusing AMLs to create "credits" associated with water quality, carbon sequestration, and wetlands and protecting the resources associated with AMLs through land conservation.

The following provides brief snap-shot summaries of several current and ongoing mine site redevelopment projects and partnerships in addition to those presented in the innovative reuse reports.

Green Mountain Wind Farm - Garrett, PA

- Located on Decker farm, which was once used for coal strip mining
- Partners included:
  - GreenMountain.com
  - National Wind Power - owner and operator (National Wind Power Ltd. of the United Kingdom and American National Power of Texas)
  - Nordex GmbH - Danish manufacturer of the turbines, towers, and blades
  - Somerset Rural Electric Cooperative - electricity produced by the wind turbines flows through underground cables to an existing substation owned by Somerset Rural Electric Cooperative
  - Distributed Generation Systems, Inc. (Disgen) of Evergreen, Colorado - developer of the project
  - Public Utility Commission
  - Exelon Community Energy - a green electricity marketing company headquartered in Wayne, Delaware County, Pennsylvania, who will market the wind power generated to commercial and residential customers
- Customers to buy wind energy generated included:
  - University of Pennsylvania
  - Penn State University
  - Carnegie Mellon University
  - Philadelphia Suburban Water Corporation
  - Giant Eagle Inc.
- Other supporters included:
  - Pennsylvania Department of Environmental Protection
  - Pennsylvania Public Utilities Commission Chairman, John M. Quain
  - Sierra Club's representative to the Mid-Atlantic Green E-Advisory Committee, Jeff Schmidt
  - Ridge-Schweiker Administration's Energy Task Force

Coyote Creek Parkway - Santa Clara, CA

- Formerly a sand and gravel mining quarry
- Presently transformed into a 60-mile paved trail used by bicyclists, rollerbladers, and hikers
- Partners included:
  - Graniterock - designed trail with cooperation of the County Parks and Recreation Department and wildlife habitat consultants, performed reclamation of the area and developed the trail, and paved and landscaped trail to enhance the contours created through mining operations
  - Santa Clara County Parks - worked with Graniterock in design of trail

Independence Mine State Historical Park - Willow Creek Valley, AK

- Previously gold and sheelite mines
- A state historical park that displays the history of the mining area, including a visitor center and guided tours
- In 1974, Independence Mine was entered into the National Register of Historic Places
- Partners included:
  - Alaska-Pacific Consolidated Mining Company (APC) - donated land to the Alaska Division of Parks and Outdoor Recreation to develop Independence Mine State Historical Park
  - Friends of Independence Mine - volunteer, nonprofit citizens' group dedicated to the preservation, continued restoration, and interpretation of this historic area
  - Alaska Division of Parks and Outdoor Recreation - established Independence Mine State Historical Park

There is a core group of programs and organizations dedicating funding, tools, information, and other resources to facilitate the cleanup of abandoned mine lands through restoration, reclamation, or other reuses. A compilation of these programs and organizations is provided in Appendix D.

Chapter 6 Sources

Alaska Department of Natural Resources/Division of Parks and Outdoor Recreation. Independence Mine State Historical Park, Web page. http://www.dnr.state.ak.us/parks/units/indmine.htm

EPA. Brownfields program Web site. http://www.epa.gov/epahome/hi-brownfields.htm

EPA. Superfund Redevelopment Program Web site. http://www.epa.gov/superfund/programs/recycle/

Green Mountain Energy Company. Green Mountain Wind Farm Celebrates One Year Anniversary Web Page. http://www.greenmountain.com/about/press_events/archive/20010607.jsp

Illinois Department of Natural Resources. Kickapoo State Recreation Area Web page. http://dnr.state.il.us/lands/landmgt/parks/r3/kickapoo.htm

Santa Clara County Department of Parks and Recreation. Coyote Creek Parkway Web page. http://www.parkhere.org/channel/0,4770,chid%253D16482%2526sid%253D12761,00.html

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Glossary[1]

For the purposes of this document, the following definitions are:

ACQUIRED LANDS - Lands in federal ownership which were obtained by the government through purchase, condemnation, gift, or by exchange. They are one category of public lands (Bureau of Land Management, 1999b).

ALLUVIUM - Natural accumulations of unconsolidated clay, silt, sand, or gravel that have been transported by water, wind, or gravity to their present position.

AQUIFER - A body of rock that contains sufficient saturated permeable material to conduct groundwater and to yield significant quantities of water to wells and springs.

BACKFILLING - The filling in again of a place from which the rock or ore has been removed.

BACKGROUND GEOCHEMISTRY - The abundance of an element in a naturally occurring material in an area where the concentration is not anomalous.

BASE METALS - Those metals usually considered to be of lesser value and of greater chemical reactivity compared to the noble (or precious) metals, most commonly copper, lead, zinc and tin.

BENEFICIATION - Improvement of the grade of ores by milling, flotation, sintering, gravity concentration, or other processes. Also termed "concentration".

CASUAL USE - Mining activities that only negligibly disturb BLM lands and resources.

CLAIM - The portion of mining ground held under the Federal and local laws by one claimant or association, by virtue of one location and record. Also called a "location."

CLOSURE - In this report the term refers to the point at which a company permanently stops activity (although it may still retain liabilities for unforeseen environmental or safety concerns).

COMMON VARIETY MINERALS - Mineral materials that do not have a special quality, quantity, character, or location that makes them of unique commercial value. On public lands such minerals are considered saleable and are disposed of by sales or by special permits to local governments.

CONCENTRATION - See "beneficiation." It also refers to the amount of a material in a host (e.g., the amount of gold in a ton of ore.)

[1]As cited from *Hardrock Mining on Federal Lands*. National Research Council, Committee on Hardrock Mining on Federal Lands, Committee on Earth Resources, Board on Earth Sciences and Resource, Commission on Geosciences, Environment, and Resources: NATIONAL ACADEMY PRESS, Washington, D.C. 1999. http://books.nap.edu/html/hardrock_fed_lands/index.html

CONSTRUCTION MINERALS (OR MATERIALS) - Materials used in construction, notably sand, gravel, crushed stone, dimension stone, asbestos, clay, cement, and gypsum.

COOPERATING AGENCY - Any federal, state, or local agency or Indian tribe with jurisdiction by law or special expertise enabling it to cooperate with the lead agency preparing an environmental impact statement under NEPA.

CORPORATE BONDING - As used in this report, the use of corporate assets as part or all of the financial assurance for the successful completion of reclamation or other corporate responsibility.

CRITICAL ENVIRONMENTAL CONCERN - Describes an area under BLM management and having special attributes.

CULTURAL RESOURCES - As used in this report, natural or man-made features having cultural or historical significance, such as structures, graves, religious sites, vistas, or bodies of water.

CUMULATIVE IMPACT - As used in this report, the collective impacts of several operations involving human activities, including mining, grazing, farming, timbering, water diversion or discharge, and industrial processing, also includes future impacts not immediately observable.

DEVELOPMENT - The preparation of a mining property so that an ore body can be analyzed and its tonnage and quality estimated. Development is an intermediate stage between exploration and mining.

DISCOVERY - As used in this report, initial recognition and demonstration of the presence of valuable mineral within a claim.

DUMP - A pile of ore, coal, or waste at a mine.

EMERGENCY FUNDS (re: for low-probability, post-closure events) - As used in this report, funds provided to deal with unexpected failures of reclamation on closed mining sites.

EPHEMERAL STREAM - A stream or reach of a stream that flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times above the water table.

EXPLORATION - As used in this report, the search for valuable minerals by geological, geochemical, geophysical, or intrusive physical examination. (See also "prospecting," which in this report is considered part of exploration.)

FEDERAL LAND MANAGEMENT AGENCIES - In this report the term refers to the Bureau of Land Management and the U.S. Forest Service; management agencies not discussed here might include the National Park Service, the Department of Energy, the Department of Defense, and others.

FERROUS METALS - Metals commonly occurring in alloys with iron, such as chromium, nickel, manganese, vanadium, molybdenum, cobalt, silicon, tantalum, and columbium (niobium).

FINANCIAL ASSURANCE - Funding or enforceable pledges of funding used to guarantee performance of regulatory obligations in the event of default on such obligations by the permittee.

GOOD SAMARITAN ACTION - An action taken for the benefit of part or all of the community at large rather than for that of the doer. In the context of this report, it usually refers to the correction of some prior detrimental environmental legacy as a convenience or as a public service, but without direct personal or institutional benefit.

GROUNDWATER - Underground water.

HARDROCK - Locatable minerals that are neither leasable minerals (oil, gas, coal, oil shale, sodium, phosphate, potassium, sulphur, asphalt, or gilsonite) nor saleable mineral materials (e.g., common variety sand and gravel). However, the EPA AML Team includes mining sites associated with phosphate extraction in this category even though they are categorized as "leasable minerals." Hardrock minerals include, but are not limited to, copper, lead, zinc, magnesium, nickel, tungsten, gold, silver, bentonite, barite, feldspar, fluorspar, and uranium. (BLM, 1999b) Usually refers to rock types or mining environments where the rocks are hard and strong and where blasting is needed to break them for effective mining. As used in this report, the term hardrock minerals is defined synonymous with “locatable minerals.”

HEAP LEACHING - As used in this report, a process for recovery of minerals from heaps of crushed ore by percolation of a solvent (such as cyanide for gold, or ferric sulfate and sulfuric acid for copper) through the heap, followed by chemical processing of the lixiviant.

LEACH PAD - The surface upon which ore is piled for heap leaching, including those facilities to collect the lixivant for mineral recovery.

LEASABLE MINERALS - A legal term that identifies a mineral or mineral commodity that is leasable by the federal government under the Mineral Leasing Act of 1920 and similar legislation. Leasable minerals include oil, gas, sodium, potash, phosphate, coal, and all minerals on acquired lands.

LIXIVIANT - A liquid medium that selectively extracts the desired metal from the ore or material to be leached rapidly and completely, and from which the desired metal can be recovered in a concentrated form.

LOCATABLE MINERALS - A legal term that identifies minerals acquired through the General Mining Law of 1872, as amended. Examples are given in Table A-1. Locatable minerals are distinguished from federally owned minerals that are disposed of by leasing (see leasable minerals). In some situations, the term “hardrock minerals” is applied to locatable minerals.

LOCATION - See “claim.” Also, the process of claiming or appropriating a parcel of mineral land.

LODE CLAIM - Synonymous with “vein claim.” As used in this report, a claim based on the presumption that the valuable mineral is a part of a bed-rock lode, vein, stockwork, stratum, or intrusion and is not dominantly a physical redistribution of values by surficial processes (the latter constitutes a placer deposit).

MINE - An opening or excavation in the ground for the purpose of extracting minerals.

MINERAL - Several other common meanings, but the following is used in this report: Any natural resource extracted from the earth for human use; e.g., ores, salts, coal, or petroleum.

MINERAL DEPOSIT - A mineral occurrence of sufficient size and grade that it might, under favorable circumstances, be considered to have economic potential.

MINERAL OCCURRENCE - A concentration of mineral that is considered to be valuable or that is of technical or scientific interest.

MINERAL SPECIES - Term used in this report to distinguish specific mineralogical species from the unmodified term "mineral" as defined above.

MULTIPLE USE - A combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output. [43 U.S.C. §1702 ©)].

NOTICE-LEVEL OPERATION - A mining or exploration operation on BLM land involving more than casual use but requiring that the operator submit only a Notice rather than a plan of operations. It is limited to an area of disturbance of 5 or fewer acres.

OPERATIONS - As used in this report, all activities and facilities involved in management, access, exploration, extraction, beneficiation, maintenance, or reclamation.

ORE - The naturally occurring material from which a mineral or minerals of economic value can be extracted profitably or to satisfy social or political objectives.

OVERBURDEN - Material of any nature, consolidated or unconsolidated, that overlies a deposit of useful minerals or ores.

OXIDATION - As used in this report, the reaction of ores or waste with oxygen (usually above the water table); in sulfide ores this results in the release of sulfuric acid that, in the absence of neutralization, mobilizes iron, copper, zinc, and other minerals. (See also redox.)

PATENT - Concerning the ownership of a mining claim: as a noun, A document that conveys title to the ground; or the process of securing a patent.

PERFORMANCE-BASED STANDARDS - Standards expressed in terms of a desired result or outcome rather than a method, process, or technology. See also "technically prescriptive standards."

PHREATOPHYTE - A plant that obtains its water supply from the zone of saturation or through the capillary fringe and is characterized by a deep root system.

PIT LAKE - As used in this report, a lake that forms within the open pit of a mining operation.

PLACER - A mineral deposit that has achieved its present distribution through the prior action of moving water or wind. Placers are usually in poorly consolidated materials and are the sources of much, but not all, tin, titanium, rare earths, diamonds, and zirconium, and some gold.

PLAN OF OPERATIONS - A plan for mining exploration or development on BLM land involving more than 5 acres or a plan for mining where the operator with preexisting, valid claims intends to mine in an area of Critical Environmental Concern or a Wilderness area.

POINT SOURCE DISCHARGE - Discharge of pollutant from a discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container.

POST-CLOSURE - As used in this report, referring to the time after a property formerly used for mining has been reclaimed.

PRECIOUS METAL - Any of several relatively scarce and valuable metals, such as gold, silver, and the platinum group metals.

PROSPECTING - The search for outcrops or surface exposures of mineral deposits. Searching for new deposits; also preliminary explorations to test the values of lodes or placers already known to exist. (See also "exploration".)

PUBLIC DOMAIN - Land owned, controlled, or heretofore disposed of by the U.S. government.

PUBLIC LAND - The part of the U.S. public domain to which title is still vested in the federal government and that is subject to appropriation, sale, or disposal under the general laws.

RECLAMATION - Restoration of mined land to original contour, use, or condition. But as used in this report, also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to mining.

RECORD OF DECISION - Under NEPA, a concise public record that states what an agency's decision was, identifies all alternatives considered by the agency and the factors considered by the agency, and states whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted or if not, why not.

REDOX - Adjective identifying chemical reactions involving oxidation (and reduction).

RESERVED LANDS - Federal lands which are dedicated to or set aside for a specific purpose or program and which are, therefore, generally not subject to disposition under the operation of all of the public land laws.

RESERVE - The quantity of mineral demonstrated to be present and known to be economically producible.

SALEABLE MINERALS - A legal term that defines mineral commodities that are sold by contract from the Federal Government. These are generally construction materials and aggregates.

SEDIMENTARY - A rock composed of sediments, or ores formed during a process of sedimentation.

SUCTION DREDGE - A dredge in which the material is lifted by pumping through a suction pipe.

TAILINGS - As used in this report, the waste from mineral beneficiation. They are usually regarded as liabilities, but under some circumstances they may be reprocessed to recover additional values.

TECHNICALLY PRESCRIPTIVE STANDARDS - As used in this report: standards expressed in terms of the techniques to be applied. See also "Performance-based standards."

UNCOMMON VARIETY MINERALS - Mineral materials that have a special quality, quantity, character, or location that makes them of unique commercial value. On public lands such minerals are locatable under the Mining Law of 1872, as amended. See Sidebar 1.2.

UNNECESSARY OR UNDUE - A surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations. Failure to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas or creation of a nuisance, may constitute unnecessary or undue degradation. Failure to comply with applicable environmental protection statutes and regulations thereunder will constitute unnecessary or undue degradation. Where specific statutory authority requires the attainment of a stated level of protection or reclamation, such as in the California Desert Conservation Area, Wild and Scenic Rivers, areas designated as part of the National Wilderness System administered by the Bureau of Land Management and other such areas, that level of protection shall be met.

WASTE - The part of an ore deposit that is too low grade to be of economic value at the time of mining, but which may be stored separately for possible treatment later.

WATER TABLE - As used in this report, the surface separating the zone is water-saturated from the zone containing air that is freely connected to the atmosphere.

WEATHERING - As used in this report, the process of decomposition of rocks or ores through the action of air and water.

WITHDRAWAL - Segregation of particular lands from the operation of specified public land laws, making those laws (including the mineral location and leasing laws) inapplicable to the withdrawn lands.

YEAR EVENT - The probabilistic frequency for an event of a given magnitude (e.g., a 1000-year flood).

228 AUTHORITY - U.S. Forest Service regulations found at 36 CFR Part 228.

261 AUTHORITY - U.S. Forest Service regulations found at 36 CFR Part 261.

3809 REGULATIONS - Bureau of Land Management regulations found at 43 CFR Subpart 3809.

Acronyms

A.I.M.	Arizona Abandoned and Inactive Mine
AMD	Acid Mine Drainage
AML	Abandoned Mine Lands
AMLIS	Abandoned Mine Lands Inventory System
AMLRP	Abandoned Mine Lands Reclamation Program
ARD	Acid Rock Drainage
AzMILS	Arizona Department of Mines and Mineral Resources Database
BLM	Bureau of Land Management
BOD	Biological Oxygen Demand
BOM	Bureau of Mines
CDBG	Community Development Block Grant
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPFM	Colloid Polishing Fiber Method
CTSP	Conservation Technology Support Program
CVI	Canaan Valley Institute
CWA	Clean Water Act
DENR	Department of Environmental and Natural Resources
DEQ	Department of Environmental Quality
DO	Dissolved Oxygen
DOC	Department of Conservation
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DNR	Department of Natural Resources
EA	Environmental Assessment
EDA	U.S. Department of Commerce's Economic Development Association
EPA	Environmental Protection Agency
EMNRD	Energy, Minerals, and Natural Resources Department

ESA	Endangered Species Act
FFT	Filter Flow Technology
FHWA	U.S. Department of Transportation, Federal Highway Administration
FLMA	Federal Land Management Agency
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FS	see USFWS
FTA	Federal Transit Administration
FWS	see USFWS
GIS	Geographical Information System
GMI	Green Mountain Institute
GPS	Global Positioning System
HPF	Historic Preservation Fund
HUD	U.S. Department of Housing and Urban Development
IAM	Inactive and Abandoned Mine Lands
ICMM	International Council on Mining and Metals
ILS	In-line Aeration and Neutralization System
IMCC	Interstate Mining Compact Commission
IRP	USDA Intermediary Relending Program
ISM	Ionic State Modification Process
LEPC	Local Emergency Planning Committee
MAS/MIL	Mineral Availability System/Mineral Industry Location System
MBMG	Montana Bureau of Mines and Geology
MDE	Maryland Department of the Environment
MDIG	USGS Mine Drainage Interest Group
MEND	Mine Environment Natural Drainage
MEPA	Montana Environmental Protection Act
MPC	Mineral Policy Center
MRDS	USGS Mineral Resources Data Systems
MSHA	Mine Safety and Health Administration
MWCB	Mine Waste Cleanup Bureau

NASLR	National Association of State Land Reclamationists
NCP	National Contingency Plan
NEA	National Endowment for the Arts
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest Service
NHPA	National Historical Preservation Act
NMA	National Mining Association
NMLRC	National Mine Land Reclamation Center
NORM	Naturally Occurring Radioactive Materials
NPL	National Priorities List
NPO	Non-profit Organization
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NSE	National Science Foundation
OCS	Office of Community Services
OERR	Office of Emergency and Remedial Response
OSM	Office of Surface Mining
OSMRE	Office of Surface Mining Reclamation and Enforcement
RAMP	Rural Abandoned Mine Program
RC&D	Resource Conservation and Development
RCRA	Resource Conservation and Recovery Act
RMMLF	Rocky Mountain Mineral Law Foundation
RO	Reverse Osmosis
SERC	State Emergency Response Commission
SMARA	California Surface Mined Lands Reclamation Act
SRI	Superfund Redevelopment Initiative
TASWER	Tribal Association on Solid Waste and Emergency Response
TBA	Targeted Brownfields Assessment
TSS	Total Suspended Solids
UMTRA	Uranium Mills Tailing Remedial Action

UMTRCA	Uranium Mill Tailings Radiation Control Act
URP	Urban Resources Partnership
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WGA	Western Governors' Association
SMCRA	Surface Mining Control and Reclamation Act
SME	Society for Mining, Metallurgy, and Exploration, Inc.
SMRD	Surface Mining Reclamation Division
SRF	State Revolving loan Fund

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Tables

To provide an overview of the tables referenced in the text of this document and presented on the following pages, a brief synopsis of the information contained in the cited tables is presented below.

Table 2-1: Selected AML Inventory Estimates
Referenced on page 11 of the text, Table 2-1 presents AML inventory estimates from selected agencies, programs, and organizations involved with AML, including the number of AML sites as estimated per agency/association and the source of the data.

Table 2-2: Reclamation Costs Per State
Table 2-2, as referenced on page 11 of the text, summarizes the estimated reclamation costs per state presented in the 1991 Western Interstate Energy Board's "Inactive and Abandoned Noncoal Mines: A Scoping Study."

Table 4-1: Federal Regulatory & Programmatic Authorities for Cleaning up AML
Providing an overview of the federal regulatory and programmatic authorities used or available for cleanup of AML, Table 4-1 presents the program and agency names, the program's purpose and scope, as well as any other key points associated with the program and its involvement with AML. This table is referenced on page 21 of the text.

Table 4-2: Bureau of Land Management (BLM) AML Sites Funded for FY01
Referenced on page 22 of the text, Table 4-2 lists the AML sites under the authority of BLM, which were funded for fiscal year (FY) 2001. The table presents the state, watershed, USGS HUC number, and sites included for each AML project as well as a break-out of the funding dollars per AML project as BLM, U.S. Forest Servcice, state, or other funding.

Table 4-3: National Park Service (NPS) AML Reclamation Site Summaries
Table 4-3, which is referenced on page 23 of the text, summarizes the reclamation activities at several NPS AML sites, including the reclamation activities underway at the site, the year reclamation started, the current status of reclamation activities, and partners involved.

Table 4-4: USDA Forest Service AML Reclamation Site Summaries
Summarizing the reclamation activities at several Forest Service AML sites, Table 4-4 (page 24 of the text) provides information such as the year reclamation started, the reclamation activities underway at the site, and partners involved.

Table 5-1: State Requirements for Hardrock Mine Sites
Table 5-1, as referenced on page 29 of the text, summarizes the state requirements for hardrock mine sites presented in the 1988 General Accounting Office (GAO) "Federal Management: An Assessment of Hardrock Mining Damage."

Table 5-2: State and Tribal AML Programs and Inventory Resources
Referenced on page 29 of the text, Table 5-2 provides a comprehensive list of websites that present information on state/tribal AML programs, inventories, or other AML-related resources, organized by state/tribe.

Table 2-1

Selected AML Inventory Estimates

Agency/Association	Estimate of AML Sites*	Source of Data
EPA	562	Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) data and information gathered by EPA Regional staff (Regional AML Inventory)
U.S. Geological Survey	116,000 - for the lower 48 continental states	http://greenwood.cr.usgs.gov/pub/open-file-reports/ofr-96-0549/ofr-96-549.html
Mineral Policy Center (MPC)	557,650	Mineral Policy Center. "Burden of Gilt." Washington, D.C. June 1993.
Alabama Department of Industrial Relations	15,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Alaska Department of Natural Resources/Division of Mines, Land and Water	432	www.dnr.state.ak.us/mlw/mining/aml.htm
Bureau of Land Management	106	www.nv.blm.gov/minerals/special/AML_App_2.htm
Arizona State Mine Inspector's Office	8,787	http://www.asmi.state.az.us/abandoned.html
MPC and EPA research efforts	8,000 - 10,000	MPC and EPA research efforts
Department of Mines and Mineral Resources	4,000	www.admmr.state.az.us/mingen.htm
Bureau of Land Management	2,008	www.nv.blm.gov/minerals/special/AML_App_2.htm
Arkansas Department of Pollution Control and Ecology	5,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.

Agency/Association	Estimate of AML Sites*	Source of Data
California		
MPC and EPA research efforts	40,000 - 47,000	MPC and EPA research efforts
State Water Resources Control Board/Division of Clean Water Program	2,400	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management	688	www.nv.blm.gov/minerals/special/AML_App_2.htm
Colorado		
Department of Natural Resources; MPC and EPA research efforts	8,000 - 23,000	MPC and EPA research efforts; http://mining.state.co.us/dmginactive.html
Inactive Mine Reclamation Program	22,000	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management (Colorado)	2,600	http://www.co.blm.gov/mines/mine.htm
Florida		
Department of Natural Resources/Bureau of Mine Reclamation	49,000 acres (clay settling ponds); 13,000 acres (non-clay settling ponds)	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Idaho		
MPC and EPA research efforts	8,000 - 16,000	MPC and EPA research efforts
Department of Health and Welfare/Division of Environmental Quality	8,700	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management	400	www.nv.blm.gov/minerals/special/AML_App_2.htm
Illinois		
Department of Mines and Minerals	35,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.

Agency/Association	Estimate of AML Sites*	Source of Data
Indiana Department of Natural Resources/Bureau of Mine Reclamation	1,200	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Louisana Department of Natural Resources/Injection and Mining Divisions	900	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Maine Department of Environmental Protection	700	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Maryland Water Resources Administration	200	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Minnesota Department of Natural Resources/Minerals Division	650	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Missouri Department of Natural Resources and Department of Environmental Quality	48,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Montana Montana Bureau of Mines and Geology (MBMG) Department of Environmental Quality Department of State Lands/Reclamation Division Bureau of Land Management	8,000 6,000 19,000 6,000	http://www.mbmg.mtech.edu/env-abldbms.htm#database http://www.deq.state.mt.us/AbandonedMines/download.asp Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991. www.nv.blm.gov/minerals/special/AML_App_2.htm

Agency/Association	Estimate of AML Sites*	Source of Data
Nevada		
Nevada Abandoned Mine Lands Environmental Task Force	8,000	http://www.nbmg.unr.edu
Department of Minerals	50,000	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management (Nevada)	165,000	www.nv.blm.gov/minerals/special/AML_App_2.htm
New Mexico		
MPC and EPA research efforts	10,000 - 20,000	MPC and EPA research efforts
Energy, Minerals, and Natural Resources/Mining and Minerals Division	7,200	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management	595	www.nv.blm.gov/minerals/special/AML_App_2.htm
New York		
Department of Environmental Conservation/Division of Mineral Resources	30,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
North Carolina		
Geological Survey Minerals Resources Division	150	http://www.geology.enr.state.nc.us/Mineral%20resources/Mineral_Resources.html
Ohio		
Department of Natural Resources/Division of Reclamation	6,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Oklahoma		
Conservation Commission	26,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.

Agency/Association	Estimate of AML Sites*	Source of Data
Oregon		
Oregon Department of Environmental Quality/Department of Geology and Mineral Industries	94 - 120	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Department of Geology and Mineral Industries/Mined Land Reclamation	3,500	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management (Oregon)	323	http://www.or.blm.gov/Resources/Minerals/aml/indexaml.htm
Pennsylvania		
Department of Environmental Resources/Bureau of Mining and Reclamation	1,300	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
South Carolina		
U.S. Geological Survey	greater than 1,000	http://water.usgs.gov/pubs/FS/FS-040-96/
South Dakota		
Department of Environment and Natural Resources	900	www.state.sd.us/denr/DES/mining/acidmine.htm
Texas		
Railroad Commission of Texas/Surface Mining and Reclamation Division	20,000	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Utah		
MPC and EPA research efforts	20,000	MPC and EPA research efforts
Department of Natural Resources/Division of Oil, Gas, and Mining	25,000 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management (Utah)	478	www.blm.gov/utah/minerals/aml/aml_blm.html

Agency/Association	Estimate of AML Sites*	Source of Data
Virginia Department of Mines/Minerals and Energy	2,000	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Washington Department of Natural Resources' Division of Geology and Earth Resources & the Department of Ecology	3,800	http://www.dnr.wa.gov/geology/
Wisconsin Department of Natural Resources	200 acres	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Wyoming Department of Environmental Quality Abandoned Mine Reclamation Program	3,371	Western Interstate Energy Board. "Inactive and Abandoned Noncoal Mines: A Scoping Study." August 1991.
Bureau of Land Management, Office of Surface Mining, Wyoming Abandoned Mine Division	931	www.nv.blm.gov/minerals/special/AML_App_2.htm

* Note: AML estimates within the table refer to either total estimated AML sites or AML acres according to individual inventories.

Table 2-2

Reclamation Costs Per State*

State	Estimated Reclamation Cost
Alaska	$5 - $10 million
Arizona	$600 million
Alabama	$54 million
Arkansas	$140 million
Colorado	$240 million
Florida	$190 million
Idaho	$300 million
Illinois	$100 million
Indiana	$450 million
Louisiana	$100 million
Maryland	$25 million
Mississippi	$23 million
Missouri	$1.3 billion
Montana	$900 million
Nevada	$2.5 million
New Mexico	$330 million
North Carolina	$22 million
Ohio	$48 million
Oklahoma	$86 million
Oregon	$57 - $77 million
Pennsylvania	$220 million
Texas	$1 billion
Utah	$170 million
Virginia	$120 million
Wisconsin	$3 million
Wyoming	$45 million

* as presented in the 1991 Western Interstate Energy Board's "Inactive and Abandoned Noncoal Mines: A Scoping Study"

Table 4-1

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Abandoned Mine Land Reclamation Program (AMLR)	U.S. Department of the Interior, Office of Surface Mining, Division of Reclamation Support	Protects the public and corrects environmental damage caused by coal and, to a limited extent, non-coal mining practices that occurred prior to August 3, 1977. Provides for the restoration of eligible lands and waters mined and abandoned or left inadequately restored.	Divided into two programs: State Indian Reclamation Program and the Federal Reclamation Program. Both programs address problems such as dangerous highwalls, slides, subsidence, dangerous portals, and polluted water.	26 States and Indian Tribes with Approved AML Programs
Appalachian Clean Streams Initiative (1994)	U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSMRE)	The mission of the Appalachian Clean Streams Initiative is to facilitate and coordinate citizen groups, university researchers, the coal industry, corporations, the environmental community, and local, state, and federal government agencies that are involved in cleaning up streams polluted by acid drainage. The initiative responds to all major interests in this endeavor. http://www.osmre.gov/acsiplan.htm	"The Appalachian Clean Streams Initiative began as a broad-based program to eliminate acid drainage from abandoned coal mines. Today the program is more focused, with a clear goal of cleaning up acid drainage problems using a combination of private and government resources."	"A major goal of the clean-up plan is to increase the exchange of information and eliminate duplicate efforts among local, state, and federal government agencies working on acid drainage projects."

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Atomic Energy Act (1954)	Nuclear Regulatory Commission; U.S. EPA	The AEA established the Atomic Energy Commission (AEC) to promote the utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public. The AEC's successor, the Nuclear Regulatory Commission (NRC), issues licenses for production of uranium and thorium as atomic source materials and disposal of the byproduct wastes from those production facilities. With the exception of in situ leach operations, neither the NRC (or the AEC before it) license or permit mine operations.	When EPA was formed, the AEC's authority to issue generally applicable environmental radiation standards was transferred to EPA. Other federal and state organizations must follow these standards when developing requirements for their areas of radiation protection. EPA issues radiation protection guidance for the public, and sets standards in conjunction with its other operating statutes (e.g., Clean Air Act, SDWA, CERCLA) for radionuclide limits in soil, water and air. Authority for control of radium in mine wastes, though not expressly stated in the statute, resides with EPA.	
Clean Water Act	U.S. EPA	Established basic structure for regulating discharges of pollutants into the waters of the U.S. Establishes national standards to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.	Gives EPA authority to implement pollution control programs such as setting wastewater standards for industry; continues requirements to set water quality standards for all contaminants in surface waters; illegal for any person to discharge any pollutant from a point source into navigable waters without a permit; address nonpoint sources.	Associated with the Clean Water State Revolving Fund which builds on EPA-State Partnerships
Emergency Planning & Community Right To Know Act (EPCRA) (Title III of SARA)	U.S. EPA and State Emergency Response Commissions	National legislation on community safety; designated to help local communities protect public health, safety, and the environment from chemical hazards.	Congress required each state to appoint a State Emergency Response Commission (SERC). The SERCs divide their states into Emergency Planning Districts and name a Local Emergency Planning Committee (LEPC) for each district.	Broad representation by fire fighters, health officials, government and media reps., community groups, industrial facilities, and emergency managers ensures that all necessary elements of the planing process are represented.

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
National Environmental Policy Act (1969)	BLM and USDA Forest Service	The purposes of this Act are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality. http://ceq.eh.doe.gov/nepa/regs/nepa/nepaeqia.htm	Under the NEPA, the federal government must consider environmental impacts when approving a project, and the Environmental Assessment (EA) is the document that is used to meet that requirement. The goals of an EA are to describe the proposed project, characterize the existing environmental conditions at the site, describe how the project will affect environmental resources, and to identify any unavoidable significant impacts. If the project can be conducted without significant impacts to the environment, the federal agency involved prepares a Finding Of No Significant Impact (FONSI) as part of the project approval process.	
National Forest Management Act (1976)	USDA Forest Service	NFMA reorganized, expanded and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. It requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of national forests. http://ipl.unm.edu/cwl/fedbook/nfma.html		

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Oil Pollution Act	U.S. EPA	This Act streamlined and strengthened EPA's ability to prevent and respond to catastrophic oil spills. Trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do it.	Requires oil storage facilities and vessels to submit to the federal government plans detailing how they will respond to large discharges. Requires the development of Area Contingency Plans to prepare for oil spill response on regional scales.	EPA has published regulations for above ground storage facilities; the U.S. Coast Guard has done so for oil tankers.
Organic Act of 1897	USDA Forest Service	This Act allows the Forest Service to manage mining and its impacts by granting the Secretary of Agriculture general power to promulgate rules to regulate "occupancy and use and to "preserve the forests thereon from destruction."	Provided for the administration of National Forests, and the Multiple Use-Sustained Yield Act of 1960 (16 USC 528) establishes the legal mandate that the National Forests are to be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. The Multiple Use-Sustained Yield Act further states that management of National Forest System lands should not affect the use or administration of the mineral resources in these lands.	
Rural Abandoned Mine Program (RAMP)[1]	Dept. of Agriculture's Natural Resources Conservation Service	RAMP restores agricultural land disturbed by strip mining.		Originally included in the AML program of SMCRA (Critics) Excessive overhead and needless duplication of other federal and state reclamation efforts (Proponents) Underfunded and unable to fulfill its goals and realize potential efficiencies

[1] Thompson, Duane, A. "The Rural Abandoned Mine Program–A Fact Sheet." CRS Report for Congress, Environment and Natural Resources Policy Division. June 12, 1995.

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Safe Drinking Water Act	U.S. EPA	The SDWA was established to protect the quality of drinking water in the U.S.	Focuses on all waters actually or potentially designed for drinking use, whether from above-ground or underground sources. Authorizes EPA to establish safe standards of purity and requires all owners or operators of public water systems to comply with primary (health-related) standards.	State government, which assume this power from EPA, also encourages attainment of secondary standards (nuisance-related).
Small Business Liability and Brownfields Revitalization Act	U.S. EPA	This Act was established to provide certain relief for small businesses from liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA) of 1980, and to amend CERCLA to promote the cleanup and reuse of brownfields, to provide financial assistance for brownfields revitalization, to enhance state response programs, and for other purposes.	For the purposes of section 104(k), the term `brownfield site' includes a site that-- `(III) is mine-scarred land.'. and is eligible for Brownfields Revitalization Funding. http://www.epa.gov/swerosps/bf/html-doc/hr2869.htm	Congressman Paul E. Kanjorski (PA-11) today announced that he has succeeded in his four-year effort to include abandoned mine lands in a federal "brownfields" law that would encourage the cleanup of contaminated industrial sites for reuse Expanding the definition of brownfields to include the excavation of culm banks and the removal of other mining waste at abandoned sites will help many communities in Northeastern and Central Pennsylvania and across the country. It will benefit business, create jobs, increase local tax bases, and improve the environment," Congressman Kanjorski said. http://www.house.gov/kanjorski/02_01_10Brownfields.htm

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Surface Mining Control and Reclamation Act	U.S. Department of the Interior - Office of Surface Mining	Coal mine sites abandoned before August 3, 1977, may be reclaimed under the provisions of Title IV of SMCRA. Taxes on currently mined coal are redistributed to states and Indian tribes for the reclamation of abandoned coal mines and associated waters. After a state has completed this phase of reclamation, it can use these funds to conduct remediation of safety and environmental hazards at abandoned hardrock and non-coal mine sites. http://www.fs.fed.us/geology/amlpaper.htm	A national coalition of states and tribes, in cooperation especially with the Department of the Interior's Office of Surface Mining Reclamation and Enforcement (OSM), has grown out of SMCRA and has been very effective in promoting good reclamation science and engineering and publicizing the many successes that have occurred in that abandoned mine lands (AML) program. This coalition, the National Association of AML Programs, is led by state agencies and is a major player in the remediation of all types of abandoned mine sites throughout the country. http://www.fs.fed.us/geology/amlpaper.htm	In FY-99, SMCRA grants totaling $145,252,000 have been distributed to 26 states and tribes for traditional AML cleanup and the Appalachian Clean Streams program. Fee collections are currently authorized until the end of fiscal year 2004, and at this time there is about $1.4 billion in the fund carried over from previous years. http://www.fs.fed.us/geology/amlpaper.htm

PROGRAM	AGENCY	PURPOSE	SCOPE	NOTES
Uranium Mill Tailings Radiation Control Act (1978 a/k/a UMTRCA or Public Law 95-604)	U.S. Department of Energy	This Act provides regulation of uranium tailings disposal sites; local regulation, zoning, and occupancy requirements; transportation regulations, and other requirements.	Uranium Mill Tailings Remedial Action (UMTRA) Program: Congress acknowledged the potentially harmful health effects associated with uranium mill tailings and designated 24 inactive uranium-processing sites for cleanup. These sites also will be part of the Long-Term Surveillance and Maintenance Program, which provides for surveillance, ground-water monitoring, and maintenance of sites cleaned up under the UMTRA Program. In addition, DOE designated cleanup of properties in the vicinity of the millsites (referred to as vicinity properties) that were contaminated with residual radioactive materials derived from the millsites.	In 1983, the EPA developed standards to protect the public and the environment from potential radiological and nonradiological hazards at abandoned processing sites. These standards include exposure limits for surface contamination and concentration limits for ground water contamination. DOE is responsible for bringing surface and ground-water contaminant levels at the 22 sites (2 sites were delisted) into compliance with EPA standards. DOE is accomplishing this through the UMTRA Surface and Ground Water Projects.

Table 4-2

Bureau of Land Management (BLM) AML Sites Funded for FY01

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
AK	Hoosier Creek	19040509	Hoosier Creek Valley	Hoosier Creek Valley	20,000	0	0	0
AK	Moose Creek	19040506	HIYU Mine Site	HIYU Mine Site	6,000	0	0	0
AK	Birch Creek	19040402	98 Mile Steese/Birch Creek	98 Mile Steese/Birch Creek	86,000	0	0	0
AK	Koyukuk River	19040601	Gold Bench Drums	Gold Bench Drums	15,000	0	0	0
AK	Quartz Creek	19050105	Quartz/Dahl Creeks	Quartz/Dahl Creeks	10,000	0	0	0
AK	Maclaren River	19020503	Maclaren River	Maclaren River	45,000	0	0	0
AK	Copper River	19020102	Simpson & Brennan	Simpson & Brennan	9,000	0	0	0
AK	Copper River	19020102	Simpson & Brennan	Simpson & Brennan	5,000	0	0	0
AK	Copper River	19020102	Glennallen Inventory	Multiple Sites TBD	5,000	0	0	0
AK BLM Total					**201,000**	**AK Total, All Sources**		

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
AZ	San Pedro	15,050,202	Armco Mill Site	Armco Mill Site	50,000	0	0	0
AZ	Burro Creek	15,030,202	Hillside Mine	Hillside Mine	70,000	0	0	100,000
AZ	San Francisco Wash	15,030,103	Emerald Isle	Emerald Isle	30,000	0	0	0
AZ BLM Total					**200,000**	**AZ Total, All Sources**		
CA	Pajaro	18060002	Jade Mill	4 Retorts	30,000	0	0	5,000
CA	Panoche-San Luis Reservoir	18040014	CalMerc	1 Retort	30,000	0	0	5,000
CA	Panoche-San Luis Reservoir	18040014	Aurora Mine	1 site creek restoration	50,000	0	0	15,000
CA	Upper Yuba	18020125	Bear/Yuba Rivers Mercury Study	55 sites	100,000	100,000	0	200,000
CA BLM Total					**210,000**	**CA Total, All Sources**		
CO	Animas	14080104	Lackawanna	1	60,000	0	0	0
CO			Lark and Joe & John	1	250,000	0	0	0
CO	Arkansas	1102001	Lake Fork	1	40,000	0	0	0

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
CO	Gunnison	14020002	Roy Pray 1	1	111,000	0	0	0
CO			Ute-Ulay	1	6,000	0	0	0
CO			Wyoming	1	74,000	0	0	0
CO BLM Total					**691,000**	**CO Total, All Sources**		
ID	Big Lost River	17040218	Champagne Creek (DAA2)	Moran Tunnel Lower Champagne Cr.	35,000	0	DEQ	0
ID	Little Lost River	17040217	North Creek (DAA4)	North Creek Mill	3,000	0	DEQ	0
ID	Jordan Creek	17050108	Bridge Creek (DAA3)	Bridge Cr., Meadow Cr.	4,000	0	7,000	50,000
ID	Jordan Creek	17050108	Owyhees Metals Contamination (DAA6)	Silver City Camp	35,000	0	IDL, DEQ	EPA
ID	Big Wood	17040219	Courier Gulch / Triumph Mine area (DAA7)	Courier Gulch, Triumph Mine	268,000	0	IDL, DEQ	Private ASARCO
ID	Camas (Beaver Cr., Willow Cr.)	17040220	Princess Blue Ribbon (DAA1)	Princess Blue Ribbon Mine	25,000	FS	DEQ	30,000 Camas Co

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
ID	Upper Coeur d'Alene River	170103012	Pritchard-Eagle-Beaver Creeks (DAB1)	Gold Back, Mother Lode, Gold Cliff	16,000	FS	30,000	0
ID	Upper Salmon	17060201	Clayton Tailings (DAB3)	Clayton Mine	70,000	0	IDL	1,500,000
ID BLM Total					**520,000**	**ID Total, All Sources**		
MT	Boulder River	10020006	Redwing/Waldy	Redwing, North Waldy	390,000	0	0	0
MT	Boulder River	10020006	High Ore Creek	High Ore Creek, King Cole, Golconda Reliance	175,000	0	1,500,000	?
MT	Boulder River	10020006	Basin	Basin	CHF Funds	100,000	0	6,000,000 EPA
MT	Prickly Pear Creek	10030101	Gregory	Gregory	125,000	0	1,000,000	0
MT	Prickly Pear Creek	10030101	Bertha	Bertha	100,000	0	300,000	0
SD	Spruce Gulch	10120202	Belle Eldridge	Belle Eldridge	75,000	0	0	0

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $	
MT	Upper Clark Fork	17010201	Litton	Litton	1,000,000	0	200,000	0	
MT	Big Hole River	10020004	Ermont	Ermont	50,000	0	0	0	
MT BLM Total $$					**2,115,000**	**MT Total $$, All Sources**			
NV	Carson	16,050,201	Veta grande	Veta grande mine and mill	90,000	0	0	0	
NV	Upper humboldt	16,040,101	Rip van winkle	Rip van winkle mine and mill	80,000	0	0	0	
NV	Hot creek	16,060,012	Tybo	Tybo mill tailings	50,000	0	0	0	
NV	Panaca valley	15,010,013	Caselton	Caselton mill tailings	50,000	0	0	0	
NV	Diamond-monitor valleys	16,060,005	Norse-windfall	Norse-windfall mill tailings	50,000	0	0	0	
NV	Meadow valley wash	15,010,013	Johnston mill	Johnston millsite	10,000	0	0	0	
OR	Rouge River	17100310	Almeda	?	20,000	0	0	0	20,000

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
OR	Sucker Creek	17100311	Sucker Creek	?	85,000	0	0	0
OR	South Umpqua	17100302	Umpqua	?	78,000	0	0	0
OR	South Umpqua	17100302	Formosa	?	50,000	0	0	0
OR	Ruckles Creek	17050203	Poorman	?	190,000	0	0	0
WA	Similkameen	17020007	Kaaba-Texas	?	8,000	0	0	0
WA	Franklin D. Roosevelt	17010307	Cleveland	?	80,000	0	0	0
WA	Similkameen	17020007	Nighthawk	?	25,000	0	0	0
WA	Franklin D. Roosevelt	17020010	Queen Seal	?	15,000	0	0	0
OR BLM Total $$					**551,000**	**OR Total $$, All Sources**		
UT	Lower San Juan Four Corners	14080201	Cottonwood Wash	62 Sites	158,596	134,726	131,626	0

ST	WATERSHED	USGS HUC#	AML PROJECT NAME	SITES INCLUDED	BLM $	FOREST SERVICE $	STATE $	OTHER $
UT	Upper Dolores River	14030002	LaSal Creek	3 Sites	15,000	0	0	0
UT BLM Total $$					**1,226,596**	**UT Total $$, All Sources**		
WY	Sweetwater River	10180006	South Pass District	KAA1- S. Pass Closures	30,000	0	2,470,000	0
WY	Sweetwater River	10180006	South Pass District	KAA2 - Duncan Tailings Remed.	91,000	0	0	0
WY	Sweetwater River	10180006	South Pass District	KAA3 - Hermit/Pine Ck Remed.	65,000	0	2,435,000	0
WY	Muskrat	10080004	Gas Hills District	KAA4 - Road/channel Remed.	100,000	0	300,000	100,000
WY	Upper Big Horn	10080007	Gebo District	KAA5-Gebo Mine Remed	40,000	0	960,000	0
WY	Upper Bear	16010101	Leefe District	KAA6 -SWWY Phosphate Mines	391,000	0	1,219,000	0
WY BLM Total $$					**717,000**	**WY Total $$, All Sources**		

* as presented in the BLM Web page “List of AML Sites Funded for FY-2001, by BLM State Offices”

http://www.blm.gov/aml/amldocs/AMLprojects2001.htm#top

Table 4-3

National Park Service (NPS) AML Reclamation Site Summaries

Site Name	Reclamation	Year started	Status	Partners
Buffalo National River, AR	Closed mines and installed bat gates to protect the bat habitat, and prevent human interference	1993	Complete	Worked closely with US Fish and Wildlife Service, academic bat biologists, and Bat Conservation International
Martin Mine, ID	Excavated and buried waste rock piles, placed topsoil over the waste, reshaped the site and access road, and revegetated	1994 (Work was performed in September and was completed in five days.)	Complete	Funding was provided from the US National Park Service (NPS) Pacific Northwest Region and a cooperative agreement with the Shoshone District of the US Bureau of Land Management (BLM). A local construction contract provided an excavator and operator and a local Boy Scout troop assisted with seeding and mulching
Lassen Volcanic National Park, CA	Geothermal well was plugged and abandoned with four cement plugs; next year, the road and pad will be recontoured and then revegetated	1997	Pending, more work scheduled for next year	BLM, Ukiah Office provided a geothermal engineer; cooperative efforts of the BLM, the USGS, the California Division of Oil, Gas and Geothermal Resources, and the NPS
Lost Horse Mine, CA	Sprayed polyurethane foam (PUF) into the collapsed hole and covered with fill from surrounding disturbed areas, built a replica of the top of the wooded shaft, rehabilitated the historic 10 stamp mill, and filled three peripheral mine adits with PUF	1996	Complete	Financial assistance from the Federal Emergency Management Agency and the historic preservation office of the NPS

Site Name	Reclamation	Year started	Status	Partners
Dorsey Site, MI	Cut and chipped 100 red pines and later used them for mulch and fill material; used fill material from an adjacent ridge to fill the main pit, creating swales to mimic the natural landscape; covered the disturbed areas with topsoil, fine-grained material, and sandy surface material to improve soil-moisture holding capacity, and revegetated	1995	Complete	NPS worked together with an engineering unit of the Michigan National Guard
Cabin Branch Pyrite Mine, VA	Identified the location of shafts, excavated material within mouth of shafts, and plugged shafts with concrete; removed tailings from creek and buried them against the toe of the highwall; shaved the highwall to allow revegetation; tailings were buried with minimum 3 feet of clean fill with fertilizer, mulch, and lime, and revegetated; stable creek channel was established and streambank slopes reduced; diversion ditches were installed	1995	Complete	Cooperative effort between the NPS and the state of Virginia; 319 (non-point source grant) received by Virginia supported 70% of the cost, 30% was covered by the NPS; volunteer groups helped plant thousands of trees

* as presented in the NPS “Abandoned Mineral Lands Restoration Projects” Web Page
http://www2.nature.nps.gov/geology/distlands/amlprojects.htm

Table 4-4

USDA Forest Service AML Reclamation Site Summaries

Site Name	Reclamation	Year started	Partners
Bear Rock Run Section 319 Project, PA	Construction of treatment ponds, access road construction, anoxic trench construction, and trail construction	N/A	Project sponsor is the Cambria County Conservation and Recreation Authority; administered by the Pennsylvannia Department of Environmental Protection, Bureau of Land and Water Conservation; participants are National Work Study Program, Americorps, USDA Soil Conservation Service, Lilly Borough, Highland Sewer and Water Authority, Washington Township, Cooney Bros. Coal Co., Lilly Civic Association, Bear Rock Sportsmen and the Benscreek Sportsmans Club
Hillman Mine Remediation, PA	Rough grading, construction of serpentine rock lined channels, and 2 settlement ponds; revegetation included mulching and fertilizing	N/A	Southern Alleghenies Planning and Development Commission applied for and received financial assistance from the Appalachian Regional Commission; operations in the project were administered on site by the Somerset County Conservation District; Lion Mining donated all the equipment and labor; local environmental groups helped to revegetate the site
Hoffman Mining Inc., PA	Two anoxic limestone drains, two in-line limestone cells, two in-line wetlands, and five in-line ponds have been put in place to eliminate acid mine drainage; research into the ecosystem is ongoing	N/A	Local students and professors have become involved in the ecosystem research along with a geologist/microbiologist from the U.S. Geological Survey (USGS)

Site Name	Reclamation	Year started	Partners
Oven Run/Pokeytown Run Project, PA	Construction of passive wetland treatment systems and limestone drains 4 separate locations	Project expected to start in July 1995 and expected to take 2 years to complete	Somerset County Conservation District with assistance and support of the USDA, Soil (now Natural Resources) Conservation Service (NRCS), and PA Dept. of Environmental Resourcess, Bureau of Soil and Water Conservation; volunteers offered help in construction and local mining companies expressed willingness to assist
Kleuh Reclamation Project, IN	Poor quality trees were cleared from the site to facilitate grading of the pile; gob pile was leveled, limestone added to neutralize the acid, and the pile was seeded; short slope draining to a field was covered with soil material; areas were fertilized, seeded, and mulched	N/A	Partners for Reclamation Project headed the project; John Jones Logging cleared the trees at no cost; Lubovitch Excavating leveled the pile; Sycamore Trails Resource Conservation and Development Council, sponsor of the project, received funding from Indiana Dept. of Environmental Management for administration, and Indiana Dept. of Natural Resources for the actual site restoration
Pleasant View Mine Project, KY	Barge-mounted pipe aerated and chemically treated the acid water with hydrated lime; coal refuse pile was removed, graded and seeded, mulched, and fertilized	1997	Appalachian Clean Streams Initiative provided funding
Blackwater River Limestone Drum Station, WV	Drum station adds limestone to the river to neutralize the acidic water; doser is used during flood conditions and is activated to bring more limestone to neutralize the waters; Rainbow and Brown trout have been added to the River annually	1994	Not indicated

Table 5-1

State Requirements for Hardrock Mine Sites*

State	Requires Reclamation Plan	Requires Compliance Inspections	Has Authority to Bond
Arizona	No state hardrock mining regulation exists	No state hardrock mining regulation exists	No state hardrock mining regulation exists
California	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	Actual inspection and compliance practice may differ between counties in the state	YES
Colorado	YES	YES	YES
Idaho	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	YES	YES
Montana	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	YES	YES
Nevada	No state hardrock mining regulation exists	No state hardrock mining regulation exists	No state hardrock mining regulation exists
New Mexico	No state hardrock mining regulation exists	No state hardrock mining regulation exists	No state hardrock mining regulation exists

State	Requires Reclamation Plan	Requires Compliance Inspections	Has Authority to Bond
Oregon	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	YES	YES
Utah	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	YES	YES
Washington	Reclamation plans required for all large mining operations; some types of small mining operations are exempted from these requirements	YES	YES
Wyoming	YES	YES	YES

* as presented in the 1988 GAO's "Federal Management: An Assessment of Hardrock Mining Damage"

Table 5-2
State and Tribal AML Programs and Inventory Resources

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Compilation of States	BLM State AML Programs	Bureau of Land Management	Provides overview of BLM State AML Programs	www.nv.blm.gov/minerals/special/AML_App_2.htm
Compilation of States	Interstate Mining Compact Commission	Interstate Mining Compact Commission	Multi-state governmental agency/organization that represents the natural resource interests of its member states and provides a forum for interstate action and communication on issues of concern to the member states	http://www.imcc.isa.us
Navajo Tribe	Navajo Abandoned Mine Lands Reclamation/UMTRA Department	Office of Surface Mining on behalf of the Navajo Nation/Division of Natural Resources	Provides information about the Navajo AML Reclamation program and its coordination with the U.S. OSM in performing reclamation at coal and non-coal (uranium and copper) mine sites	http://www.navajoaml.osmre.gov/
Alaska	Division of Mining, Land and Water - Abandoned Mine Lands Program	Alaska Department of Natural Resources	Provides information about funding sources and levels, the AML inventory, accomplishments, and contact information of the Alaska AML Program	www.dnr.state.ak.us/mlw/mining/aml.htm

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Alaska	The Abandoned Mine Lands Program in Alaska	Bureau of Land Management - Alaska	Provides listing of current and past AML projects in Alaska as well as links to points of contact, and EPA Web pages for further information on particular watersheds of interest	http://www.ak.blm.gov/
Arizona	Abandoned and Inactive Mines	Arizona State Mine Inspector's Office	Provides history of the AZ State Mine Inspector's work and partnership with the BLM and NPS, information about the Abandoned and Inactive Mine survey (A.I.M.) conducted by the State Mining Inspector's office, and links to: frequently asked questions, annual funding report, mine reclamation activities, and mine safety awareness	http://www.asmi.state.az.us/abandoned.html
Arizona	Arizona Abandoned Mine Program	Bureau of Land Management - Arizona	Provides listing of Arizona AML Projects and links for further information on each	http://www.az.blm.gov/mines/mines.htm
Arizona	Arizona Department of Mines and Mineral Resources	State of Arizona	Provides information about the Department of Mines and Mineral Resources mine inventory and opportunities to purchase the inventory database	www.admmr.state.az.us/mingen.htm

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Arkansas	Surface Mining and Reclamation Division	State of Arkansas Department of Environmental Quality	Provides information about and links for the Arkansas Non-Coal Program, mine site databases for open-cut, coal and quarry mines, and mining handbooks and online brochures	http://www.adeq.state.ar.us/mining/default.htm
Arkansas	Mining Database Information/Open-Cut Mining	State of Arkansas Department of Environmental Quality	Searchable database of open-cut mining sites according to permit ID, mine name, mineral, county, or mine operator	http://www.adeq.state.ar.us/home/pdssql/pds.asp
California	SMARA Projects	California Deparment of Conservation/Mineral Resources Division	Listing of publications of the SMARA mineral land classification project dealing with mineral resources in California	http://www.consrv.ca.gov/cgs/minerals/mlc/SMARA_pubs_2001.pdf
California	California Department of Conservation: California Geological Survey	California Department of Conservation	Provides various links including: California Mineral Resources, State Mining and Geology Board, Office of Mine Reclamation, Environmental Resources Evaluation System Web pages	http://www.consrv.ca.gov/cgs/geologic_resources/mineral_resource_mapping/index.htm

State/Tribe	Web site Name	Web site Host	Description	Internet Address
California	Office of Mine Reclamation	California Office of Mine Reclamation	Provides information and links to: a listing of Eligible Sites for SMARA funding, Abandoned Mine Lands Unit, a listing of other related links	http://www.consrv.ca.gov/OMR/
California	Abandoned Mine Lands Unit	California Office of Mine Reclamation	Provides information about the programs partnerships with other agencies and associations and the combined effort to compile an inventory of abandoned mines (a link to the Abandoned Mine Lands Report is included, which presents the findings of the inventory survey)	http://www.consrv.ca.gov/OMR/abandoned_mine_lands/
California	Abandoned Mine Lands BLM California	Bureau of Land Management - California	Provides listing of AML sites with current projects in California and links to further information for each	http://www.ca.blm.gov/pa/aml/
Colorado	Abandoned Mines	Colorado Department of Natural Resources/Division of Minerals and Geology	Provides information about and links for inactive mine reclamation, mine subsidence protection program, non-point source program, forfeited bond reclamation, and general information about the dangers of abandoned mines	http://mining.state.co.us/dmginactive.html

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Colorado	Mining Data	Colorado Department of Natural Resources/Division of Minerals and Geology	Searchable database of Colorado mine sites	http://mining.state.co.us/operatordb/
Colorado	BLM Colorado Abandoned Mine Lands Program	Bureau of Land Management - Colorado Office	Provides links to project descriptions for mine cleanup that have the greatest impact on public safety and nation's waters	http://www.co.blm.gov/mines/mine.htm
Florida	Florida Department of Environmental Protection	Florida DEP	Provides information about the new partnership between Florida DEP and the phosphate industry in addressing abandoned phosphate mines, and fund reserves in the NLRTF	http://www.dep.state.fl.us/secretary/news/2001/01-164.htm
Idaho	Abandoned Mine Land Program	Idaho Department of Lands/ Bureau of Minerals	Provides information on the Idaho Abandoned Mine Land Program and current AML projects	http://www2.state.id.us/lands/Bureau/Minerals/Abandoned%20Mine%20Program_files/Abandoned%20Mine%20Program.htm
Idaho	Idaho's AML Program	Bureau of Land Management - Idaho	Provides background and current information about the Idaho AML Program	http://www.id.blm.gov/aml/program.htm

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Minnesota	Iron Range Resources and Rehabilitation Agency	Iron Range Resources and Rehabilitation Agency	Provides information about mining programs designed to provide incentives for the exploration of minerals besides iron, and other initiatives to enhance the taconite industry and to reclaim abandoned mine lands	http://ironrangeresources.org/natural/?page=25
Montana	Mine Waste Cleanup Bureau (MWCB)	Montana Department of Environmental Quality	Provides information about the MWCB, reclamation guidance, interactive maps, historical narratives, and priority site listings (Superfund and SMCRA)	http://www.deq.state.mt.us/rem/mwcb/index.asp
Montana	Mine Waste Cleanup Bureau (MWCB) - Downloads Webpage	Montana Department of Environmental Quality	Five Statewide, downloadable, databases pertaining to Montana inactive mine sites.	http://www.deq.state.mt.us/AbandonedMines/download.asp
Montana	Abandoned-Inactive Mines Inventory of USFS and BLM - Administered Land in Montana	Montana Bureau of Mines and Geology (MBMG)	Provides information about the abandoned-inactive mine inventory compiled through a partnership between the USFS, BLM, and MBMG, definition for abandoned and inactive mines, and a description of the inventory database	http://www.mbmg.mtech.edu/env-abldbms.htm#database

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Montana/Dakotas	Montana/Dakotas Abandoned Mine Land Program	Bureau of Land Management - Montana/Dakotas Office	Provides listing of AML project descriptions and links for further information on each	http://www.mt.blm.gov/aml/
Nevada	Abandoned Mine Lands	State of Nevada Commission on Mineral Resources/Division of Minerals	Provides various links to information for AMLs, AML reclamation/restoration activities, and current AML statistics in Nevada	http://minerals.state.nv.us/
Nevada	Nevada's Abandoned Mine Land Program	Bureau of Land Management - Nevada Office	Provides general information about the AML Program in Nevada and lists current, past and future AML projects with links to further information for each	http://www.nv.blm.gov/AML/
New Mexico	Abandoned Mine Lands Program - New Mexico, Oklahoma, Kansas, Texas (information is listed for New Mexico only)	Bureau of Land Management - New Mexico Office	Provides information about AML projects in New Mexico, State of New Mexico and BLM partnership, watersheds affected by AMLs, and links for further information on each	http://www.nm.blm.gov/nmso/aml/aml_home.htm
New Mexico	Abandoned Mine Land Bureau	New Mexico's Energy, Minerals and Natural Resources Department (EMNRD)	Provides information about the New Mexico AML Program and potential hazards associated with abandoned mines	http://www.emnrd.state.nm.us/

State/Tribe	Web site Name	Web site Host	Description	Internet Address
North Carolina	Mining Program	Land Quality Section/Division of Land Resources/NC Department of Environment and Natural Resources	Provides information about and links for the NC Mining Program, mining industry indicators, inventories of permitted active and inactive mines in NC, and current news briefs about the NC mining industry	http://www.dlr.enr.state.nc.us/mining.html
North Dakota	Mineral Resources of North Dakota	North Dakota Geological Survey and the Department of Geosciences at North Dakota State University	Provides information about and links for various types of mining in ND including uranium	http://www.state.nd.us/ndgs/minerals/minerals.htm
Oregon	Mined Land Reclamation Program	The Oregon Department of Geology and Mineral Industries	Provides information about the Oregon Mined Land Reclamation Program	http://www.oregongeology.com/mlr/mlrhome.htm
Oregon/Washington	Oregon/Washington Abandoned Mine-Land Program	Bureau of Land Management - Oregon/Washington Office	Provides information about AML project sites as organized by watersheds	http://www.or.blm.gov/Resources/Minerals/aml/indexaml.htm
South Carolina	U.S. Geological Survey (USGS) Programs in South Carolina	U.S. Geological Survey	Provides information about and links for the South Carolina mineral resource data system, which is based off of the USGS's MRDS and MAS systems	http://water.usgs.gov/pubs/FS/FS-040-96/

State/Tribe	Web site Name	Web site Host	Description	Internet Address
South Dakota	Inactive and Abandoned Mines in the Black Hills	South Dakota - Department of the Environment and Natural Resources (DENR)/Minerals and Mining Program	Provides information about the inactive and abandoned mine lands (IAMs) inventory conducted by the SD School of Mines and Technology and DENR's reclamation activities at those identified IAM sites	http://www.state.sd.us/denr/DES/mining/acidmine.htm
Texas	Abandoned Mine Lands Reclamation Program	Texas Railroad Commission	Provides information about the AML Reclamation program and its current focus on uranium mines	http://www.rrc.state.tx.us/divisions/sm/programs/aml/aboutaml.htm
Utah	Utah Abandoned Mine Land Program	Bureau of Land Management - Utah Office	Provides information about the Utah AML Program, AML projects organized by watersheds, and links for further information on each	http://www.blm.gov/utah/minerals/aml/aml_blm.html
Utah	Utah Abandoned Mine Reclamation	State of Utah - Department of Natural Resources/Division of Oil, Gas, and Mining	Provides information and links for AML reclamation (including a downloadable version of "The Practical Guide to Reclamation in Utah"), education, community outreach and current AML projects in Utah	http://dogm.nr.state.ut.us/amr/default.htm

State/Tribe	Web site Name	Web site Host	Description	Internet Address
Washington	Mine Reclamation Program	Washington State Department of Natural Resources	Provides information about and links for the Washington Mine Reclamation Program, surface mine reclamation, inactive and abandoned metal mines, and online mine reclamation publications	http://www.dnr.wa.gov/geology/
Washington	SURFMINES	Washington State Department of Natural Resources	Downloadable GIS coverage containing the locations of mines with current or terminated Washington DNR Reclamation Permits	http://www.dnr.wa.gov/geology/smgis.htm
Washington	Directory of Washington Mines, 2001	Washington State Department of Natural Resources/Division of Geology and Earth Resources	Indices of Washington mines organized by operator, county, and commodity	http://www.dnr.wa.gov/geology/pdf/ic94.pdf
Wisconsin	Metallic Mining In Wisconsin	Wisconsin Department of Natural Resources	Provides general information about metallic mining in Wisconsin and the role of the DNR	http://www.dnr.state.wi.us/org/aw/wm/mining/Metallic/
Wyoming	Abandoned Mine Land Division	Wyoming State Abandoned Mine Land Division - Division of Wyoming DEQ	Provides information about the Wyoming DEQ's AML Program, its funding approaches, links for current AML projects and site information	http://deq.state.wy.us/aml/index.asp?pageid=7

Appendix A

CERCLIS and EPA Regional AML Inventory

In an attempt to begin building the foundation for a multi-agency AML inventory, the AML Team has started by assessing and compiling information from their own (EPA) data sources (see page 15 of the text). This inventory of 562 sites was compiled as of 2002, from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database and limited information gathered from EPA Regional staff.

CERCLIS is an automated data processing system that allows users to access data on CERCLA sites. It contains information on hazardous waste sites collected from site inspections, preliminary assessments, and remediation of hazardous waste sites including: basic site information, OUs, site history, site location, site status, leads for actions, response actions, removal actions, contaminants, PRPs, planned start and completion dates, and human health and environmental risks. Because the data is entered by the individual EPA Regions, the data quality may be inconsistent among Regions.

Data queried from the CERCLIS database was manipulated and entered into a spreadsheet with multiple information categories for each AML site. Further research from internet and other mine-related resources was then used to fill in any identified data gaps. The result is the AML Team AML Inventory. However, it should be noted that this is an initial step toward a more collaborative inventory as envisioned by the AML Team. Next steps may include further research and assessment into other available EPA resources, as well as initialization of outreach efforts to other entities for future AML inventory collaborations.

More information about the sites in the CERCLIS and EPA Regional AML Inventory can be found at: http://www.epa.gov/superfund/programs/aml/amlsite/nonnpl.htm.

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
1	CALLAHAN MINING CORP	1	ME	MED980524128	HARBORSIDE, END OF OLD MINE LANE ROAD, BROOKSVILLE (CAPE ROSIER), ME	>20 and <100 ACRES	The site is the former location of a zinc/copper open-pit mine. The mining operations were conducted adjacent to and beneath Goose Pond, a tidal estuary. Facility features include large waste piles (waste rock piles), and a tailings pond. The open pit mine ceased operations in 1972 and was flooded by opening a dam at Goose Falls. The mine is currently under water and is subject to daily tidal exchange in Goose Pond. 1968-1972		1981 Discovery, 2001 Proposal; Sept. 2002 Final to NPL	>10, <=100 (1 MILE), >1,000, <=10,000 (3-4 MILES)	NPL Final		Copper, lead, zinc	Sediment, Soil, Surface Water	Leslie McVickar, (617) 918-1374	Pamela Harting-Barrat, (617) 918 - 1318
2	KERRAMERICAN MINE (FORMER)	1	ME	MED055715775	MINES ROAD, BLUE HILL, ME				1994 Discovery 1999 ESI		Other: Not on the NPL; HRS Ongoing					
3	ORE HILL MINE	1	NH	NHN000103157			Copper and zinc mine. Years of operation: 1840-1914. USFS lead site									
4	ELIZABETH MINE	1	VT	VTD988366621	MINE ROAD, STRAFFORD, VT	>20 and <100 ACRES	1793-1958. The Elizabeth Mine is an abandoned copper mine located on Mine Road in the Village of South Strafford within the Town of Strafford, Orange County, Vermont. The property consists of three mine tailings piles, two open-cut mines, several adits (horizontal mine entrances), underground shafts and tunnels, ventilation shafts, and several former ore processing buildings.		1990 Discovery, 2001 Listing; Sept. 2002 EPA signed Action Memorandum for NTCRA	>1,000, <=10,000 (1 MILE), >1,000, <=10,000 (3-4 MILES)	NPL Final		Aluminum, cobalt, copper, iron, manganese, and zinc	Sediment, Soil, Surface Water	Ed Hathaway, (617) 918-1372; William Lovely, (617) 918-1240	Sarah White, (617) 918-1026
5	ELY COPPER MINE	1	VT	VTD988366571	TOWN HIGHWAY 38, BEANVILLE ROAD, 1.4MI W. OF RT 113, VERSHIRE, VT	>5 and <20 ACRES	The Ely Copper Mine is an abandoned copper mine located in a rural setting off Beanville Road in Vershire, Orange County, Vermont. The property encompasses approximately 1,800 acres, about 275-350 acres of which were used for copper mining activities from 1821 to 1920. Since 1920, the mining operation has been inactive, except for the removal of "dump-ore" from the property to South Strafford between 1949 and 1950.		1990 Discovery, 2001 Listing	>10, <=100 (1 MILE), >1,000, <=10,000 (3-4 MILES)	NPL Final	2001	Aluminum, cobalt, copper, iron, manganese, and zinc	Ground Water, Sediment, Soil, Surface Water	William Lovely, (617) 918-1240; Ed Hathaway, (617) 918-1372	Sarah White, (617) 918-1026
6	PIKE HILL COPPER MINE	1	VT	VTD988366720	PIKE HILL ROAD, CORINTH, ORANGE COUNTY	>5 and <20 ACRES	The Pike Hill Copper Mine (PHCM) is an abandoned copper mine, located in a rural, mostly wooded setting in Corinth, VT. The Site includes two former mines, the northern, Union Copper Mine, and the southern, Eureka Copper Mine, which were later known simply as the Pike Hill Mines. Run-off from tailing piles has caused acid mine drainage and elevated loads of metals to the Pike Hill Brook and the Waits River.	John Ayers		>10, <=100 (1 MILE), >1,000, <=10,000 (3-4 MILES)	Other: Not on the NPL; HRS Ongoing		Aluminum, cobalt, copper, iron, manganese, and zinc	Surface Water, Sediment, Soil	William Lovely, (617) 918-1240; Ed Hathaway, (617) 918-1372	Sarah White, (617) 918-1026
7	GLEN RIDGE RADIUM	2	NJ	NJD980785646	GLEN RIDGE, ESSEX COUNTY, NJ	>90 ACRES	The Glen Ridge Radium Site is in a residential neighborhood in Glen Ridge, Essex County, New Jersey. The site contains approximately 25, 000 cubic yards of contaminated material that is scattered through a neighborhood of about 0.50 square mile. The soil at the site is contaminated with radioactive waste materials suspected to have originated from nearby radium-processing facilities that operated in the early 1900s.		1983 Discovery, 1990 ROD, 1985 Listing, 2004 Focused Feasibility Study	425 residential properties and several municipal properties	NPL FINAL	1985	Radium, radon gas, radon decay products, indoor and outdoor gamma radiation	Soil, Air, Ground Water		
8	MONTCLAIR/WEST ORANGE RADIUM	2	NJ	NJD980785653	MONTCLAIR AND WEST ORANGE NEIGHBORHOODS, ESSEX COUNTY, NJ	120 ACRES	The 120 acre Montclair/West Orange Radium site includes more than 450 residential properties and several municipal properties. The soil at the site is contaminated with radioactive waste materials suspected to have originated from radium-processing facilities located nearby during the early 1900s. Some of the radium-contaminated soil was used as fill in low-lying areas or was mixed with cement for sidewalks and foundations.		1983 Discovery, 1990 ROD, 1985 Listing, 2004 Focused Feasibility Study	450 residential properties and several municipal properties	NPL Final	1985	Radium, radon gas, radon decay products, indoor and outdoor gamma radiation	Soil, Air, Ground Water		
9	RINGWOOD MINES/LANDFILL	2	NJ	NJD980529739	PETERS MINE ROAD, RINGWOOD BOROUGH, NJ	640 ACRES	Magnetite mines were operated on the site from 1750-1945.		1979 Discovery 1994 Deletion	0 (1 MILE), 0 (3-4 MILES)	Deleted from the Final NPL	1983	Lead, methylene chloride	Air, Ground Water, Solid Waste, Soil, Surface Water		
10	U.S. RADIUM CORP.	2	NJ	NJD980654172	ALDEN & HIGH STS AND OTHER ADDRESSES IN ORANGE, NJ	1 ACRE	The site is a former radium-processing facility where extraction, production, application, and distribution took place from about 1917 through 1926.		1982 Discovery 2001 RA	0 (1 MILE), 14,152 (3-4 MILES)	NPL Final	1983	Radium-226	Air, Debris, Ground Water, Liquid Waste, Soil		
11	W.R. GRACE & CO., INC./WAYNE INTERIM STORAGE SITE (USDOE)	2	NJ	NJ1891837980	868 BLACK OAK RIDGE RD, WAYNE TOWNSHIP, NJ	6.5 ACRES	From 1948 until 1971, site operators extracted thorium and rare earths from monazite ore at the 6 1/2 acre W.R. Grace & Co. facility in Wayne Township. In 1971, W.R. Grace ceased processing monazite ore.		1983 Discovery 2000 ROD	0 (1 MILE), 0 (3-4 MILES)	NPL Final	1984	Radioactivity	Residuals, Soil		

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
12	LI TUNGSTEN CORP.	2	NY	NYD986882660	GARVIES POINT RD., GLEN COVE, NY	>5 and <20 ACRES	1940-1985 tungsten processing plan; Production Facility	Glen Cove Development Corporation /Village Green Realty at Garvies Point, Inc.	1989 Discovery 1999 ROD Inactive Drummed chemicals and lab reagents removed, mercury spill addressed, inventory performed in 1990. Interim measures included consolidation and temp relocation of ore material to Dickson Warehouse, removal of significant quantities of debris vegetation	>100, <=1,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Final	1992	Arsenic, lead, radium-226, thorium-232	Debris, Liquid Waste, Sludge, Soil, Solid Waste	Edward G. Als, 212-637-4274	
13	VERMICULITE BG1	3	DE	DEN000305644	BESTWALL GYPSUM WILMINGTON, DE				2001 PA		Other: Not on the NPL; NFRAP					
14	AMBLER ASBESTOS PILES	3	PA	PAD000436436	LOCUST STREET, AMBLER, PA	15 ACRES	Production Facility, 1867-1974. Dumping of asbestos-containing waste on the site apparently began in the early 1930's and continued until 1974.		1980 Discovery, 1996 Deletion Inactive	7,000 (1 MILE), 55,849 (3-4 MILES)	Deleted from the Final NPL	1986	Asbestos	Debris, Ground Water, Liquid Waste, Other, Sediment, Sludge, Soil, Solid Waste, Surface Water	James J. Feeney, 215-814-3190	Richard Kuhn, 215-814-3063
15	BUTLER MINE TUNNEL	3	PA	PAD980508451	LUZERNE COUNTY, PITTSTON, PA		The Butler Mine Tunnel in Pittston, Luzerne County, Pennsylvania, was originally constructed about 50 years ago as a collection and discharge point for mine drainage from an estimated 5-square-mile area of underground coal mines. In addition, hazardous materials were disposed in the tunnel, which discharges directly to the Susquehanna River.	Hi-Way Auto Service Station	1979 Discovery, NPL Listing1987, 1996 ROD	1,400 within site boundaries, 25,000 (5 MILES)	NPL Final	1987	Semi-volatile organic compounds (VOCs), Petroleum Hydrocarbons, Bis(2-ethylhexyl)phthalate	Ground Water, Surface Water, Soil, Sediment, Other	Donna Santiago, 215-814-3222	Vance Evans, 215-814-5526
16	FOOTE MINERAL CO.	3	PA	PAD077087989	CHESTER COUNTY, EAST WHITELAND TOWNSHIP, PA	79 ACRES	The Foote Mineral Co. Site occupies 79 acres on Bacton Hill Road in East Whiteland Township. The site is made up of two large quarries, a solvent burn pit, a lined settling basin, and more than 50 plant buildings and process areas. From 1942 - 1991, Foote Mineral Co., Cyprus Foote Mineral Company, and the Department of Defense (DoD) owned and/or conducted operations at the site.	Frazer-Exton Development, L.L.C.	1990 Consent Order, 1991 Site Closed, 2002 clean-up expected to finish	42, 300 (4 MILES)	NPL Final	1992	Lithium, boron, chromium, VOCs, organics, and various chemical components of solvents	Soil, Ground Water	James J. Feeney, 215-814-3190	Lisa M. Brown, 215-814-5528
17	FRANKLIN SLAG PILE	3	PA	PASFN0305549	CASTOR AVENUE, PHILADELPHIA COUNTY, PHILADELPHIA, PA	~110,000 CUBIC YARDS	The Franklin Slag Pile site is located in the Port Richmond section of northeast Philadelphia, PA. A pile of copper slag is located on the site. The slag was generated as a by-product from copper smelting conducted at the adjacent Franklin Smelting and Refining Corporation. Operations at the Franklin Slag Pile Site ceased in 1999.		1999 Site Closed, 2000 EPA Inspection, 2001 Public Meeting, 2002 NPL Final,	0 (1/4 MILE)	NPL Final	2002	Lead	Air, Surface Water	Kristine Matzko, 215-814-5719	Trish Taylor, 215-814, 5539
18	HUTCHINSON MINE PCB SITE	3	PA	PAD982364275	HWY. 136, HUTCHINSON, PA				1987 Discovery 1989 PA		Other: Not on the NPL; NFRAP			Liquid Waste, Other, Soil		
19	JACKS CREEK/SITKIN SMELTING & REFINING, INC.	3	PA	PAD980829493	MAITLAND, PA	115 ACRES	1954-1987 smelting no-iron metals/scrap metal and aluminum recycling business/precious metal recycling; Production Facility	Joseph Krentzman and Sons Inc.	1983 Discovery 2001 RD Inactive	361 (1 MILE), 1,151 (3-4 MILES)	NPL Final	1989	Antimony, cadmium, copper, cyanide, lead, selenium, silver, zinc, PAHs, dioxins	Air, Debris, Ground Water, Other, Sediment, Sludge, Soil, Solid Waste, Surface Water	Rashmi Mathur , 215-814-5234	Fran Burns, (215) 814-3063

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20	PALMERTON ZINC PILE	3	PA	PAD002395887	211 FRANKLIN ST, PALMERTON, PA	200 ACRES	Former primary zinc smelting operation		1980 Discovery 2001 ROD Active	853 (1 MILE), 0 (3-4 MILES)	NPL Final	1983	Zinc, copper, cadmium, lead	Ground Water, Soil, Surface Water	Charlie Root (OU 1 & OU 3), 215-814-3193; Eugene Dennis (OU 2 & OU 4), 215-814-3202	David Polish, 215-814-3327
21	SHARON STEEL CORP.	3	PA	PAD001933175	MERCER COUNTY, PA	400 ACRES	The Sharon Steel Corporation Farrell Works Disposal Area site is an area of about 400 acres located in Mercer County in Western, PA. The site is southwest of the former Sharon Steel Corporation Farrell Works, and is bordered on the east by the Shenango River. Beginning about 1900, the Sharon Steel Corporation used the area to dispose of blast furnace slag, electric arc furnace slag, basic oxygen furnace slag, and sludge. From 1949 to 1981, millions of gallons of spent pickle liquor acid were dumped over the slag.		1998 NPL Final, 2000 RI/FS Phase I, 2002 RI/FS Phase II scheduled		NPL Final	1998	Arsenic, lead, and chromium	Ground Water, Other, Surface Water	Rashmi Mathur , 215-814-5234	Patrick Gaughan, 304-234-0238
22	HYMAN VIENER & SONS	3	VA	VAD003112364	5300 HATCHER ST, RICHMOND, VA		Production Facility		1985 Discovery 1988 SI Inactive		Other: Not on the NPL; Referred to Removal - NFRAP			Ground Water, Soil, Surface Water		
23	LOUISA MINE (VA VERMICULITE LTD.)	3	VA	VAN000305634	14093 LOUISA ROAD, LOUISA, VA						Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)					
24	U.S. TITANIUM	3	VA	VAD980705404	NELSON COUNTY, PINEY RIVER, VA	50 ACRES	Between 1931 and 1971, titanium dioxide was produced at the site from ilmenite ore using a sulfate-based leaching process. The site was originally owned by the Virginia Chemical Corporation and was sold to American Cyanamid Corporation (now Cytec Industries, Inc.) which operated the facility until it closed in 1971.		2002 expected ESD	200 (1 MILE)	NPL Final	1983	Aluminum, iron, copper, nickel, zinc, and cadmium	Ground Water, Soil	Phil Rotstein, 215-814-3232	Patrick Gaughan, 304-234-0238
25	VERMICULITE NU 1	3	VA	VAN000305645	ONDULINE-USA, FREDERICKSBURG, VA				2001 PA		Other: Not on the NPL; NFRAP					
26	BLACK FORK FISH KILL	3	WV	WVD988803227	BLACK FORK RIVER, PARSONS, WV						Other: Not on the NPL; NFRAP					
27	EDNA PCB TRANSFORMER	3	WV	WVD988800355	LAWLIS ROAD, EDNA, WV				1992 Discovery, 1997 SI		Other: Not on the NPL; Status Not Specified					
28	OTSEGO PCB CAPACITOR	3	WV	WVD988767448	CEDAR CREEK RD, OTSEGO, WV	0.9 ACRE								Air, Ground Water, Other, Solid Waste, Soil, Surface Water		
29	AGRICO CHEM. CO./SADDLE CREEK MINE	4	FL	FLD980727192	JCT S 33&334, LAKELAND, POLK COUNTY		Closed mine and beneficiation plant, clay settling and sand tailings areas. Two separate tracts 1) north of and adjacent to Tenoroc Fish Management Area, and 2) south of US 92 east of Saddle Creek, east half of tract has approved "Development of Regional Impact from city of Lakeland for Housing & Commercial development.		1985, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					
30	AGRICO CHEM. SOUTH PIERCE WORKS	4	FL	FLD092980150	SR 630, BARTOW, POLK COUNTY	560 ACRES	Facility began operations in 1972. Plant produces phosphoric acid, granular triple super phosphate, and sulfuric acid. Gypsum stack and process pond covers 560 acre area. Lab wastewater reportedly run to process pond. Lab waste included carbon tetrachloride, toluene, xylene, acetone, methyl ethyl ketone, and sulfuric acid.		1980, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL		MINIMAL DATA			
31	BORDEN CHEM. CO./TENOROC MINE	4	FL	FLD980727432	TENOROC MINE RD, ALBURNDALE, POLK COUNTY		Closed mine, beneficiation plant, clay settling and sand tailings areas. Currently state owned fish management area known as Tenoroc Fish Management Area. Is core area of Saddle Creek Restoration & Alternative Mitigation Project.		1985, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					

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32	BORDEN FEED PHOSPHATE CMPLX	4	FL	FLD001704741	PLANT CITY, HILLSBOROUGH COUNTY		Non-mandatory area, status unknown.		1980, PA; 1989, SI; 1993, SIP							
33	BREWSTER LONESOME MINE	4	FL	FLD000826834	SR 39&SR 674, LONESOME, HILLSBOROUGH COUNTY		Lonesome benefication plant closed, portion north of South Prong Alafia River and east of SR 39 donated to State as Alafia River Recreation Area - mostly reclaimed- some active mining & reclamation remain, clay settling areas & sand tailings areas. Remaining portion consolidated into the IMC Four Corners/Lonesome Mine complex.		1985, PA; 1991, SI							
34	CENTRAL PHOSPHATES	4	FL	FLD098930076	STATE RD 39 N, PLANT CITY, HILLSBOROUGH COUNTY		Comprised of a chemical plant and phosphogypsum stack	CF INDUSTRIES	1980, PA; 1990, SI; 1994, SIP		SF Alternative ?: Non-NPL					
35	ESTECH GENERAL CHEMICALS, SILVER CITY MINE	4	FL	FLD004106829	SR 555, BARTOW, POLK COUNTY		Closed mine, benefication plant, chemical plant, phosphogypsum stack; clay settling and sand tailings areas; portions of mine now owned, and within, the Florida Power Corp. Hines Energy Facility.	FLORIDA POWER CORP. HINES ENERGY FACILITY	1980, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					
36	ESTECH, INC., WATSON MINE	4	FL	FLD980385496	FT. MEADE, POLK COUNTY		Closed mine and beneficiation plant, clay settling areas, flocculated clay-in-pits & sand tailings, majority of reclaimed land in agricultural production (mostly citrus and pasture).		1986, PA; 1991, SI; 1995, SIP							
37	FARMLAND INDUSTRIES, INC.	4	FL	FLD043055003	PEEBLEDALE ROAD, BARTOW, POLK COUNTY	500 ACRES	Two sulfuric acid, two phosphoric acid, superphosphoric acid, diammonium phosphate, monoammonium phosphate plants. Surge pond, two primary treatment ponds, secondary treatment pond, three polishing ponds. Lime storage area, water filled sand mine pits, fw lake. 500 acre gypsum stack. Operations conducted from 1965 to present. FDEP issued ground water permit in 1985. FDEP issued warning notice in 1987 for ground water violations and consent order in 1988		1980, PA; 1990, SI; 1994, SIP		SF Alternative ?: Non-NPL		Radium-226, metals, radionuclides	Ground Water, Soil		
38	GARDINIER, INC./FT. MEADE MINE	4	FL	FLD000827428	(CARGILL) FT. MEADE, POLK COUNTY		Operating mine and benefication plant. Temporarily shutdown. Clay settling & sand tailing areas.		1985, PA; 1991, SI							
39	GRACE, W.R. & FOUR CORNERS MINE	4	FL	FLD991302308	MULBERRY, POLK COUNTY		Operating mine & benefication plant, clay settling and sand tailings area, incorporates a portion of the former Lonesome Mine.		1985, PA; 1991, SI; 1995, SIP							
40	HAYNESWORTH MINE, BREWSTER PLANT	4	FL	FLD000826842	BRADLEY JUNCTION, POLK COUNTY		Haynesworth benefication plant closed. Clay settling areas & sand tailing areas. Consolidated into IMC Kingsford complex.		1985, PA; 1991, SI							
41	IMC/CLEAR SPRINGS MINE	4	FL	FLD000770420	CLEAR SPRINGS ROAD, BARTOW, POLK COUNTY		Closed mine and beneficiation plant, clay settling areas & sand tailings. Proposed housing & industrial development.	CLEAR SPRINGS LAND DEVELOPMENT CO.	1985, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					
42	IMC PHOSPHATES (AGRICO) PALMETTO MINE	4	FL	FLD980727077	BRADLEY JUNCTION, POLK COUNTY		Majority of tract incorporated in to the Cargill Hooker's Prairie Mine, Non-mandatory being reminded and/or used as clay settling areas.		1985, PA; 1991, SI							
43	IMC PHOSPHATES (AGRICO) PAYNE CREEK MINE	4	FL	FLD980727135	FT. GREEN RD., BRADLEY JUNCTION, POLK COUNTY		Operating mine & benefication plant, clay settling and sand tailings areas, now incorporates portions of the Palmetto Track and US AgriChemicals Rockland Mine.		1985, PA; 1991, SI; 1994, SIP							
44	INTL MINERAL & CHEM/KINGSFORD MINE	4	FL	FLD000770453	DOC DURRANCE RD, BRADLEY JUNCTION, POLK COUNTY		Currently operating mine and benefication plant, clay settling area & sand tailings area, surrounds IMC New Wales Chem. Plant & Phosphogypsum stack.		1985, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					
45	MOBIL/FT. MEADE MINE	4	FL	FLD021714639	US HWY 17, FT. MEADE, POLK COUNTY	10,000 ACRES	Benefication plant, 8,206 acres of clay settling ponds, 2,500 acres of sand tailings. Mine estimated at 4 miles, and includes four of the clay settling ponds. Phosphate was separated from sand using amino fatty acid, kerosene, fuel oil, sulfuric acid, sodium hydroxide, methyl ethyl ketone, and ammonia. Mining conducted from 1956 to 1990. Mine reclamation conducted from 1990-1995.		1985, PA; 1991, SI; 1992, UST CAP;1995, SIP		SF Alternative ?: Non-NPL		Minimal data indicates no significant priority pollutant nor radionuclide contamination. However, given size of facility, studies to date were likely inadequate to properly assess facility.			
46	MOBIL CHEMICAL CO./ELECTRO PHOS. DIV.	4	FL	FLD070864285	1155 PEEBLEDALE RD, MULBERRY, POLK COUNTY		Phosphate rock, coke, water, silica combined in furnace to produce elemental phosphorous. Waste streams included slag and phosphate contaminated water. Facility operated from 1975 to 1983. Enforcement action ongoing due to violations from gross alpha, fluoride, radium-226, radium-228, pH, and TDS. FDEP currently in negotiations with Mobil Chem. Co. to conduct additional assessment work and remediation.		1982, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL		Metals, salts, silicates, fluorides, phosphates, and radionuclides including radium-226 and radium-228.	Ground Water, surface water		

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47	MULBERRY PHOSPHATES	4	FL	FLD004106415	4000 SR 60 E, MULBERRY, POLK COUNTY		NuGulf Wingate Creek mine & benefication plant north of SR 64, Manatee County - Piney Point Chemical Plant & phosphogypsum stack on lower Tampa Bay - Mulberry Chemical plant & phosphogypsum stacks in Mulberry on North Prong Alafia River, currently in bankruptcy/receivership. FDEP currently moving to close stacks and chemical plants.				SF Alternative ?: Non-NPL					
48	SYDNEY MINE SLUDGE POND	4	FL	FLD000648055	HILLSBOROUGH COUNTY, BRANDON, FL	9.5 ACRES	The Sydney Mine Sludge Pond Site is a 9.5 acre former liquid waste disposal site that was strip-mined for phosphate ore from the 1930s through the 1950s.	Hillsborough County			NPL Final	1989	Volatile Organic Compounds (VOCs)	Ground Water, Soil,		
49	T/A MINERAL CORP., MULBERRY PLANT (AGRIFOS)	4	FL	FLD077586634	STATE HWY S, MULBERRY, POLK COUNTY	160 ACRES	160 acre settling pond. Fuel oil, amines, kerosene, ammonia, sulfuric acid, and fatty acid added to float and remove phosphate from sand. Benefication plant dismantled prior to 1980, surrounding land reclaimed.		1985, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL		NO DATA AVAILABLE			
50	USS AGRICHEM	4	FL	FLD045003316	HWY 630, FT. MEADE, POLK COUNTY	133 ACRES	Plant produces/produced sulfuric acid, phosphoric acid, fluosilicic acid, and triple super phosphate. Three gypsum stacks span 133 acre area. Three NPDES discharge permits. 110 tons of PCB contaminated soil excavated in 1995 from chemical storage area. May 1990, facility exceeded SO2 emissions and was fined by FDEP.		1980, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL		Radionuclides, PCB	Soil, air		
51	W.R. GRACE & BONNY LAKE MINE	4	FL	FLD003952033	HWY 60, (CARGILL) BARTOW, POLK COUNTY		Closed mine and benefication plant, clay settling & sand tailings areas. Operating chemical plant and phosphogypsum stacks.		1980, PA; 1991, SI; 1995, SIP		SF Alternative ?: Non-NPL					
52	NATIONAL SOUTHWIRE ALUMINUM	4	KY	KYD049062375	HAWESVILLE, HANCOCK COUNTY, KY	1,100 ACRES	The National Southwire Aluminum Co. (NSA), a division of Southwire Co. of Carrollton, GA, is located on the south bank of the Ohio River near Hawesville in Hancock County, KY. The 1,100 acre facility is an alumina ore refining operation which produces aluminum ingots for further processing by other Southwire facilities.		1992 RI/FS, 2000 ROD, 2004 RD/RA began	16,000 (4 MILES)	NPL Final	1994	Cyanide, fluoride, polychlorinated biphenyls (PCBs)	Ground Water, Soil		
53	LOFLIN GOLD MINE	4	NC	NCN000407301	LOFLIN HILL ROAD, ONE MILE SOUTH OF TRINITY, NC				2001 Discovery		Other: Not on the NPL; PA Start Needed					
54	HENRY'S KNOB	4	SC	SCN000407376	STATE HIGHWAY 55 AND HENRY KNOB ROAD,CLOVER, SC				2001 Discovery		Other: Not on the NPL; Status Not Specified					
55	MACALLOY CORPORATION	4	SC	SCD003360476	NORTH CHARLESTON, SC	125 ACRES	Macalloy Corporation is a 125 acre parcel situated in a primarily industrialized area of North Charleston, SC. The facility manufactured ferrochromium alloy by smelting chromite ore, coke, silica gravel and bauxite in submerged electric arc furnaces. Ferrochromium alloy is used in the production of high quality stainless steel. The plant was owned/operated by Pittsburgh Metallurgical Company from 1941 to 1966, Airco (British Oxygen Corporation) from 1966 to 1979, and by Macalloy from 1979 to July 1998 when alloy production ceased.	U.S. Government (Defense Logistics Agency)	2000 NPL Final, 2000 RI/FS, 2002 ROD expected		NPL Final	2000	Hexavalent chromium, trivalent chromium, and other metals	Ground Water, Air, Surface Water, Soil		
56	BAUTSCH-GREY MINE	5	IL	ILN000508088	1000 S. BLACK JACK ROAD, GALENA, IL				2000 Discovery, 2001 ESI		Other: Not on the NPL; ESI Ongoing					
57	CIRCLE SMELTING CORP.	5	IL	ILD050231976	STATE RTE 50, BECKEMEYER, IL	>100 ACRES	The Circle Smelting Corporation facility was originally constructed in 1904 as a primary zinc smelter. In 1920, it was converted to a secondary zinc smelter and began recovering zinc from scrap metals.		1987 Discovery, 1996 Proposal	>1,000, <=10,000 (1 MILE), >1,000, <=10,000 (3-4 MILES)	NPL Proposed		Zinc, nickel, lead, cadmium	Sediment, Soil, Surface Water		
58	HEGELER ZINC	5	IL	ILN000508134	SOUTH OF ROSS LANE, HEGELER, IL				2000 Discovery		Other:Not on the NPL; ESI Start Needed					
59	ILLINOIS ZINC CO.	5	IL	ILSFN0507992	500 BRUNNER STREET, PERU, IL				1999 Discovery 2001 Integrated Assessment		Other:Not on the NPL; ESI Start Needed					
60	KERR-MCGEE (KRESS CREEK/WEST BRANCH OF DUPAGE RIVER)	5	IL	ILD980823991	ALONG RR TRKS S OF ROOSEVELT R, DUPAGE COUNTY, IL	7.3 MILES	This site received waste from the Kerr-McGee Rare Earth facility that operated from 1931-1973.		1983 Discovery 1992 RI/FS 1997 Removal	8,000 (1 MILE), 20,000 (3-4 MILES)	NPL Final	1991	Radionuclides, thorium	Soil and sediments	Rebecca Frey, 312-886-4760	Jennifer Ostermeirer, 312-353-0618

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61	KERR-MCGEE (REED-KEPPLER PARK)	5	IL	ILD980824007	NEAR JCT OF YALE & NATIONAL, WEST CHICAGO IL	11.0 ACRES	This site received waste from the Kerr-McGee Rare Earth facility that operated from 1931-1973.		1983 Discovery 1992 RI/FS	8,000 (1 MILE), 12,550 (3-4 MILES)	NPL Final	1990	Radionuclides, thorium	Soil	Rebecca Frey, 312-886-4760	Jennifer Ostermeirer, 312-353-0618
62	KERR-MCGEE (RESIDENTIAL AREAS)	5	IL	ILD980824015	ADJACENT TO PLT AT 258 ANN STREET, WEST CHICAGO, IL	30.0 ACRES	This site received waste from the Kerr-McGee Rare Earth facility that operated from 1931-1973.		1983 Discovery 1993 RI/FS 1995-present ongoing Non-time Critical Removal	8,000 (1 MILE), 12,550 (3-4 MILES)	NPL Final	1990	Radionuclides, thorium	Soil	Rebecca Frey, 312-886-4760	Jennifer Ostermeirer, 312-353-0618
63	LITTLE GRANT MINE	5	IL	ILN000508228	MERIDIAN ROAD, GALENA, IL				2001 Discovery		Other: Not on the NPL; Combined PA/SI Ongoing					
64	ROSICLARE MINES	5	IL	ILN000508137	CORNER OF MAIN STREET AND BOHN STREET, ROSICLARE, IL				2001 Discovery		Other: Not on the NPL; ESI Start Needed					
65	TAR LAKE	5	MI	MID980794655	NE COR SEC30 T29N R6W , MANCELONA TOWNSHIP, MI	4 ACRES	The 200-acre Tar Lake site is the location of a former iron works facility that was in operation from 1882 to 1945. Secondary manufacturing processes on the site generated a tar waste similar to residue from still bottoms. This tar residue was discharged into a natural surface depression on the site property. The site property also contains a municipal landfill area.		1981 Discovery	702 (1 MILE), 0 (3-4 MILES)	NPL Final	1983	Iron, lead, nickel, chromium, copper, and phenols	Ground Water, Sludge, Solid Waste, Soil, Surface Water	Thomas Bloom, (312) 886-1967	
66	TORCH LAKE	5	MI	MID980901946	STE RTE 26 N OF QUINCY MILLS, HOUGHTON COUNTY, MI	2,660 ACRES	Copper milling and smelting activities in the area from 1890's until 1969 produced mill tailings that contaminated the lake sediments and shoreline. Inactive.	Universal Oil Products/Quincy Development Company	1984 Discovery 2002 Partial Deletion	4,000 (1 MILE), 9,893 (3-4 MILES)	NPL Final	1986	PAHs	Debris, Ground Water, Liquid Waste, Sediment, Solid Waste, Soil, Surface Water	Steven Padovani, (312) 353-6755	Stuart Hill, (312) 886-0689
67	ALSCO ANACONDA	5	OH	OHD057243610	TUSCARAWAS COUNTY, GNADENHUTTEN, OH	4.8 ACRES	The 4.8 acre Alsco Anaconda site, owned by the Atlantic Richfield Company, is located in the Village of Gnadenhutten, approximately 50 miles south of Akron, OH. From 1965 to 1978, the site was used for the disposal of wastewater and wastewater treatment sludge that were generated by the production of aluminum products.	Atlantic Richfield Company	1989 & 1992 RODs, 1989 &1993 UAOs, 1996 PCOR issued, 2001 PCOR signed	3,100 (3 MILES)	NPL Deleted	2001	Cyanide, chromium, polychlorinated biphenyls (PCBs), arsenic, cadmium, lead, mercury, and zinc.	Ground Water, Soil, Surface Water	Gladys Beard, 312-886-7253	
68	ORMET CORP.	5	OH	OHD004379970	MONROE COUNTY, HANNIBAL, OH		The Ormet Corporation site, located in Monroe County, OH, is an aluminum processing facility that began operating in 1958. Between 1958 and 1968, about 85,000 tons of spent potliner material were stored in an unlined open storage area. The spent potliner was also placed in an unlined landfill adjacent to the Ohio River.	Ormet	1994 RI/FS, 1994 ROD, 1997 Explanation of Significant Differences, 1998 CC, 2002 5yr review	1,500 (3 MILES), 3,000 (2,000 feet drinking water well)	NPL Final	1987	Cyanide, fluoride, arsenic, manganese, polychlorinated biphenyls (PCBs)	Ground Water, Soil, Sediments	Bernard J. Schorle, 312-886-4746	Zenny Sadlon, 312-886-6682
69	AMERICAN SMELTING & REFINING DEMING MILL	6	NM	NMD980749220	1.5 MI.NW OF CITY, DEMING, NM						Other: Not on the NPL; NFRAP					
70	CIMARRON MINING CORP.	6	NM	NMD980749378	EAST OF HWY 380, CARRIZOZO, NM	10 ACRES	The site operated from 1979-1982 using cyanide salts and metal strippers to extract gold from ore brought to the site.	City of Carrizozo	1980 Discovery, 2000 Partial Deletion	1,380 (1 MILE), 2,000 (3-4 MILES)	NPL Final	1989	Cyanide (OU 1), lead, beryllium and arsenic (OU 2)	Debris, Ground Water, Sediment, Soil	Petra Sanchez, 214-665-6686	214-665-6619

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71	CLEVELAND MILL	6	NM	NMD981155930	FOREST ROUTE 804, 1.5 MI, SILVER CITY, NM	18 ACRES	The site is an abandoned lead, zinc, and copper mine and mill covering about 4 acres near mine and about 10 acres of the bed of Little Walnut Creek.	Mining Remedial Recovery Company	1986 Discovery, 2001 Deletion Search for off-site disposal facility unsuccessful and weather events caused extensive off-site contaminant migration. As a result EPA implemented a time critical removal action excavating waste in mill area and stream, limestone treatment to neutralize	0 (1 MILE), 1,200 (3-4 MILES)	Deleted from the Final NPL	1989	Arsenic, beryllium, cadmium, lead, zinc	Ground Water, Sediment, Soil, Surface Water	Kathleen Aisling, 214-665-6686	Nancy Stonebarger, 214-665-6619
72	DEADMAN CANYON	6	NM	NMD982289704	CANYON IS NEAR TYRONE, NM						Other: Not on the NPL; NFRAP					
73	GYPSUM MINE	6	NM	NM0000605394	2 MILES SE FROM EXIT 246 OF I25, SANTO DOMINGO, NM				2001 Discovery		Other: Not on the NPL; PA Start Needed					
74	HOMESTAKE MINING CO.	6	NM	NMD007860935	HWY 53, MILAN, NM	110 ACRES	1958-1982 Uranium processing mill and two tailings embankments	Homestake Mining Company	1980 Discovery 1996 Construction Completion	0 (1 MILE), 3,700 (3-4 MILES)	NPL Final	1983	Alkaline mill tailings, radium, selenium, uranium, radon	Ground Water, Soil	Mike Purcell, 214-665-6707	Mike Purcell, 214-665-6707
75	KENNECOTT COPPER CORP CHINO MINES DIV	6	NM	NMD980749311	SOUTH OF HWY 90, SANTA RITA, NM						Other: Not on the NPL; NFRAP					
76	MINERAL CREEK TAILING	6	NM	NMD981155906	FOREST ROUTE 701 3.5 MI E OF HWY 180, ALMA, NM						Other: Not on the NPL; NFRAP					
77	MOLYCORP, INC.	6	NM	NMD002899094	NM HWY 38 RED RIVER CANYON, QUESTA, NM	>100 ACRES	1920-?		1980 Discovery 2000 Proposal; PRP-lead RI/FS	>10, <=100 (1 MILE), >100, <=1,000 (3-4 MILES)	NPL Proposed					
78	NACIMIENTO MINE/MILL	6	NM	NMD981600471	5.7MI.EAST OF INTERSECTION WITH NM44, CUBA, NM				1986 Discovery 1993 ESI; USFS lead		Other: Not on the NPL; ESI Ongoing					
79	NATIONAL POTASH CO	6	NM	NMD007396658	30 MILE E OF CARLSBAD /HWY 62/180, CARLSBAD, NM						Other: Not on the NPL; NFRAP					

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80	TERRERO MINE	6	NM	NMD986668820	1.75 MILES N OF TERRERO, NM				1989 Discovery; 1990 SI; Currently reaching end of RA, Construction Completion and Closeout expected for Spring 2003		Other: Not on the NPL; Deferred to State of NM, NM Environment Dept. Superfund Oversight Section					
81	UNC SAN MATEO MINE	6	NM	NM1223075515	2 1/2 MI.SE OF SR53, SAN MATEO, NM						Other: Not on the NPL; USFS lead					
82	UNITED NUCLEAR CORP.	6	NM	NMD030443303	HWY 566 21 MI NE OF GALLUP, CHURCH ROCK, NM	640 ACRES	Uranium mill and ore processing facility, 1977-1982	United Nuclear Corporation	1979 Discovery 1998 Construction Completion	43 (1 MILE), 650 (3-4 MILES)	NPL Final	1983	Arsenic, cadmium, cobalt, nickel, radium-226/228, selenium, and gross alpha	Ground Water, Soil	Mark Purcell, 214/665-6707	Mark Purcell, 214/665-6707
83	EAGLE PICHER CRETA COPPER OPERATION SITE	6	OK	OK0000605421	34 DEG. 29-30.73" N LAT, OLUSTEE, OK				2001 Discovery, 2002 SI		Other: Not on the NPL; SI Ongoing					
84	GAINES CREEK WATERSHED COAL MINES	6	OK	OKD987068384	E.PITTSBURGH & CENTRAL & WESTERN LATIMER, GOWEN, OK				1989 Discovery, 1993 SI		Other: Not on the NPL; HRS Ongoing					
85	TAR CREEK (OTTAWA COUNTY)	6	OK	OKD980629844	MIAMI/PICHER, OK/SURROUNDINGS	25,600 ACRES	Underground mining for lead (lead sulfide or galena) and zinc (zinc sulfide or sphalerite), by the room-and-pillar method, in the Oklahoma portion of the Tri-State Mining District began in 1891 and lasted through early 1970.	private or indian restricted	1982 Discovery 1997 ROD Phase II removal activities at approximately 300 residential homes involving removal of soil in 6 inch lifts.	10,000 (1 MILE), 10,000 (3-4 MILES)	NPL Final	1981	Zinc, lead, cadmium	Ground Water, Liquid Waste, Solid Waste, Soil, Surface Water	Rafael A. Casanova (OU 1), 214-665-7437; Bob Sullivan (OU 2), 214-665-2223	Donn Walters, 214-665-6483
86	RSR Corp.	6	TX	TXD079348397	WEST DALLAS, DALLAS COUNTY, TX	13.6 SQUARE MILES	The abandoned smelter is located near the center of the site study area at the intersection of Westmoreland and Singleton Boulevard. The RSR site consists of five operable units (OUs); OU1 - Residential property, OU2 - DHA property, OU3 - Slag piles, OU4 - Smelter property and OU5 - Battery Breaking facility/Other Industrial property.		1995, 1996, 1997 RODs	17,000 (within study area)	NPL Final	1995	Lead, arsenic, cadmium	Drinking Water, Air	Carlos Sanchez, 214-665-8507	Janetta Coats, 214-665-7308
87	TEX - TIN CORP.	6	TX	TXD062113329	STATE HIGHWAY 146 AND FM 519, TEXAS CITY, GALVESTON COUNTY, TX	170 ACRES	The Tex Tin site is located in a mixed industrial/petrochemical/residential area in Texas City, TX. The site was originally developed as a tin smelting operation by the U.S. Government during World War II.		1999, 2000, 2001 RODs	25,000 (3 MILES)	NPL Final	1998	Arsenic, cadmium, chromium, copper, lead, nickel, radionuclides, gamma radiation	Ground Water, Soil	Carlos Sanchez, 214-665-8507	Donn Walters, 214-665-6483
88	CHEROKEE COUNTY	7	KS	KSD980741862	KS	25 SQ MI	Over one hundred years of widespread lead and zinc mining created piles of mine tailings.		1979 Discovery, 1997 ROD Public water supply and ground water/surface water cleanup are complete (OU1 and 5).	4,500 people in vicinity	NPL Final	1983	Cadmium, lead, selenium, zinc	Air, Debris, Ground Water, Other, Sediment, Soil, Surface Water	Dave Drake, 913-551-7626	Hattie Thomas, 913-551-7762
89	NATIONAL ZINC	7	KS	KSD980406698	KS	10 SQ MI	Closed zinc smelter	U.S. Steel	Non-time critical removal	1,000 people in vicinity	Other: Not on the NPL		Lead	Soil	Don Lininger, 913-551-7724	Alex Chen, 913-551-7962
90	PRIME WESTERN SMELTER	7	KS	KSD980685366	KS	10 SQ MI	Closed lead smelter		Non-time critical removal	1,000 people in vicinity	Other: Not on the NPL		Lead	Soil	Don Lininger, 913-551-7724	Denise Robert, 913-551-7559

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91	OMAHA LEAD	7	KS	NESFN0703481	KS	10 SQ MI	Closed lead smelter		TC removal	50,000 people in vicinity	NPL Proposed	2002	Lead	Soil	Don Bahnke, 913-551-7747	Debbie Kring, 913-551-7725
92	ANNAPOLIS LEAD MINE	7	MO	MO0000958611	1 MI NE OF ANNAPOLIS, MO	25 ACRES	Lead processing mill site.		1993 Discovery, 2000 HRS Package	100 people in vicinity	Other: Not on the NPL; HRS Ongoing		Cadmium, lead, and zinc	Soil and ground water	Heath Smith, 913-551-7903	Hattie Thomas, 913-551-7762
93	BIG RIVER MINE TAILINGS/ST. JOE MINERALS CORP.	7	MO	MOD981126899	SECTION 25 26 35 & 36 T37N R4E, DESLOGE, MO	53 SQ MILES	This site is one of six large areas of mine waste in this rural region, approximately 110 square miles in size. From 1929-1958, mine tailings were disposed over about 600 acres, bounded on three sides by the Big River.		1980 Discovery, 1992 Listing	>1,000, <=10,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Final	1992	Lead, cadmium, zinc	Soil, Surface Water	Bruce Morrison, 913-551-7755	Hattie Thomas, 913-551-7762
94	HERCULANEUM LEAD SMELTER	7	MO	MOD006266373	HERCULANEUM, MO	10 SQ MI	Operating primary lead smelter	Doe Run Co.	TC removal, multi-media order	1,000 people in vicinity	Other: Not on the NPL		Cadmium and Lead	Soil and air	Burce Morrison, 913-551-7755	Debbi Kring, 913-551-7725
95	LAWRENCE COUNTY MINING AREA SITES	7	MO	MON000703982	LAWRENCE COUNTY - MULTIPLE AREAS, AURORA, MO	10 SQ MI	Abandoned lead and zinc mine		2001 Discovery	5,000 people in vicinity	Other: Not on the NPL; Combined TC removal ongoing		Cadmium, lead, and zinc	Soil and ground water	Bryan Burnett, 913-551-7742	Hattie Thomas, 913-551-7762
96	MADISON MINE (ANSCHUTZ MINING CORP)	7	MO	MOD098633415	401 N MINE LAMOTTE ST, FREDERICKTOWN, MO	10 SQ MI	Abandoned lead and zinc mine		1981 Discovery 1999 ESI		Other: Not on the NPL; RI/FS Ongoing		Cadmium, lead, and zinc	Ground Water, Soil, Surface Water	John Cook, 913-551-7716	Hattie Thomas, 913-551-7762
97	MISSOURI SMELTER SITES	7	MO				Over 150 primary lead and zinc smelters scattered throughout Missouri		State Lead PAs		Other: Not on the NPL		Cadmium, lead, and zinc	Soil	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
98	MISSOURI MINE SITES	7	MO				Over 3,000 mine sites scattered throughout Missouri		State Lead PAs		Other: Not on the NPL		Cadmium, lead, and zinc	Soil	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
99	NEWTON COUNTY MINE TAILINGS	7	MO	MOD981507585	ENTIRE TOWN OF GRANBY, MO	250 SQ MI	Abandoned lead and zinc mining district		1986 Discovery 2001 HRS Package	20,000 people in vicinity	Other: Not on the NPL; HRS Ongoing		Cadmium, lead, and zinc	Ground Water, Soil	Mark Doolan, (913) 551-7169	Hattie Thomas, 913-551-7762
100	ORONOGO-DUENWEG MINING BELT	7	MO	MOD980686281	VARIOUS LOCATIONS, JASPER COUNTY, MO	6,400 ACRES	Mining, milling, and smelting of lead and zinc ore, 1848-1968		1979 Discovery 2001 RD Inactive.	60,000 people live within the site	NPL Final	1990	Cadmium, lead, zinc, manganese	Air, Ground Water, Other, Soil, Surface Water	Mark Doolan, (913) 551-7169	Hattie Thomas, 913-551-7762
101	ST JOE MINERALS CORP - INDIAN CREEK	7	MO	MOD000669150		100 ACRES	Dormant lead mine/mill site	Doe Run Co.	State Lead PA/SI	100 people in vicinity	Other: Not on the NPL		Cadmium and lead	Soil, surface water, and ground water	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
102	ST JOE MINERALS CORP - FLETCHER	7	MO	MOD086785391		100 ACRES	Dormant lead mine/mill site	Doe Run Co.	State Lead PA/SI	100 people in vicinity	Other: Not on the NPL		Cadmium and lead	Soil, surface water, and ground water	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
103	ST JOE MINERALS - BRUSHY CREEK	7	MO	MOT300010691		100 ACRES	Dormant lead mine/mill site	Doe Run Co.	State Lead PA/SI	100 people in vicinity	Other: Not on the NPL		Cadmium and lead	Soil, surface water, and ground water	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
104	ST JOE MINERALS CORP - VIBURNUM	7	MO	MOD000823252	ST JOE DR, VIBURNUM, MO		Abandoned lead and zinc mine		1980 Discovery 1989 SI	10,000 people in vicinity	Other: Not on the NPL; PA/SI Ongoing		Cadmium, lead, and zinc	Soil, ground water, and surface water	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
105	STATE RT 49 LEAD SPILL	7	MO	MO0002357473	3.3 MILES SOUTH OF BLACK, MO	250 miles of road	State highway contaminated from ore trucks transporting concentrate from mine/mill to smelter		1998 Discovery 1998 PA		Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup		Cadmium, lead, and zinc	Soil	Bryant Burnett, 913-551-7762	Hattie Thomas, 913-551-7762
106	ARGO SMELTER	8	CO	COD983789454	200 WEST 48TH AVENUE, DENVER, CO				1992 Discovery, 1992 PA		Site is Part of NPL Site					

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107	ASARCO INC LEADVILLE UNIT	8	CO	COD060631322	9 MI E OF LEADVILLE, LEADVILLE, CO						Other: Not on the NPL; NFRAP					
108	ASARCO, INC. (GLOBE PLANT)	8	CO	COD007063530	DENVER, CO	>20 and <100 ACRES	Smelting operations to refine metals began in 1886. Today, the Globe Plant produces specialty metals and alloys for electronic applications.		1978 Discovery, 1995 RA	>1,000, <=10,000 (1 MILE)	NPL Proposed		Metals	Air, Ground Water, Sediment, Soil, Surface Water	Armando Saenz, (302) 312-6559	Patricia Courtney, (303) 312-6631
109	ATLAS MINERALS - SUMMIT PROP	8	CO	COD000710665	TWP 43N, R 19W, CO						Other: Not on the NPL; NFRAP					
110	BAKER'S PARK MILL	8	CO	COT090010943	HOWARDSVILLE TOWNSITE, HOWARDSVILLE, CO						Other: Not on the NPL; NFRAP					
111	BANK-BOULDER CR (TUNGSTEN PROD CO DUMP)	8	CO	COD980717250	CANYON BLVD, BOULDER, CO						Other: Not on the NPL; NFRAP					
112	BATTLE MOUNTAIN GOLD	8	CO	COD983774498	3 MIILES N. OF SAN LUIS, CO						Other: Not on the NPL; NFRAP					
113	BERYL ORE CO.	8	CO	CO0000255224	INTERSECTION OF W 100TH AVE & ALKIRE ST, WESTMINSTER, CO						Other: Not on the NPL; NFRAP					
114	BRODIE GOLD REDUCTION CO	8	CO	CO0000284414	NW 1/4 NE 1/4 SEC 25 T15S R70W, CRIPPLE CREEK, CO						Other: Not on the NPL; NFRAP					
115	CALIFORNIA GULCH	8	CO	COD980717938	S OF CY-YAK TUNNEL DOWNSTREAM, LEADVILLE, CO	16.5 SQ MI	California Gulch and the surrounding 162 square miles form a mining district first developed in 1859 in the central Rocky Mountains of Colorado. Miners worked this watershed extensively, seeking gold, silver, copper, zinc, manganese and lead.	Leadville Corporation	1982 Discovery, 2002 Partial Deletion Non critical removal actions in 1995 and 1996 addressed the Garibalie Mine and Agwalt Mine sites.	2,000 (1 MILE), 3,879 (3-4 MILES)	NPL Final	1983	Cadmium, copper, lead, zinc	Ground Water, Liquid Waste, Other, Sediment, Soil, Solid Waste, Surface Water	Rebecca Thomas, (302) 312-6552	Mike Holmes, (303) 312-6607
116	CAMERON HEAP LEACH	8	CO	COD980957641	COUNTY ROAD 82, CRIPPLE CREEK, CO						Other: Not on the NPL; NFRAP					
117	CAPTAIN JACK MILL	8	CO	COD981551427	T1N R73 W, SE 1/4 SEC. 12, WARD, CO		Midnight Dump		1987 Discovery, 1998 ESI		Other: Not on the NPL; HRS Ongoing			Solid Waste		
118	CARBONERO MINE	8	CO	CO0001916360	2.5 MI NE OF OPHIR, CO				1996 Discovery, 1999 SI		Other: Not on the NPL; Status Not Specified					
119	CEDAR RESOURCES	8	CO	COD983778416	T36N R4E SEC 22 1/2 MI E OF PLATORO RES, CONEJOS, CO		Production Facility		1993 Discovery, 1996 SI		Other: Not on the NPL; Status Not Specified					

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120	CENTRAL CITY, CLEAR CREEK	8	CO	COD980717557	NEAR TOWN IDAHO SPRINGS, CO	400 SQ MI	Production Facility, 1859-1982. Clear Creek is a 400-square-mile watershed that extends from the Continental Divide east to Denver. It is popular for recreation and is a drinking water source for the Denver area. Historic gold mining in the Clear Creek basin contaminated the watershed.	various, EPA conducting PRP search	1982 Discovery, 1991 ROD Three removal actions conducted by EPA since 1987: removal action to prevent collapse of mine waste pile, connecting three residences to municipal water, removal of mercury from small trailer.	0 (1 MILE), 8,000 (3-4 MILES)	NPL Final	1982	aluminum, arsenic, cadmium, chromium, copper, fluoride, lead, manganese, nickel, silver, zinc	Debris, Ground Water, Leachate, Liquid Waste, Other, Soil, Surface Water	Gene Taylor, (303) 312-6536	Mike Holmes, (303) 312-6607
121	CLIMAX MINE	8	CO	COD073407421	EAST OF COLORADO HWY 91 AT FREMONT PASS, CLIMAX, CO				1993 Discovery, 1998 ESI		Other: Not on the NPL; Status Not Specified					
122	COBALT SMELTER	8	CO	COD983797457	LONGHORN ROAD, BOULDER, CO						Other: Not on the NPL; NFRAP					
123	COLORADO PHILADELPHIA REDUCTION WORKS	8	CO	COD983802463	E SIDE OF 31ST BTWN HWY 24 & ROBINSON ST, COLORADO SPRINGS, CO				1993 Discovery, 1997 SI		Other: Not on the NPL; Status Not Specified					
124	COLORADO SCHOOL OF MINES RI/CREEKSIDE	8	CO	COD000823401	FAR W END OF 12TH ST, GOLDEN, CO				1980 Discovery, 1996 SI		Other: Not on the NPL; NFRAP			Other, Sediment, Soil, Solid Waste, Surface Water		
125	COORS PORCELAIN CO - CLAY MINE	8	CO	COD980635197	1/2 MI S OF RALSTON RESERVOIR, GOLDEN, CO						Other: Not on the NPL; NFRAP					
126	CORTEZ ORE LOCATION	8	CO	COD983799073	6788 COUNTY ROAD 24, CORTEZ, CO						Other: Not on the NPL; NFRAP					
127	COZINCO	8	CO	COD094154671	100 W. LEAD ST./T50N,R8E,SEC25, SALIDA, CO				1987 Discovery, 1990 SI		Site is Part of NPL Site					
128	CROOKE BROTHERS SMELTING WORKS	8	CO	CO0000023093	1 MI S LAKE CITY ALNG N FRK GUNNSN RIVER, LAKE CITY, CO				1993 Discovery, 1998 SI		Other: Not on the NPL; HRS Start Needed					
129	CSM EXPERIMENTAL MINE	8	CO	COD983793753	365 8TH STREET, IDAHO SPRINGS, CO						Other: Not on the NPL; NFRAP					
130	DENVER RADIUM SITE	8	CO	COD980716955	VARIOUS PLACES IN DENVER, CO	160 ACRES	1910-1924. Radioactive soils and debris were abandoned in Denver, Colorado after the city's radium industry collapsed in the 1920s.		1979 Discovery, 2000 RA	163,000 (1 MILE), 491,396 (3-4 MILES)	NPL Final	1983	radium, thorium, uranium, arsenic, lead and radon gas	Air, Debris, Ground Water, Other, Sludge, Soil, Solid Waste, Surface Water	Jim Hanley, (303) 312-6725	Rob Henneke, (303) 312-6734

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131	EAGLE MINE	8	CO	COD081961518	W OF US HWY 24, MINTURN/REDCLIFF, CO	235 ACRES	Miners began working the Eagle Mine in the 1880s, searching for gold and silver. A hundred years of mining near Vail left metals that killed fish in the Eagle River, threatened drinking water wells in Minturn. The site includes the now-flooded Eagle Mine, the abandoned town of Gilman and 8 million tons of mine wastes.	Glenn Miller, Battle Mountain Corporation, FDIC	1980 Discovery, 2001 Construction Completion Abandoned. Emergency removal action conducted in 1984 included: all but 3 transformers. PRPs ordered to conduct site remediation in 1988 including: plugging mine audits, removing tailings, removing and capping wetland soil, temp gw pumping, long-term monitoring, di	360 (1 MILE), 1,350 (3-4 MILES)	NPL Final	1986	arsenic, cadmium, chromium, lead, mercury, silver, zinc	Debris, Ground Water, Liquid Waste, Other, Sediment, Soil, Solid Waste, Surface Water	Gene Taylor, (303) 312-6536	Eleanor Dwight, (303) 312-6813
132	EAST WILLOW CREEK AND WILLOW CREEK	8	CO	CO0001014398	NO ADDRESS, CREEDE, CO				1995 Discovery, 1997 SI		Site is Part of NPL Site					
133	ENERGY FUELS MINE NO 1	8	CO	COD058734203	20 MI S OF STEAMBOAT SPRINGS, CO						Other: Not on the NPL; NFRAP					
134	ENERGY FUELS MINE NO 2	8	CO	COD000716423	20 MI S OF STEAMBOAT SPRINGS, CO						Other: Not on the NPL; NFRAP					
135	ENERGY FUELS MINE NO 3	8	CO	COD000716480	20 MI S OF STEAMBOAT SPRINGS, CO						Other: Not on the NPL; NFRAP					
136	FREJONLEY MINE	8	CO	COD981550718	T1S, R83W, SEC 34, MCCOY, CO	0.9 ACRE					Other: Not on the NPL; NFRAP			Other, Soil, Solid Waste		
137	FRENCH GULCH	8	CO	CO0001093392	1 MILE ABOVE TOWN ON FRENCH GULCH, BRECKENRIDGE, CO				1995 Discovery, 1997 SI		Other: Not on the NPL; HRS ongoing			Ground Water		
138	GATEWAY VANADIUM MILL	8	CO	COD980666358	HWY 141, GATEWAY, CO				1980 Discovery, 1982 HRS Package		Other: Not on the NPL; NFRAP					
139	GENERAL ELECTRIC URANIUM MGMT CORP	8	CO	COT000622209	HWY 141, NATURITA, CO						Other: Not on the NPL; NFRAP					
140	GILLETTE GOLD EXTRACTION CO	8	CO	CO0000284422	SW 1/4 NE 1/4 SW 1/4 SEC 4 T15S R69W, VICTOR, CO				1994 Discovery, 1999 SI		Other: Not on the NPL; Status Not Specified					

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141	GOLD HILL TAILINGS	8	CO	COD983801275	E 1/2 S 14 & W EDGE SEC 13 T145 R6TW, COLORADO SPRINGS, CO						SF Alternative Site					
142	GOLDEN AGE MINE	8	CO	CO0000023077	1.5 MI N OF JAMESTOWN RD IN CASTLE GULCH, JAMESTOWN, CO				1993 Discovery 1999 HRS Package		Other: Not on the NPL; HRS ongoing					
143	GRAND JUNCTION PROJECTS OFFICE	8	CO	COD983766692	GRAND JUNCTION, CO						Other: Not on the NPL; NFRAP					
144	GRAND JUNCTION SMELTING CO	8	CO	COD983800335	1441 WINTERS AVE, GRAND JUNCTION, CO						Other: Not on the NPL; NFRAP					
145	GRAND JUNCTION URANIUM MILL TAILINGS	8	CO	COD980717318	ADJ TO N BANK OF COLORADO RIV, GRAND JUNCTION, CO						Other: Not on the NPL; NFRAP					
146	GREAT WEST GOLD AND SILVER	8	CO	COD983801069	CAMP CREEK 13 MI SW OF GUNNISON, VULCAN, CO				1993 Discovery 1998 SI		Other: Not on the NPL; Status Not Specified					
147	GUNNISON MILL SITE	8	CO	COD980666291	COUNTY RD 38, GUNNISON, CO						Other: Not on the NPL; NFRAP					
148	HENDERSON MINE CLIMAX MOL	8	CO	COD041517343	9 MI W OF EMPIRE, EMPIRE, CO						Other: Not on the NPL; NFRAP					
149	HENDERSON ML CLIMAX MOL	8	CO	COD000695064	20 MI SE OF PARSHALL, PARSHALL, CO						Other: Not on the NPL; NFRAP					
150	HENDRICKS MINING & MILLING	8	CO	COD078348737	3000 N 63RD ST & E VALMONT RD, BOULDER, CO				1980 Discovery 1982 HRS Package		Other: Not on the NPL; NFRAP					
151	HEROLD BLACKHAWK	8	CO	COD981550668	T3S, R72W, SEC 6, BLACKHAWK, CO		Production Facility		Inactive		Other: Not on the NPL; NFRAP			Liquid Waste, Other, Soil		
152	IDARADO MINE - OURAY	8	CO	COD980807820	US HWY 550, OURAY, CO						Other: Not on the NPL; NFRAP					
153	IDARADO MINE - TELLURIDE	8	CO	COD000716589	STATE HWY 145, TELLURIDE, CO						Other: Not on the NPL; NFRAP					
154	ILSE MINE	8	CO	COD980957674	OAK CREEK GRADE ROAD, WESTCLIFFE, CO						Other: Not on the NPL; NFRAP					
155	INACTIVE GOLD MINING	8	CO	COD980667026	T3S, R73W, SEC.23, CENTRAL CITY, CO						Other: Not on the NPL; NFRAP					
156	KENDRICK & GELDER SMELTING CO	8	CO	CO0000075200	SE 1/4 SW 1/4 SEC8 T41N R7W, SILVERTON, CO				1993 Discovery 1994 PA		Other: Not on the NPL; Status Not Specified					

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157	KERR MINE	8	CO	COD076467950	10 MI E OF WALDEN, CO						Other: Not on the NPL; NFRAP					
158	KOPPERS - SALIDA	8	CO	COD980959167	9000 COUNTY ROAD #152, SALIDA, CO				1986 Discovery 1988 SI		Site is Part of NPL Site					
159	K-T MINE	8	CO	COD076459452	4950 COUNTY RD 119, MAYBELL, CO						Other: Not on the NPL; NFRAP					
160	LAMOTTE MINE	8	CO	COD980634786	NEAR RICO,CO(EST.-SEE 'FINDS'), RICO, CO						Other: Not on the NPL; NFRAP					
161	LEADVILLE TUNNEL	8	CO	COD980953913	1 MI N OF LEADVILLE, LEADVILLE, CO						Other: Not on the NPL; NFRAP					
162	LINCOLN PARK	8	CO	COD042167858	2 MI S OF CANON CITY, CO				1980 Discovery 2002 ROD	0 (1 MILE), 0 (3-4 MILES)	NPL Final			Air, Ground Water, Other, Soil, Surface Water	Rebecca Thomas, (303) 312-6552	Catherine Roberts, (303) 312-6025
163	LOMA VANADIUM MILL	8	CO	COD980666895	OFF I-70, LOMA, CO						Other: Not on the NPL; NFRAP					
164	LONDON MINE	8	CO	CO0000286203	SOUTH MOSQUITO CREEK VALLEY BETWEEN LON, FAIRPLAY, CO				1995 Discovery 1998 SI		Other: Not on the NPL; HRS Start Needed					
165	MIDDLE CREEK MINE	8	CO	COD980807549	10 MI SW OF TWN T5NR86W,S12,13, STEAMBOAT SPRINGS, CO						Other: Not on the NPL; NFRAP					
166	N CONTINENT URANIUM MILL TAILINGS	8	CO	COD980717367	ADJ TO S BANK OF DOLORES RIV, SLICK ROCK, CO						Other: Not on the NPL; NFRAP					
167	NATURITA URANIUM MILL TAILINGS	8	CO	COD980717326	ADJ TO W BANK SAN MIGUEL RIV, NATURITA, CO						Other: Not on the NPL; NFRAP					
168	NEW RIFLE URANIUM MILL TAILINGS	8	CO	COD980717508	N BANK OF COLORADO RIV, RIFLE, CO						Other: Not on the NPL; NFRAP					
169	NL IND, MINE, MILL	8	CO	COD980634604	SAGUACHE CO, BONANZA CITY, CO				1981 Discovery 1994 SI		Other: Not on the NPL; Status Not Specified			Residuals		
170	NORTHGATE PLT	8	CO	COD031941321	17 MI W OF WALDEN NEAR COWDREY, CO						Other: Not on the NPL; NFRAP					
171	OLD RIFLE URANIUM MILL TAILINGS	8	CO	COD980717516	N BANK OF COLORADO RIV RIFLE, CO						Other: Not on the NPL; NFRAP					
172	OMAHA AND GRANT SMELTER	8	CO	COD983789462	42ND & VINCENT ST., DENVER, CO				1992 Discovery 1998 SI		Site is Part of NPL Site					

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173	PEARL AND 3RD STREET	8	CO	COD982572315	313 PEARL STREET, BOULDER, CO						Other: Not on the NPL; NFRAP					
174	PLACERVILLE TRAM SITE	8	CO	COD980666770	1 MI N OF PLACERVILLE, CO - HWY 62						Other: Not on the NPL; NFRAP					
175	PORTLAND MILL SITE	8	CO	CO0001024546	NEAR EQUESTRIAN CENTER ON W RIO GRANDE R, COLORADO SPRINGS, CO						Other: Not on the NPL; NFRAP					
176	PROSPECT HEIGHTS AREA	8	CO	COD982583825	SOUTH 4TH STREET, CANON CITY, CO				1988 Discovery 1989 PA		Other: Not on the NPL; NFRAP					
177	RAILROAD LOADING DOCK	8	CO	COD980666655	S OF SILIG AVE, MONTROSE, CO						Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup					
178	RICO - ARGENTINE	8	CO	COD980952519	ONE MILE NORTH OF RICO,CO, ON HIGHWAY 145						Other: Not on the NPL; HRS ongoing			Sediment, Surface Water		
179	RUBY DISTRICT SOUTH	8	CO	CO0002378230	WEST OF CRESTED BUTTE, CO				1998 Discovery 2000 ESI		Other: Not on the NPL; Status Not Specified					
180	SANTA FE (BRIDGE) CULVERT	8	CO	COD982572513	SANTA FE ST. AT ARKANSAS RIVER, PUEBLO, CO				1990 Discovery 1999 ESI		Other: Not on the NPL; Status Not Specified					
181	SAWPIT TRAM SITE (ORE STORAGE)	8	CO	COD980499289	1/2 MI W OF SAWPIT, CO						Other: Not on the NPL; NFRAP					
182	SEVEN DEVILS MINE	8	CO	COD982584088	ACCESS ROAD TO KASSLER TREATMENT PLANT, WATERTON, CO						Other: Not on the NPL; NFRAP					
183	SHATTUCK CHEMICAL CO.	8	CO	COD007057417	1805 S. BANNOCK ST., DENVER, CO						Other: Not on the NPL; NFRAP					
184	SILVER BELL MINE/MILL	8	CO	COD980069645	ST HWY 145 @ ILLIUM VALLEY RD OPHIR EXIT, OPHIR, CO				1993 Discovery 1995 SI		SF Alternative Site					
185	SILVER MOUNTAIN - GRACE MINE SITE	8	CO	COD980952766	NE 1/4 NE 1/4 SEC 20 T3S R74W, EMPIRE, CO						Other: Not on the NPL; NFRAP					
186	SLAG PILE (NL IND. PROP.)	8	CO	COD980635106	HARRISON AVE & ELM STREET, LEADVILLE, CO						Other: Not on the NPL; NFRAP					

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187	SMELTERTOWN SITE	8	CO	COD983769738	9000 CNTY RD 152, SALIDA, CO	>20 AND <100 ACRES	Lead/zinc smelting, RR tie treating plant, sand/gravel mining, production facility, 1880-19883	H.E. Lowdermilk Company/Butala Construction	1986 Discovery 1998 ROD Inactive 5,000 tons of creosote stained soil removed from site. Alternative water supply provided in time critical action in 1995.	5,200 people within 4 miles	NPL Proposed	1992	Benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, pentachlorophenol, HpCDD, HxCDD, HxCDF, OCdd	Ground Water, Sediment, Solid Waste, Soil, Surface Water		Patricia Courtney, (303) 312-6631; Marion Galant, (303) 692-3304
188	SMELTERTOWN ZINC (SITE B)	8	CO	CO0000343061	9000 CNTY RD 152, SALIDA, CO	118 ACRES					Site is Part of NPL Site					
189	SMUGGLER MOUNTAIN	8	CO	COD980806277	SPRUCE STREET, PITKIN COUNTY, CO	75 ACRES	Silver, lead, zinc mining/reprocessing facility, 1879-1920		1983 Discovery 1999 Deletion Limited emergency action performed including installation of fence and signs.	4,500 (1 MILE), 4,766 (3-4 MILES)	Deleted from the Final NPL	1986	Lead, cadmium, zinc, silver, mercury	Ground Water, Other, Soil		
190	STANDARD METALS CORP MAYFLOWER MILL	8	CO	COD041093501	2 MI NE SILVERTON ON HWY 110, SILVERTON, CO						Other: Not on the NPL; NFRAP					
191	STANDARD METALS CORP SUNNYSIDE MINE	8	CO	COD000716662	7 MI N OF HWY 110, GLADSTONE, CO						Other: Not on the NPL; NFRAP					
192	SUMMITVILLE MINE	8	CO	COD983778432	RIO GRANDE COUNTY, CO	>100 ACRES	Mining has occurred at Summitville since the 1870s. In the 1980s, Summitville Consolidated Mining Company, Inc. (SCMCI) began operating a large-scale surface gold mine, using the heap-leach process. Pyritic, gold-bearing ore was mined, crushed and stacked or heaped on a multi-layered, lined pad. In operation from 1870-1992	ASARCO/Summitville Consolidated Company Inc.	1991 Discovery 2001 FS EPA began treating leachate from HLP and AMD from the French Drain Sump, Cropsy Waste Pile, and Reynolds Adit in 1992 as an emergency response action.	0 (1 MILE), 0 (3-4 MILES)	NPL Final	1994		Ground Water, Leachate, Liquid Waste, Solid Waste, Soil, Surface Water		Eleanor Dwight, (303) 312-6813; George Carnes, State Community Involvement Specialist, (303) 692-3329
193	SWEENEY MILL	8	CO	CO0001096791	1835 SUGARLOAF RD., BOULDER, CO				1995 Discovery 1998 SI		Other: Not on the NPL; Status Not Specified					
194	TWENTY MILE MINE	8	CO	COD980807531	2 MI S OF MILNER, CO						Other: Not on the NPL; NFRAP					

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195	TWO BROTHERS MINE	8	CO	CO0012044960	1 MILE N. OF IDAHO SPRINGS, CO						Other: Not on the NPL; Status Not Specified					
196	UNION CARBIDE URANIUM MILL TAILINGS	8	CO	COD980717466	ADJ TO S BANK OF DOLORES RIV, SLICK ROCK, CO						Other: Not on the NPL; NFRAP					
197	UNION OIL OF CAL-PARACHUTE CRE	8	CO	COD980718902	16 MILES FROM RIFLE, PARACHUTE, CO						Other: Not on the NPL; Deferred to RCRA					
198	URAVAN URANIUM PROJECT (UNION CARBIDE CORP.)	8	CO	COD007063274	NEAR URAVAN, CO, ON HWY 141	3,500 ACRES	The Uravan Uranium site began as a radium-recovery plant in 1912. Its owners converted it for vanadium extraction. From the 1940s to 1984, the plant operated as a uranium- and vanadium- processing facility.		1980 Discovery 1999 RD	125 (1 MILE), 0 (3-4 MILES)	NPL Final	1986	Lead, arsenic, cadmium and vanadium as well as radioactive products such as raffinates, raffinate crystals and mill tailings containing uranium and radium	Air, Debris, Ground Water, Sediment, Solid Waste, Soil, Surface Water		George Carnes, (303) 692-3329
199	USDA-BONANZA MINING DISTRICT	8	CO	CO7122307526	KERBER CREEK ABOVE BONANZA, CO				1992 Discovery 1994 SI		SF Alternative Site					
200	VAN BIBBER DRAINAGE CLAY MINE	8	CO	COD983791005	T3S R70W SEC.7 SE 1/4 OF E 1/2, GOLDEN, CO						Other: Not on the NPL; NFRAP					
201	VANADIUM MILL SITE NEWMIRE COLORADO	8	CO	COT090011487	ST RTE 145 SEC 21, TELLURIDE, CO						Other: Not on the NPL; NFRAP					
202	VASQUEZ BOULEVARD AND I-70	8	CO	CO0002259588	DENVER COUNTY, DENVER, CO		Historically, this area was a major smelting center for the Rocky Mountain Wast. Three smelting plants, Omaha-Grant, Argo, and Globe, operated in the area from the 1870's through the present, refining gold, silver, copper, lead, and zin. Only the Globe plant is still in operation today, refining high-purity metals.		1999 RI, 1999 NPL Final		NPL Final	1999	Lead, arsenic	Soil		
203	WEST WILLOW CREEK	8	CO	CO0001035427	WEST WILLOW CREEK, CREEDE, CO				1995 Discovery 1997 SI		Site is Part of NPL Site					
204	WOLF TONGUE MILL	8	CO	COD983785668	95 WOLF TONGUE COURT, NEDERLAND, CO						Other: Not on the NPL; NFRAP					
205	ANACONDA ALUMINUM CO COL FLS RED PLT	8	MT	MTD057561763	1 MI N OF COLUMBIA FLS, COLUMBIA FALLS, MT						Other: Not on the NPL; Status Not Specified					
206	ANACONDA CO. SMELTER	8	MT	MTD093291656	3 MI SE OF ANACONDA, ANACONDA, MT	5,894 ACRES	Production Facility, 1890-1980, former copper and ore processing facility. These facilities were developed to remove copper from ore mined in Butte from about 1884 through 1980, when the smelter closed.	Anaconda Minerals Company/ Atlantic Richfield Company	Inactive: 1980 Discovery, 1998 ROD	0 (1 MILE), 6,902 (3-4 MILES)	NPL Final	1983	Arsenic, as well as copper, cadmium, lead and zinc	Air, Debris, Ground Water, Other, Sediment, Soil, Solid Waste, Surface Water	Charles Coleman, (406) 457-5038	Diana Hammer, (406) 457-5040
207	ANACONDA MINERALS CO, GREAT FALLS REF	8	MT	MTD093291599	E OF 15TH ST ON MISSOURI RIV, BLACK EAGLE, MT						Other: Not on the NPL; NFRAP					
208	APEX MILL - BANNACK STATE PARK	8	MT	MTD980806665	BANNACK STATE PARK, BANNACK, MT						Other: Not on the NPL; NFRAP					

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209	ASARCO INC TROY UNIT	8	MT	MTD096199989	20 MI S OF TROY, TROY, MT						Other: Not on the NPL; NFRAP					
210	ASBESTOS MINE (KARST)	8	MT	MTD980717474	KARST KAMP DISTRICT, BOZEMAN, MT						Other: Not on the NPL; NFRAP					
211	BARKER HUGHESVILLE MINING DISTRICT	8	MT	MT6122307485	FOREST SERVICE ROAD 6403, GREAT FALLS, MT	>5 and <20 ACRES	Rich silver and lead ores were discovered in the BH District in 1879. Mining activity occurred until around 1893 and again in the 1920s, 1940s, and 1970s. There are approximately forty-six abandoned mines in the BH District.		1988 Discovery, 2001 Listing	>0, <=10 (1 MILE), >10, <=100 (3-4 MILES)	NPL Final	2001	Arsenic, metals	Ground Water, Soil, Surface Water	Rosemary Rowe, (406) 457-5020	Diana Hammer, (406) 457-5040
212	BASIN MINING AREA	8	MT	MTD982572562	NORTH OF I-15, BASIN, MT	>100 ACRES	Hard rock mining and milling, 1875-1960	various/ OT Mining	1989 Discovery, 2001 ROD	>100, <=1,000 (1 MILE), >100, <=1,000 (3-4 MILES)	NPL Final	1999	Antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, thallium, zinc	Other, Soil, Surface Water	Jim Harris, RPM for Town of Basin OU, (406) 457-5032; Mike Bishop, RPM for Basin Watershed OU, (406) 457-5041	Diana Hammer, (406) 457-5040
213	BEAVERHEAD NF	8	MT	MT5122307478	610 N. MONTANA ST., DILLON, MT				1992 Discovery, 1992 PA		Other: Not on the NPL; Fed Fac Site Inspection Review Start Needed					
214	BOULDER RIVER RAILROAD	8	MT	MTD986070399	NE 1/4 SW 1/4, OF SEC. 30, T6N-R4W, BOULDER, MT						Other: Not on the NPL; NFRAP					
215	CARPENTER SNOW CREEK MINING DISTRICT	8	MT	MT0001096353	NO SPECIFIC ADDRESS, NEIHART, MT	>20 and <100 ACRES	Mining began in the CSC District when prospectors from Barker discovered silver deposits near the future town of Neihart. The CSC District's mines primarily yielded silver, lead, and zinc ores. After 1883, only those mines with high grade silver ore continued to operate. During the 1940s, lead and zinc were produced in large quantities. The CSC District has been largely inactive since the 1960s, although some mines have reported mine development work and some sporadic production.		1995 Discovery, 2001 Listing	>0, <=10 (1 MILE), >100, <=1,000 (3-4 MILES)	NPL Final	2001	Arsenic, metals	Ground Water, Soil, Surface Water	Rosemary Rowe, (406) 457-5020	Diana Hammer, (406) 457-5040
216	CLARK FORK RIVER	8	MT	MTD981551476	CLARK FORK RIVERBANK, MISSOULA (ALSO OTHERS), MT						Site is Part of NPL Site					
217	EAST HELENA SITE	8	MT	MTD006230346	S OF EAST HELENA, MT	100 SQ MI	The East Helena site includes an operating lead smelter, the town of East Helena and surrounding rural agricultural lands. For more than 100 years, lead and zinc smelting operations have deposited lead, arsenic and cadmium contaminants into the soil, surface water and ground water of the Helena Valley. However, ASARCO plans to shut the plant down on April 4, 2001.		1980 Discovery, 1992 RA	3,000 (1 MILE), 4,254 (3-4 MILES); 36,700 within 3 miles	NPL Final	1983	arsenic, lead	Air, Ground Water, Sediment, Soil, Surface Water	Scott Brown, (406) 457-5935; Susan Zazzali, RCRA Project Manager, (406) 457-5019	Diana Hammer, (406) 457-5040
218	ERMONT MILL - MILL TAILINGS	8	MT	MTD980953707	T 6S R 11W SEC 35, ARGENTA, MT						Other: Not on the NPL; NFRAP					
219	FLATHEAD MINE AREA	8	MT	MTD986066488	SEC 17&8, T 25N, R23W, N OF RESERV BNDRY, NIARADA, MT						Other: Not on the NPL; NFRAP					
220	GOLDEN MESSENGER MINE	8	MT	MTD980953699	T 11N R 1W, 1.5 MI E OF YORK, MT						Other: Not on the NPL; NFRAP					
221	GOLDSIL MINING CO.	8	MT	MTD024751760	T 4N R 5W SEC 32, MARYSVILLE, MT						Other: Not on the NPL; NFRAP					

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222	HENDERSON MOUNTAIN	8	MT	MT0000063131	1/4 MI NE OF COOKE CITY OFF US HWY 212, COOKE CITY, MT						Site is Part of NPL Site					
223	HIGH ORE MINE	8	MT	MTD980953673	T 6N R 4W SEC 36, BASIN, MT						Other: Not on the NPL; NFRAP					
224	IRON MOUNTAIN MILLSITE	8	MT	MT0010106206	FLAT CREEK ROAD, SUPERIOR, MT				2000 Discovery 2001 SI		Other: Not on the NPL; SI Ongoing					
225	ISLAND AT ROCK CREEK	8	MT	MT0007592784	EASTERN EDGE OF RED LODGE BETWEEN 8TH, RED LODGE, MT						Other: Not on the NPL; NFRAP					
226	JARDINE ARSENIC TAILINGS	8	MT	MTT000603274	5 MI E OF GARDINER-JARDINE RTE, GARDINER, MT						Other: Not on the NPL; NFRAP					
227	JOSLYN STREET TAILINGS	8	MT	MT0000616409	NEAR INTERSECTION OF JOSLYN & BRADY, HELENA, MT						SF Alternative Site					
228	KENDALL VENTURE MINE	8	MT	MTD982572455	HILGER, MT						Other: Not on the NPL; NFRAP					
229	KING CREEK	8	MT	MTD986069920	FT BELKNAP INDIAN RESERVATION, HAYS, MT				1991 Discovery 1993 SI		Other: Not on the NPL/ Referred to Removal - Further Assessment Needed					
230	KOOTENAI NF	8	MT	MT7122307500	506 U.S. HWY. 2 WEST, LIBBY, MT						Other: Not on the NPL; NFRAP					
231	LIBBY ASBESTOS SITE	8	MT	MT0009083840	952 EAST SPRUCE STREET, LIBBY, MT	>100 ACRES	1890-1990		2002 Proposal	>1,000, <=10,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Proposed					
232	LONDONERRY MINE	8	MT	MT1141190081	NW 1/4 SW 1/4 SEC.4 T8N R13W, MAXVILLE, MT				1990 Discovery 1990 PA		Other: Not on the NPL; Fed Fac Site Inspection Review Start Needed					
233	MCLAREN MILL TAILINGS	8	MT	MTD981550841	SEC25, T9S R14E, COOKE CITY, MT				1987 Discovery 1989 PA		Other: Not on the NPL; NFRAP			Ground Water, Other, Soil		
234	MILLTOWN RESERVOIR SEDIMENTS	8	MT	MTD980717565	ADJACENT TO SE SIDE OF MILLTOWN, MT				1981 Discovery 1995 RI/FS	6,080 (1 MILE), 7,000 (3-4 MILES)	NPL Final	1983		Air, Ground Water, Sediment, Soil, Surface Water		

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235	MOUAT INDUSTRIES	8	MT	MTD021997689	STILLWATER COUNTY, COLUMBUS, MT		The Mouat Industries site is located south of Columbus, MT. The land was leased from the City of Columbus. Mouat Industries processed chromium ore into high-grade sodium dichromate at the site from 1957 - 19963. The process produced wastes containing hexavalent chromium and sodium dichromate.	City of Columbus	1991PRPs order, 1994 Soil treatment, 1996 Ground Water ERA		NPL Final		Hexavalent chromium	Ground Water, Surface Water, Soil		
236	PHILIPSBURG MINING AREA	8	MT	MTD980666523	UPR CLARK FORK BASIN, PHILIPSBURG, MT						Other: Not on the NPL; NFRAP					
237	REVAIS CREEK MINE	8	MT	MTD982596025	SEC9, T17N, R22W, DIXON, MT						Other: Not on the NPL; NFRAP					
238	SILVER BOW CREEK/BUTTE AREA	8	MT	MTD980502777	BUTTE TO MILLTOWN RESERVIOR, BUTTE, MT	10,880 ACRES	Silver Bow Creek was used as a conduit for mining, smelting, industrial and municipal wastes from 1865-1985.		1979 Discovery 1999 RA Inactive	35,930 (1 MILE), 0 (3-4 MILES)	NPL Final		Arsenic, copper, zinc, cadmium, lead	Air, Ground Water, Other, Sediment, Solid Waste, Soil, Surface Water		Diana Hammer, (406) 457-5040
239	TENMILE CREEK	8	MT	MT0000105510	SE 1/4 SEC 34 T10N R5W, HELENA, MT	10 ACRES			1989 Discovery 1990 SI		Site is part of NPL Site			Soil		
240	TUNGSTEN MILL - MILL TAILINGS	8	MT	MTD980953608	T.45 R 9W SEC 4,5 & 9, GLEN, MT						Other: Not on the NPL; NFRAP					
241	UPPER BLACKFOOT MINING COMPLEX	8	MT	MTD986069474	NE1/4 SE1/4 OF SEC 28, T 15N, R6W, LINCOLN, MT				1991 Discovery 1994 SI		Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup					
242	UPPER TENMILE CREEK MINING AREA	8	MT	MTSFN7578012	RIMINI ROAD, HELENA, MT	>20 AND <100 ACRES	The Upper Ten Mile Creek Mining Area site consists of numerous abandoned and inactive hard rock mine sites that produced gold, lead, zinc, and copper. Mining began in the Rimini Mining District before 1870 and continued through the 1920s. Little mining has been performed in the Rimini Mining District since the early 1930s.		1999 Listing	>10, ≤ 100 (1 MILE), >10, <100 (3-4 MILES)	NPL Final	1999	Lead, zinc, copper	Ground Water, Other		
243	US ANTIMONY CORP	8	MT	MTD050261833	PROSPECT CR, THOMPSON FALLS, MT						Other: Not on the NPL; NFRAP					
244	WICKES/CORBIN MINING SITE	8	MT	MTD981550155	T7N,R4W,SEC 15,SW 1/4,SW 1/4, WICKES, MT				1987 Discovery 2002 ESI		Other: Not on the NPL; Status Not Specified					
245	ZORTMAN MINE	8	MT	MTD089515498	225 MAIN STREET ZORTMAN, MT						Other: Not on the NPL; NFRAP					
246	ANNIE CREEK MINE TAILINGS	8	SD	SDD987666013	SECTION 3 TS4N R2E, LEAD, SD	>20 AND <100 ACRES	1907-1916				Other: Removed from Proposed NPL			Sediment, Soil, Surface Water		
247	BALD MOUNTAIN TAILINGS	8	SD	SD0000135608	NE 1/4 NE 1/4 SEC 35 T5N R2E, TROJAN, SD				1993 Discovery		Other: Not on the NPL; PA Start Needed					

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248	EDGEMONT SD URANIUM MILL TAILINGS	8	SD	SDD980717458	IMMED E OF EDGEMONT, SD						Other: Not on the NPL; NFRAP					
249	GILT EDGE MINE	8	SD	SDD987673985	4 MILES SE OF LEAD, U.S. FOREST SERVICE ROAD 170, LEAD, SD	>100 ACRES	Mining operations for gold, copper and tungsten had been conducted in this small mining district since 1876. About a century ago, a series of small mines began dumping metal - laden mill tailings into Strawberry Creek and Bear Butte Creeks. By 1986, when the State permitted Brohm Mining Company (BMC) to conduct larger-scale open-pit mining, off-site receiving waters had been contaminated. Under a State mining permit, BMC developed three open pits, a large cyanide heap leach pad, and a 12 million cubic yard valley-fill waste-rock dump, as well as other operations.		2001 ROD	>10, <=100 (1 MILE), >10, <=100 (3-4 MILES)	NPL Final	2000	heavy metals, including arsenic, cadmium, cobalt, copper, lead and zinc, and nitrates and sulfates	Leachate, Liquid Waste, Solid Waste	Ken Wangerud, (303) 312-6703	Eleanor Dwight, (303) 312-6813
250	MAITLAND TAILINGS IMPOUND	8	SD	SDT470010067	4 MI NW OF LEAD, SD						Other: Not on the NPL; NFRAP					
251	MINNESOTA RIDGE MINE	8	SD	SD0001097757	USFS ROAD #203 SEC.6 TOWNSHIP 2N RANGE4E, LAWRENCE COUNTY, SD				1995 Discovery 1995 PA		Other: Not on the NPL; NFRAP					
252	NORTH CAVE HILLS MINING SITES	8	SD	SD0012261936	25 MILES NORTH OF BUFFALO, SD				2001 Discovery		Other: Not on the NPL; Status Not Specified					
253	RICHMOND HILL PROJECT	8	SD	SD0001014406	4 MI NW OF LEAD,SD, OFF HWY 473				1993 Discovery 2001 SI		SF Alternative Site					
254	SPOKANE MUNITIONS	8	SD	SDD982583817	R6E,T25,SW1/4,SEC26, SPOKANE, SD						Other: Not on the NPL; NFRAP					
255	STRAWBERRY CREEK MINE TAILINGS	8	SD	SDD981543770	LEAD, SD						Site is Part of NPL Site					
256	TVA SILVER KING MINES INC	8	SD	SD6640090035	US HWY 18, EDGEMONT, SD						Other: Not on the NPL; NFRAP					
257	WASP #2 TAILINGS	8	SD	SDD987674231	FROM LEAD, SW ON HWY 85, LEAD, SD				1991 Discovery 1996 SI		Other: Not on the NPL; ESI Start Needed					
258	WHITEWOOD CREEK	8	SD	SDD980717136	10 MI PART OF STREAM, WHITEWOOD, SD		Gold and ore mining and milling operations 1882-1978	Homestake Mining Co.	1980 Discovery	280 (1 MILE), 1,000 (3-4 MILES)	Deleted from the Final NPL		Arsenic, cadmium, copper, silver, mercury and cyanide	Soil, Surface Water		Ted Fellman, (303) 312-6119
259	ABANDONED ORE BUYING STATION	8	UT	UTD980717490	250 N 200 W, BLANDING, UT						Other: Not on the NPL; NFRAP					
260	ALGER REDUCTION WORKS/ CORINNE SMELTERS	8	UT	UT0000984815	ARIZONA AND 2ND STREET, CORINNE, UT						Other: Not on the NPL; NFRAP					
261	AMER. CONSOLIDATED MINING CLIFTON SITE	8	UT	UTD980959332	SE OF MONTEZUMA PK/NEAR CLIFTON, CLIFTON, UT						Other: Not on the NPL; NFRAP					
262	AMERICAN FORK CANYON/UINTA NATIONAL	8	UT	UTD988074951	AMERICAN FORK CANYON, PLEASANT GROVE, UT				1992 Discovery, 1995 PA		Other: Not on the NPL; NFRAP					

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263	AMERICAN HILL BULLION	8	UT	UT0010343424	5200 S. STATE ST., MURRAY, UT				2001 Discovery		Other: Not on the NPL; PA Ongoing					
264	AMERICAN SMELTING AND REFINING CO	8	UT	UTD988075743	GARFIELD, BINGHAM CANYON, UT				1992 Discovery		Site is Part of NPL Site					
265	ATLAS MINERAL CORP MILL SITE	8	UT	UTD980717607	AT US HWY 163 & UTAH 279, MOAB, UT						Other: Not on the NPL; Deferred to NRC					
266	BADGER SMELTING WORKS	8	UT	UTD988075222	3050 SOUTH 100 WEST, SOUTH SALT LAKE, UT						Other: Not on the NPL; NFRAP					
267	BARBEE AND WALKER MILL	8	UT	UT0000935403	NORTH END OF WHITE REEF W OF LEEDS, UT						Other: Not on the NPL; NFRAP					
268	BAUER TAILINGS	8	UT	UTD980635528	5 MI S OF TOOELE, BAUER, UT				1981 Discovery, 1999 ESI		Other: Not on the NPL; NFRAP					
269	BIG HILL/CHLORIDE CHIEF MINES	8	UT	UT0001958420	ONE-HALF MI NORTH OF LEEDS, UT		Production Facility		1997 Discovery, 1999 PA		Other: Not on the NPL; SI Ongoing					
270	BINGHAM GOLD AND COPPER COMPANY	8	UT	UTD988075230	7300 SOUTH 100 WEST, MIDVALE, UT				1992 Discovery		Site is Part of NPL Site					
271	BLM - MERCUR CANON OUTWASH	8	UT	UT1141193002	HIGHWAY 73, EAST OF TOOELE ARMY DEPOT, TOOELE, UT						Other: Not on the NPL; NFRAP					
272	BULLION CANYON MILLS	8	UT	UT0012605880	AT FIREMAN'S PARK, MARYSVALE, UT	15 ACRES			2002 Discovery		Other: Not on the NPL; PA Start Needed					
273	COTTONWOOD CANYON	8	UT	UTD980635700	12 MI W OF BLANDING, UT						Other: Not on the NPL; NFRAP					
274	DAVENPORT AND FLAGSTAFF SMELTERS	8	UT	UTD988075719	1 MILE W OF INTERSECTION USH 209 AND 210, SANDY CITY, UT	>20 and <100 ACRES	1870-1875. The Flagstaff/Davenport site consists of properties near the mouth of Little Cottonwood Canyon in southeast Salt Lake County, Utah. This area includes the remains of three old smelters.		1992 Discovery, 2000 Proposal	>1,000, <=10,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Proposed		Lead, arsenic	Soil	Stan Christensen, (303) 312-6694	
275	DESERT MOUNDS MINE	8	UT	UTD980635692	12 MI W OF CEDAR CITY, UT						Other: Not on the NPL; NFRAP					
276	DRY VALLEY VANADIUM MILL	8	UT	UTD980952790	NORTHERN BASE OF DEER NECK MESA, SAN JUAN, UT						Other: Not on the NPL; NFRAP					
277	DYER MINE AND SMELTER (BULLIONVILLE)	8	UT	UT0001053594	32 MILES NORTH OF VERNAL, UT						Other: Not on the NPL; NFRAP					
278	EAST SUMMIT MINING CLAIMS-BLM	8	UT	UT1141190040	20 MIS NORTH OF MODENA, UT						Other: Not on the NPL; NFRAP					

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279	ESSEX COPPER PROCESSING PLANT	8	UT	UTD988066064	3 MILES WEST OF MILFORD, UT				1988 Discovery, 1996 SI		Other: Not on the NPL; NFRAP					
280	EUREKA MILLS	8	UT	UT0002240158	1.25 MI W OF THE UTAH-JUAB COUNTY LINE, INTERSECTION OF US HWY 6 AND SHRIVER ST, EUREKA, UT		The Eureka Valley was known as the Main Tintic District and was heavily mined from the 1880's to the 1950's.		1997 Discovery, 2001 Proposal	>100, <=1,000 (1 MILE), >100, <=1,000 (3-4 MILES)	NPL Proposed		Lead, arsenic	Soil	Paula Schmittdiel, (303) 312-6861	Catherine Roberts, (303) 312-6025
281	FLAGSTAFF II SMELTER	8	UT	UTD988075735	440 EAST 8680 SOUTH, SANDY, UT						Site is Part of NPL Site					
282	FLAGSTAFF SMELTER	8	UT	UTD988075248	9500 S LITTLE COTTONWOOD CANYON, SANDY, UT				1992 Discovery, 2000 HRS Package		Site is Part of NPL Site					
283	FRANKLIN OR HORN SILVER SMELTER	8	UT	UTD988071585	4600 SOUTH WEST TEMPLE, MURRAY, UT						Other: Not on the NPL; NFRAP					
284	FRYE CANYON TAILING	8	UT	UTD980718688	80 MI SE OF HITE-FRYE CYN RD, HITE, UT						Other: Not on the NPL; NFRAP					
285	GERMANIA SMELTING & REFINING COMPANY	8	UT	UTD988071601	4900 SOUTH WEST TEMPLE, MURRAY, UT				1991 Discovery, 1994 SI		Site is Part of NPL Site					
286	GOLD DOME MINING AND MILLING SITE	8	UT	UTD988066486	200 NORTH 330 WEST, OREM,\ UT						Other: Not on the NPL; NFRAP					
287	HIGHLAND BOY SMELTER SITE	8	UT	UTD980957898	5700 SOUTH 950 WEST, MURRAY, UT						Other: Not on the NPL; NFRAP					
288	HOLE IN ROCK MINE	8	UT	UTD988071916	3 MI NE OF BLUFF, MONUMENT VALLEY, UT						Other: Not on the NPL; NFRAP					
289	INTERNATIONAL SMELTING AND REFINING	8	UT	UTD093120921	2.5 MILES NE OF TOOELE, TOOELE, UT	>100 ACRES	1910-1972		1984 Discovery 2000 Listing	>100, <=1,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Final	2000	Arsenic, cadmium, copper, lead, mercury, and zinc	Ground Water, Sediment, Soil, Surface Water	Josh Knight, 1-800-227-8917 x 6160	Nancy Mueller, 1-800-227-8917 x 6602
290	JACOBS SMELTER	8	UT	UT0002391472	NEAR INTERSECTION OF SMITH & JOHNSON STS, STOCKTON, UT	>0 and <5 ACRES	1872-1900 smelting	various	1995 Discovery 2001 Partial NPL Deletion	>100, <=1,000 (1 MILE), >100, <=1,000 (3-4 MILES)	NPL Final	1999	Lead, arsenic	Soil	Jim Christiansen, (303) 312-6748	Nancy Mueller, (303) 312-6602
291	JENNINGS AND PASCOE SMELTER	8	UT	UTD988075255	STATE RD 89 (BECK STREET) & 800 NORTH, SALT LAKE CITY, UT						Other: Not on the NPL; NFRAP					
292	JONES AND PARDEE SMELTER	8	UT	UTD988075263	6 MI ABOVE THE MOUTH OF LITTLE COTTONWOOD, SALT LAKE CITY, UT						Other: Not on the NPL; NFRAP					
293	KEIGLEY QUARRY/US STEEL CORP	8	UT	UTD980635635	1 1/2 MI NW OF TOWN, SANTAQUIN, UT						Other: Not on the NPL; NFRAP					
294	KENNECOTT (NORTH ZONE)	8	UT	UTD070926811	12000 WEST 2100 SOUTH, MAGNA, UT	>100 ACRES	1898-?		1986 Discovery 1995 RI/FS	>1,000, <=10,000 (1 MILE), >1,000, <=10,000 (3-4 MILES)	NPL Proposed		Lead, arsenic and selenium	Sludge, Soil	Eva Hoffman, 303-312-6764	Nancy Mueller, 303-312-6602

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295	KENNECOTT (SOUTH ZONE)	8	UT	UTD000826404	10200 SOUTH 8400 WEST, COPPERTON, UT	>100 ACRES	1860-?		1984 Discovery 2001 ROD	>1,000, <=10,000 (1 MILE), UNKNOWN (3-4 MILES)	NPL Proposed		Lead, arsenic, zinc, silver, heavy metals	Ground Water, Other, Sediment, Sludge, Soil, Solid Waste, Surface Water	Eva Hoffman, 303-312-6764	Nancy Mueller, 303-312-6602
296	KIMBERLY MILL	8	UT	UTN010161342	APPROX. 3.8 MI SE OF THE I-70 MILL CREEK, JUNCTION, UT				2001 Discovery		Other: Not on the NPL; PA Ongoing					
297	LEEDS 5 STAMP MILL	8	UT	UT0000934653	1 MILE N OF LEEDS, LEEDS, UT				1994 Discovery 1999 SI		Other: Not on the NPL; Referred to Removal - NFRAP			Solid Waste		
298	LEEDS SILVER RECLAMATION SITE	8	UT	UTD981550619	2 MLS W OF LEEDS TO WHITE REEF, LEEDS, UT				1986 Discovery 1992 SI		Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Liquid Waste, Sediment, Soil		
299	LITTLE COTTONWOOD SMELTER	8	UT	UTD988074977	3600 E 9500 S, SANDY, UT						Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)					
300	MANTI - LASAL NATIONAL FOREST MINES	8	UT	UT1122307605	SEC 30, T28, R26EM OLD LA SAL, UT						Other: Not on the NPL; NFRAP					
301	MAYFLOWER MOUNTAIN TAILINGS PONDS	8	UT	UTD980951438	NE 1/4 SEC 25 T 2S R 4E, WASATCH COUNTY, UT						Other: Removed from Proposed NPL					
302	MIDVALE SLAG	8	UT	UTD081834277	136 E. S TEMPLE, MIDVALE, UT	300 ACRES	1902-? waste water treatment plant and smelter		1983 Discovery 1999 RD	22,381 (1 MILE), 84,000 (3-4 MILES)	NPL Final	1984	Arsenic, cadmium, chromium, cobalt, lead, manganese, mercury, zinc	Air, Ground Water, Other, Sediment, Soil, Solid Waste, Surface Water	Fran Costanzi, (303)-312-6571	Eleanor Dwight, (303)-312-6813
303	MINGO SMELTER	8	UT	UTD988070488	100 EAST 90TH SOUTH, SANDY, UT						Site is Part of NPL Site					
304	MONTICELLO MILL TAILINGS (USDOE)	8	UT	UT3890090035	T335,R23E,S31-T335,R24E,S36, MONTICELLO, UT	78.0 ACRES	1942-1960 uranium and vanadium milling operation	Bureau of land management/ US Energy Research and Development Administration and US Department of Energy	1980 Discovery 2001 RA Inactive 15,000 cy contaminated soil excavated and disposed of onsite in 1972	250 (1 MILE), 3,000 (3-4 MILES)	NPL Final	1989	Arsenic, chromium, lead, radium-226	Ground Water, Sediment, Soil, Solid Waste, Surface Water	Paul S. Mushovic, (303) 312-6662	Catherine Roberts, (303) 312-6025

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305	MONTICELLO RADIOACTIVELY CONTAMINATED PROPERTIES	8	UT	UTD980667208	9 N 3RD E ST, MONTICELLO, UT	320.0 SQ MI	1942-1960		1981 Discovery 2000 Deletion	1,500 (1 MILE), 1,530 (3-4 MILES)	Deleted from the Final NPL			Debris, Soil		
306	MORGAN OR HANOVER SMELTING WORKS	8	UT	UTD988071619	4280 SOUTH WEST TEMPLE, MURRAY, UT				1991 Discovery 1997 SI		Other: Not on the NPL; HRS Start Needed					
307	MURRAY SMELTER	8	UT	UTD980951420	5300 S MAIN STREET, MURRAY CITY, UT	>5 and <20 ACRES	1902-1949 smelting	ASARCO/various	1984 Discovery 1998 RA	>1,000, <=10,000 (1 MILE), >100,000 (3-4 MILES)	NPL Proposed	1994	Arsenic, lead, aluminum, cadmium, copper, mercury, nickel, selenium, silver, thallium, zinc	Debris, Ground Water, Sediment, Soil, Solid Waste, Surface Water	Bonnie Lavelle, 303-312-6579	Eleanor Dwight, 303-312-6813
308	NORTH LILLY MINING PCB	8	UT	UTD988078960	3 MI S OF EUREKA ON HWY 6, EUREKA, UT						Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)					
309	NORTH STAR SMELTER	8	UT	UTD988075289	LITTLE COTTONWOOD CANYON, ALTA, UT						Other: Not on the NPL; NFRAP					
310	OLD COBALT TAILINGS POND	8	UT	UTD980717987	JUNCTION OF I-80 AND HWY 201, LAKE POINT, UT				1980 Discovery 1989 PA		Other: Not on the NPL; Referred to Removal - NFRAP-Cleanup Complete			Ground Water, Solid Waste, Soil, Surface Water		
311	OLSON/NEIHART RESERVOIR	8	UT	UTD980951412	SE 1/4 SEC 30 R5E T2S, HEBER CITY, UT				1984 Discovery 1984 HRS Package		Other: Removed from Proposed NPL					
312	ORE BUYING STATION - MOAB	8	UT	UTD980804421	158 N 400 E, MOAB, UT						Other: Not on the NPL; NFRAP					
313	PIONEER 3-STAMP MILL	8	UT	UTN010161078	APPROX. 900 RED CLIFFS ROAD, SOUTH OF LEEDS, UT				2001 Discovery		Other: Not on the NPL; PA Ongoing					
314	RICHARDSON FLAT TAILINGS	8	UT	UTD980952840	NW 1/4 SEC 1 T2S R 4E, PARK CITY, UT	>100 ACRES	Site consists of a tailings dam and impoundment that were used to capture and hold mill tailings from the Ontario Mine near Park City, 1953-?		1984 Discovery 1992 SI	UNKNOWN (1 MILE), >1,000, <10,000 (3-4 MILES)	NPL Proposed		Arsenic, cadmium, copper, lead, mercury, silver and zinc	Ground Water, Surface Water		
315	RIO ALGOM CORP/LISBON MINE	8	UT	UTD073110603	10 MI S OF LA SAL, UT						Other: Not on the NPL; NFRAP					
316	SANDY SAMPLING WORKS	8	UT	UTD988075305	8580-8586 SO. 150 EAST, SANDY, UT						Site is Part of NPL Site					
317	SANDY SMELTER SITE	8	UT	UTD988078044	440 E. 8660 S., SANDY, UT						Other: Not on the NPL; HRS ongoing			Soil		

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318	SATURN MINING AND SMELTING COMPANY	8	UT	UTD988075313	9000 SOUTH 200 WEST, SANDY, UT						Site is Part of NPL Site					
319	SHARON STEEL CORP. (MIDVALE TAILINGS)	8	UT	UTD980951388	7800 SOUTH 700 WEST, MIDVALE, UT JUST SOUTH OF SALT LAKE CITY	260 ACRES	Milling operation, 1910-1971	UV Industries Inc.	1984 Discovery 1999 Construction Completion Inactive	8,179 (1 MILE), 422,035 (3-4 MILES)	NPL Final	1990	Lead, arsenic, cadmium	Air, Debris, Ground Water, Liquid Waste, Solid Waste, Soil, Surface Water		Dave Allison, (801) 536-4479; Citizens for a Safe Future for Midvale City, Verdon Walker, (801) 240-3354
320	SHERIDAN HILL SMELTER	8	UT	UTD988075321	7500 SOUTH 200 WEST, MIDVALE, UT				1992 Discovery		Site is Part of NPL Site					
321	SILVER CREEK TAILINGS	8	UT	UTD980951404	SUMMIT CTY, PARK CITY, UT				1984 Discovery 1992 SI		Deleted from the Final NPL					
322	SILVER MAPLE CLAIMS	8	UT	UTD980951396	HIGHWAY 248, 30 MI E OF SALT LAKE CITY, PARK CITY, UT				1984 Discovery 1994 SI		Other: Not on the NPL; Site Reassessment Ongoing					
323	SOUTHWEST ASSAY SITE	8	UT	UTD988066239	1 MILE NORTH OF LEEDS, UT				1989 Discovery 1992 SI		Other: Not on the NPL; Status Not Specified					
324	STANDARD SMELTING AND REFINING COMPANY	8	UT	UTD988075727	CORNER OF DUPONT AVE. AND CAROUSEL, SALT LAKE CITY, UT						Other: Not on the NPL; NFRAP					
325	STORMONT COMPANY MILL	8	UT	UT0000935452	3.5 MI S OF LEEDS, UT, ON VIRGIN RIVER						Other: Not on the NPL; NFRAP					
326	THOMPSON URANIUM ORE	8	UT	UTD980667265	VARIOUS LOCATIONS IN THOMPSON, UT						Other: Not on the NPL; NFRAP					
327	TINTIC SMELTER	8	UT	UT0001958453	2.5 MILES SOUTHWEST OF EUREKA, UT						Other: Not on the NPL; NFRAP					
328	UNITED SMELTING REFINING AND MINING CO	8	UT	UTD988075347	7800 SOUTH 400 WEST, MIDVALE, UT				1992 Discovery		Site is Part of NPL Site					
329	UTAH ORE SAMPLING	8	UT	UTD067982785	5510 SOUTH 300 WEST, WEST MURRAY, UT						Other: Not on the NPL; Deferred to NRC					
330	VIPONT MINE	8	UT	UTD981545957	2 MI FROM THE UTAH/IDAHO BORDER GROUSE CREEK, UT				1986 Discovery 1995 SI		Other: Not on the NPL; HRS Start Needed					
331	VITRO URANIUM MILL TAILINGS	8	UT	UTD980717698	33RD S 9TH W, SOUTH SALT LAKE, UT						Other: Not on the NPL; NFRAP					
332	W & M ROBBINS CO SMELTER	8	UT	UTD988071643	5000 SOUTH STATE STREET, MURRAY, UT						Other: Not on the NPL; NFRAP					

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333	WASATCH SILVER LEAD WORKS	8	UT	UTD988071635	4850 S 80 W, MURRAY, UT						Other: Not on the NPL; NFRAP					
334	WIGHTMAN AND COMPANY SMELTER	8	UT	UTD988075362	11 M UP BIG COTTONWOOD CANYON/SILVER FK SALT LAKE CITY, UT						Other: Not on the NPL; NFRAP					
335	WOODHULL BROTHERS SMELTER	8	UT	UTD988071593	4200 SOUTH STATE STREET, MURRAY, UT						Other: Not on the NPL; NFRAP					
336	ASBESTOS MINE - CASPER MOUNTAIN	8	WY	WYD980667125	S SIDE OF CASPER MTN, CASPER, WY						Other: Not on the NPL; NFRAP					
337	ATLANTIC CITY ORE OPERATIONS	8	WY	WYD067301770	30 MI S OF LANDER ON HWY 28, LANDER, WY						Other: Not on the NPL; NFRAP					
338	BAGGS URANIUM MILL SITE	8	WY	WYD980952949	6 MILES WEST OF BAGGS, WY						Other: Not on the NPL; NFRAP					
339	DUNCAN MINE - ATLANTIC CITY	8	WY	WYD981540107	SOUTH PASS ROAD, ATLANTIC CITY, WY						Other: Not on the NPL; NFRAP					
340	FERRIS HAGGERTY MINE	8	WY	WYD988874707	35 MILES NE OF BAGGS, WY				1993 Discovery, 1994 SI		Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup					
341	PORCUPINE CREEK MINE	8	WY	WYD980667067	BIG HORN MTNS - NEAR LOVELL, WY						Other: Not on the NPL; NFRAP					
342	RIVERTON URANIUM MILL TAILINGS	8	WY	WYD980717706	N OF HWY 789, RIVERTON, WY						Other: Not on the NPL; NFRAP					
343	SPLIT ROCK URANIUM MILL ACID POND	8	WY	WYD000825984	1 MI NE OF JEFFREY CITY, WY						Other: Not on the NPL; NFRAP					
344	SPLIT ROCK URANIUM MILL SITE	8	WY	WYD980375901	2 MI NE OF JEFFREY CITY, WY						Other: Not on the NPL; NFRAP					
345	YTTRIUM PROCESSING PLANT	8	WY	WYD980952030	NO. CEDAR ST., LARAMIE, WY	5 ACRES	Production Facility		Inactive		Other: Not on the NPL; NFRAP			Debris, Solid Waste, Soil		
346	A & B NO. 3 MINE	9	AZ	NND983466731	SECTION 21, T29N, R9E, CAMERON, AZ, NAVAJO NATION		Abandoned uranium mine - dates unknown.	Navajo Nation	1990 Discovery, 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Soil	Navajo Superfund Program (928) 871-0859	

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347	ABANDONED COPPER MINE	9	AZ	NND982399875	COPPER MINE, FREDONIA, AZ, NAVAJO NATION	~25 miles	Abandoned copper mine. Years of operation: 1957 - 1967 (approximately).	Navajo Nation	1988 Discovery, 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; SI Start Needed		Copper and sulfuric acid	Surface water, soil	Navajo Superfund Program (928) 871-0859	
348	AMERICAN LEGION MINE	9	AZ	AZ0000307959	8M NORTH ON STOCKTON RD., KINGMAN, AZ			BLM	1994 Discovery		Other: Not on the NPL; PA Start Needed					
349	ARITMECO - EMERALD ISLE MINE	9	AZ	AZ0000308031	4M SOUTH ON CHLORIDE ROAD, CHLORIDE, AZ	174 ACRES		BLM	1994 Discovery		Other: Not on the NPL; Fed Fac Preliminary Assessment Review Start Needed					
350	ASARCO - ALTA MINE	9	AZ	AZ0000308221	7M SE OF AZ HWY 82, ON FLUX CANYON ROAD, PATAGONIA, AZ		Underground mine (lead/silver) and mill. Years of operation: 1870 - after 1905	ASARCO	1994 Discovery		Other: Not on the NPL; Site Reassessment Ongoing; NFA 2002 (remediation on metals has been done)		Metals	Ground water, sediment, soil		
351	ASARCO - HARDSHELL MINE	9	AZ	AZ0000308262	8M SE OF AZ HWY 82, FLUX CANYON RD., PATAGONIA, AZ		Silver mine. Years of operation: 1870s - 1905	ASARCO	1994 Discovery	Very small	Other: Not on the NPL; Site Reassessment Ongoing		Lead			
352	ASARCO - HERMOSA MINE	9	AZ	AZ0000308270	8M SE OF AZ HWY 82, ON FLUX CANYON RD., PATAGONIA, AZ	~ 5000 square feet	Underground and open cut silver mine. Years of operation: 1875 - 1943.	ASARCO	1994 Discovery, PA 2002	Very small	Other: Not on the NPL; NFA 2002		Arsenic and lead	Surface water and ground water		
353	ASARCO - TRENCH CAMP MINE	9	AZ	AZ0000308288	6M SE OF AZ HWY 82, FLUX CANYON RD., PATAGONIA, AZ	~22 ACRES	Zinc, lead, and silver underground mine and mill. Years of operation 1859 - 1964.	ASARCO	1994 Discovery, PA 2002	Very small	Other: Not on the NPL; NFA 2002		Arsenic and zinc	Surface water		
354	ASARCO INC HAYDEN PLT	9	AZ	AZD008397127	640 ASARCO AVE, HAYDEN, AZ	690 ACRES	Copper processing and smelting. Years of operation: 1911 - present.	ASARCO	1979 Discovery, 2000 ESI	1,500 (1 MILE)	Other: Not on the NPL; ESI Ongoing		Arsenic and sulfuric acid	Soil, air, and surface water		
355	BECLABITO AGGREGATED URANIUM MINES	9	AZ	NN0001159284	36'37'30'-52'30'N,109'07'30'-108'52'30'W, BIKLABITO, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation ongoing		Other: Not on the NPL; PA Start Needed					
356	BECLABITO LEASE URANIUM MINES	9	AZ	NND986667616	2 MILES SOUTH OF BICLABITO T., BIKLABITO, NAVAJO NATION	50.7 ACRES	Abandoned uranium mine. Years of operation: 1950 - 1953.	Navajo Nation	1991 Discovery, 1990 PA, Reclamation ongoing	0 population < 2.5 miles	Other: Not on the NPL; SI Start Needed		Arsenic, selenium, lead, uranium, radon, thorium, and polonium	Soil, possible ground water, air	Navajo Superfund Program (928) 871-0859	

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357	BHP PINTO CREEK MINE	9	AZ	AZT000624353	HWY 60 8 MI W OF MIAMI, AZ	numerous square miles	Leaching operation. Years of operation: mining 1882 - ?; 1904 - 1953; 1943 - 1982; 1996 - present.	BHP	1997 Discovery	small	Other: Not on the NPL; PA Start Needed		Metals	Soil, sediment, surface water, and ground water		
358	BIG HORN MINE (U.S. MINE)	9	AZ	AZ0000308296	17M SOUTH SOUTHWEST OF AGUILA, AZ	~200 ACRES	Open pit gold mine with cyanide heap leaching. Years of operation: 1916 - present.	L.W. Mining	1994 Discovery, 2002 PA	Very small	Other: Not on the NPL; NFRAP		Berium, cyanide	Ground water		
359	BLACK MESA AGGREGATED URANIUM MINES	9	AZ	NN0001166164	36'07'30'-30'00'N,109'45'00'-110'00'00'W, BLACK MESA, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation complete		Other: Not on the NPL; PA Start Needed					
360	BLUE JOHN MINE	9	AZ	AZSFN0905574	PINE MOUNTAIN ROAD & KING PIN LANE, PRESCOTT, AZ	~1,500 cubic yards of tailings	Gold and silver mine and mill. Years of operation: ~1900 - 1938.		1999 Discovery	Several homes within 200 feet	Other: Not on the NPL; Status Not Specified					
361	BLUEWATER URANIUM MINE	9	AZ	NND983469891	SECTIONS 18,24,26,T13 RIOW/R11W, PREWITT 5 MILES WEST, NAVAJO NATION	11 ACRES	Abandoned uranium mine. Dates unknown.		1991 Removal		Other: Not on the NPL; PA Start Needed		Uranium and other heavy metals.	Air, Soil	Navajo Superfund Program (928) 871-0859	
362	BLUEWATER URANIUM MINE (SANTA FE)	9	AZ	NND986683316	SECTION 19 T13N R10W, PREWITT 5 MILES WEST, NAVAJO NATION		Uranium mine. Years of operation: 1951 - early 1980s	Santa Fe Pacific Corp.	AO#91-16	~40 (1/4 MILE) (1991)	Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)		Radioactive mine waste and metals	Soil		
363	BOYD TISI NO. 2 MINE	9	AZ	NND983466756	NR HWY 89, CAMERON, AZ, NAVAJO NATION	3-4 ACRES	Abandoned uranium mine. Years of operation: 1957 - 1958.	Navajo Nation	1990 Discovery, 1992 PA		Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals.	None	Navajo Superfund Program (928) 871-0859	.
364	CAMERON AGGREGATED URANIUM MINES	9	AZ	NN0001166255	T28-29N, R9-11E, CAMERON, AZ, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation ongoing		Other: Not on the NPL; PA Start Needed					
365	CASH MINE AKA Storm Cloud Mine	9	AZ	AZ0001038546	T. 12 N R.2 W, SEC.1, PRESCOTT, AZ	~3,000 ACRES (~21,382 square feet tailings)	Years of operation: gold mining 18802 - 1890s; copper milling 1927 - 1929.		1995 Discovery, 1999 PA	~640 (1 MILE)	Other: Not on the NPL; PA Ongoing		Metals	Soil, sediment, ground water, surface water		
366	COVE MESA AGGREGATED URANIUM MINES	9	AZ	NN0001166263	36'22'30'-37'30'N,109'07'30'-22'30'W, COVE, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation ongoing		Other: Not on the NPL; PA Start Needed					
367	DUNCAN MILLSITE	9	AZ	AZ0002378016	T7N, R9E, SECTION 19, MARICOPA, AZ		Processing of cinnabar (mercury ore) and mining. Years of operation: ~1928 - 1979 and 1992.	Forest Service	1998 Discovery		Other: Not on the NPL; Referred to Removal - Further Assessment Needed		Mercury, cyanide, and metals	Sediment and soil		

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368	DUVAL CORP/ESPERANZA MINE	9	AZ	AZ8141190076	6200 DUVAL MINE RD/ NOGALES HWY., SAHUARITA, AZ	20 square miles	Years of operation: mining 1870s - 1929; processing 1959 - 1981.	Cyprus Sierrita Corp.	1979 Discovery, 1991 PA		Other: Not on the NPL; SI Start Needed		Metals	Sediment, soil, and ground water		
369	EASTERN NAVAJO AGGREGATED URANIUM MINES	9	AZ	NN0001166271	35'30'00'-45'00'N,107'52'30'-108'22'30', CROWNPOINT, NAVAJO NATION		PA needed.		1995 Discovery		Other: Not on the NPL; PA Start Needed					
370	ENOS JOHNSON URANIUM MINE-RED VALLEY	9	AZ	NND982399982	RED VALLEY, NAVAJO NATION		PA needed.		1988 Discovery		Other: Not on the NPL; PA Start Needed					
371	FEBCO URANIUM MINE	9	AZ	NND986669166	PREWITT, NAVAJO NATION				1991 Discovery, 2001 PA		Other: Not on the NPL; PA Start Needed					
372	FRANK JR. MINE	9	AZ	NND983466822	COVE AZ, APPROX 15 MI E OF ROUND ROCK, NAVAJO NATION		Abandoned uranium mine. Years of operation: ~1952 - 1958.	Navajo Nation	1990 Discovery, 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	Remote	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Surface water and ground water	Navajo Superfund Program (928) 871-0859	Yes - complaints
373	FRANK NO. 1 MINES	9	AZ	NND983466806	COVE AZ, APPROX 15 MI E OF ROUND ROCK, NAVAJO NATION	120 ACRES	Abandoned uranium mine. Years of operation: 1951 - 1957, 1957 - 1963, 1965 - 1967.	Navajo Nation	1990 Discovery, 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	427	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Ground water, soil, and surface water	Navajo Superfund Program (928) 871-0859	Yes - complaints
374	GIBSON MINE	9	AZ	AZD983478488	9M W OF MIAMI OFF RTE 60 TO FOREST SVC., MIAMI, AZ	~300 ACRES	Copper mine. Years of operation: 1906 - 1930s, 1965 - 1990.		1992 Discovery, 1993 PA	Rural	Other: Not on the NPL; SI Start Needed		Sufuric acid, cadmium, copper, magnesium, lead, zinc	Surface water		
375	HASSAYAMPA/LYNX CREEK ABANDONED MINES	9	AZ	AZ5120090068	5 MILES SE PRESCOTT-PRESCOTT NATL FOREST, PRESCOTT, AZ	7 square miles	Several mines within two watersheds.	Forest Service	1991 Discovery 1999 SI	Rural	Other: Not on the NPL; SI Ongoing		Metals	Soil, sediment, surface water, and ground water		
376	HILLSIDE MINE	9	AZ	AZN000905867	BOULDER CREEK 4 MILES W OF BAGDAD, BAGDAD, AZ		No file.				Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)					
377	HOLIDAY GIRL MINE	9	AZ	AZ0001038785	T.12 1/2 N R.2 W, SEC 31, PRESCOTT, AZ	~2,500 square feet (tailings)			1995 Discovery 1999 PA	640 (1 MILE)	Other: Not on the NPL; PA Ongoing		Antimony, arsenic, barium, lead, and copper	Soil and surface water		

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378	HUSKON NO. 26 MINE	9	AZ	NND983466749	SECTION 33, T28N, R10E, CAMERON, NAVAJO NATION	0.3 ACRES	Abandoned uranium mine. Year of operation: 1957.	Navajo Nation	1990 Discovery, 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	40 homes within 1 mile	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Soil and air	Navajo Superfund Program (928) 871-0859	
379	INSPIRATION CNSLD COPPER-OXHIDE AREA	9	AZ	AZ1141190073	SEC 22-28,33-36, 2-4 T1N&S R14E, MIAMI, AZ		Copper mining and smelting. Years of operation: 1968 - after 1991.	Inspiration CNSLD Copper Co.	1979 Discovery 1983 PA		Other: Not on the NPL; SI Start Needed		Metals	Ground water, sediment, soil, and surface water		
380	IRON CAP MINE	9	AZ	AZ0000309062	2 MI N OF GLOBE, GLOBE, AZ				1994 Discovery, PA 2002	Very small	Other: Not on the NPL; PA Start Needed, NFA 2002		Arsenic	Surface water		
381	IRON KING MINE & TAILINGS	9	AZ	AZ0000309013	.25 MI SW. ON HWY 69, HUMBOLDT, AZ	153 ACRES	Years of operation: mining, smelter, fertilizer plants, labs, disposal 1942 - after 1984; mill 1938; cyanide plant 1940; mining 1933 - after 1983. (with DEQ)	Ironite Products Co., Terry Nolan	1994 Discovery		Other: Not on the NPL; PA/SI 2002		Arsenic and metals	Ground water, sediment, and soil		
382	KENNECOTT MINERALS CO MINES PLT	9	AZ	AZD000626606	ST HWY 177 20 MI E OF HAYDEN, HAYDEN, AZ		Now ASARCO Ray?				Other: Not on the NPL; NFRAP		Copper and metals	Ground water, sediment, and soil		
383	KING TUTT MESA AGGREGATE SITE	9	AZ	NND986667434	OAK SPRINGS, NAVAJO RESERVATION, OAK SPRINGS, NAVAJO NATION		Large aggregate site - final determination not made. Abandoned uranium mines. Years of operation: 1950s - 1960s.	Navajo Nation	1989 Discovery 1997 ESI, Reclamation Complete (per information from Navajo Superfund Program)	Significant	Other: Not on the NPL; Integrated ESI/RI Ongoing		Uranium and other heavy metals	Ground water, surface water, soil, and air	Navajo Superfund Program (928) 871-0859	High degree of community concern.
384	KLONDYKE TAILINGS	9	AZ	AZ0000309294	1MILE N.W. OF KLONDYKE, KLONDYKE, AZ	70,000 cubic yards of tailings	Mill site for processing of ore containing lead, zinc, copper, silver, and gold. Years of operation: 1940s - 1950s.	M. Claridge	1994 Discovery 2000 SI	~26 (4 MILES)	Other: Not on the NPL; NFRAP		Antimony, arsenic, copper, lead, zinc, cadmium	Soil and surface water		Nature Conservancy interest
385	LION ADIT	9	AZ	AZN000905896	TOWNSHIP 12.5 N, PRESCOTT, AZ				2001 Discovery		Other: Not on the NPL; PA/SI 2002		Metals	Soil and surface water		some
386	MAGMA COPPER CO	9	AZ	AZD001886654	MAIN ST, SUPERIOR, AZ	~200 ACRES	Copper mine, processing, smelter. Years of operation: 1911 - 1982.	Magma Copper Co.	1979 Discovery 2001 ESI	3,700	Other: Not on the NPL; HRS Start Needed		Cadmium, copper, lead, maganese, selenium, and zinc	Ground water and soil		
387	MAGMA COPPER CO. - OLD DOMINION MINE	9	AZ	AZ0000309047	U.S. HWY 60 GLOBE, AZ	~100 ACRES	Copper mine, processing, smelter. Years of operation: 1874 - 1931.	BHP Billiton	1994 Discovery 2002 PA	Rural	Other: Not on the NPL; NFRAP		Copper and metals	Soil		
388	MANSFIELD CANYON MINES SITE	9	AZ	AZ0002001857	TOWNSHIP 21 SOUTH, NOGALES, AZ	~14,000 cubic yards of waste rock	Copper, lead, zinc, silver, and iron mining. Years of operation: late 1870s - 1950s.	USFS	Federal Facility PA 1994; Forest Service Removal 1996	3 (1/4 MILE)	Other: Not on the NPL; Referred to Removal - Further Assessment Needed		Arsenic, copper, maganese, and zinc	Surface water and ground water		

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389	MCCLEUR TAILINGS	9	AZ	AZ0000309096	8M S. ON SENATOR HWY., PRESCOTT, AZ	~11,000 square feet of tailings area	Dust tailings area for copper, silver, and gold mines. Years of operation: 1800s - 1900s		1994 Discovery 1999 PA	640 (1 MILE)	Other: Not on the NPL; PA Ongoing		Antimony, arsenic, barium, copper, lead, and cadmium	Soil, surface water, and air		
390	MCKINLEY MILL	9	AZ	AZN000905897	TOWNSHIP 12.5 N, PRESCOTT, AZ	~16,000 square feet of tailings area			2001 Discovery	640 (1 MILE)	Other: Not on the NPL; PA Start Needed		Antimony, arsenic, barium, copper, lead, and cadmium	Soil, surface water, and air		
391	MESA I MINES	9	AZ	NND983466772	COVE AZ, APPROX 15 MI E OF ROUND ROCK, NAVAJO NATION		Abandoned uranium mine. Years of operation: 1950 - 1951, 1951 - 1952, 1953 - 1958, 1961 - 1963, 1965 - 1967.		1990 Discovery 1992 PA, Reclamation Complete	small	Other: Not on the NPL; SI Start Needed		Uranium, vadium, thorium, lead, arsenic, and other heavy metals	Air, soil, ground water, surface water	Navajo Superfund Program (928) 871-0859	Yes - complaints
392	MESA II MINES NO. 1 & 2, P-21	9	AZ	NND983466780	LUKACHUKAI MOUNTAINS AREA/COVE CHAPTER, RED VALLEY, NAVAJO NATION	528 ACRES	Abandoned uranium mines. Years of operation: 1956 - 1967.	Navajo Nation	1990 Discovery 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	small	Other: Not on the NPL; SI Start Needed		Uranium, other radioactive and heavy metals	Surface water, ground water, and air	Navajo Superfund Program (928) 871-0859	Community concern.
393	MESA V MINE	9	AZ	NND983466814	COVE AZ, APPROX 15 MI E OF ROUND ROCK, NAVAJO NATION	~120 ACRES	Abandoned uranium - vanadium mine. Years of operation: 1951 - 1952, 1953 - 1955, 1960 -1963, 1963 - 1968.	Navajo Nation	1990 Discovery 1992 PA	310 (4 MILES)	Other: Not on the NPL; SI Start Needed, NFA		Uranium, vanadium, and other heavy metals	Surface water and air	Navajo Superfund Program (928) 871-0859	
394	MINEREC MINING CHEMICAL	9	AZ	AZD983480716	300 E VAMORI ST, TUCSON, AZ		No file.		1998 Removal		Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Liquid Waste, Solid Waste		
395	MONTANA MINE/RUBY TAILINGS	9	AZ	AZ0000309104	11M SOUTH OF ARIVACA, AZ				1994 Discovery 2001 PA		Other: Not on the NPL; NFRAP					
396	MONUMENT VALLEY AGGREGATED URANIUM MINES	9	AZ	NN0001166289	T41-425, R18E OLJETO, MONUMENT VALLEY, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation Complete		Other: Not on the NPL; PA Start Needed					
397	NAVAJO - BEGAY #1 URANIUM MINE	9	AZ	NND986667517	NAVAJO RESERVATION, OAK SPRINGS, NAVAJO NATION	~185 ACRES	Abandoned uranium mine. Years of operation: 1953 - 1954, 1966 - 1967. Part of King Tutt Mesa Aggregate Site	Navajo Nation	1989 Discovery 1991 SI, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium, lead, thorium, arsenic, selenium, and vanadium	Soil, air, surface water, and possible ground water	Navajo Superfund Program (928) 871-0859	Chapter meetings have expressed concern.
398	NAVAJO - BEGAY #2 URANIUM MINE	9	AZ	NND986667509	NAVAJO RESERVATION, OAK SPRINGS, NAVAJO NATION	~ 200 ACRES	Abandoned uranium mine. Years of operation: 1962, 1961 -1966, 1967. Part of King Tutt Mesa Aggregate Site	Navajo Nation	1989 Discovery 1991 SI, Reclamation Complete (per information from Navajo Superfund Program)	30 (1 MILE); 540 (4 MILES)	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Arsenic, lead, selenium, thorium, uranium	Surface water, soil, and air	Navajo Superfund Program (928) 871-0859	

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399	NAVAJO - CARRIZO MINE	9	AZ	NND986667491	14 MI SE OF 'FOUR CORNERS', OAK SPRINGS, NAVAJO NATION		Abandoned uranium mine. Years of operation: 1956 -1958 Part of King Tutt Mesa Aggregate Site	Navajo Nation	1989 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium and other heavy metals	Soil and surface water	Navajo Superfund Program (928) 871-0859	
400	NAVAJO - FRANKS PT./VCA PLOT #6 UR MINE	9	AZ	NND986675049	1 1/4 MILES NW OF OAK SPRINGS, NAVAJO NATION	21.1 ACRES	Abandoned uranium mine. Years of operation: 1950 - 1951, 1961 - 1962.	Navajo Nation	1989 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)	Significant	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium and other heavy metals	Soil and surface water	Navajo Superfund Program (928) 871-0859	
401	NAVAJO - JUNCTION CLAIM URANIUM MINE	9	AZ	NND986675023	T29N, R21W; 1.75 E, NM/AZ. BOA, OAK SPRINGS, NAVAJO NATION	55.3 ACRES	Abandoned uranium mine. Year of operation: 1953.	Navajo Nation	1989 Discovery 1990 PA, Reclamation Complete (per information from Navajo Superfund Program)	Low	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Air and ground water	Navajo Superfund Program (928) 871-0859	
402	NAVAJO - SALT CANYON MINES	9	AZ	NND986667467	NAVAJO RESERVATION, OAK SPRINGS, NAVAJO NATION	257 ACRES	Abandoned uranium mine. Years of operation: 1953 -1954, 1955. Part of King Tutt Mesa Aggregate Site	Navajo Nation	1989 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)	0 (1 MILE), 499 (4 MILES)	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium, arsenic, selenium, thorium, radium, vanadium	Soil, wetlands, air, and possible ground water	Navajo Superfund Program (928) 871-0859	
403	NAVAJO - UPPER SALT ROCK URANIUM MINE	9	AZ	NND986667590	1 1/4 MI. NW OAK SPRINGS, OAK SPRINGS, NAVAJO NATION		Abandoned uranium and vanadium mine. Years of operation: 1948, 1950 - 1951, 1961 -1962. Part of King Tutt Mesa Aggregate Site	Navajo Nation/Not PRA	1989 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)	36 (1 MILE)	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium, arsenic, lead, selenium, and radium	Soil, surface water, and air	Navajo Superfund Program (928) 871-0859	
404	NAVAJO - WILLIAMS POINT MINE, VCA #4	9	AZ	NND986673283	9 MI N-NE OF RED VALLEY, AZ, RED VALLEY, NAVAJO NATION	10 ACRES	Abandoned uranium mine. Years of operation: 1942 -1947.	Navajo Nation	1990 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium and other heavy metals	Air and ground water	Navajo Superfund Program (928) 871-0859	
405	NAVAJO RED WASH POINT URAN. MINE	9	AZ	NND986667459	8 MI N-NE OF RED VALLEY, OAK SPRINGS, NAVAJO NATION	3.5 ACRES	Abandoned uranium mine. Years of operation: 1942, 1948 -1950, 1951 -1952, 1952. Part of King Tutt Mesa Aggregate Site	Navajo Nation	1991 Discovery 1992 SI, Reclamation Complete (per information from Navajo Superfund Program)	0 (1 MILE), 499 (4 MILES)	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium, radium, thorium, arsenic, selenium, and lead	Soil, surface water, and air	Navajo Superfund Program (928) 871-0859	

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406	NAVAJO VCA PLOT 7 URANIUM MINE	9	AZ	NND986667426	ADJ. TO THE AR., NM BORDER AT, OAK SPRINGS, NAVAJO NATION	205 ACRES	Abandoned uranium mine. Years of operation: 1943 - 1944, 1948 - 1950, 1950 - 1952, 1950, 1951, 1954 - 1957, 1961 -1964, 1955 -1959, 1960, 1961.	Navajo Nation	1989 Discovery 1991 SI, Reclamation Complete (per information from Navajo Superfund Program)	Significant	Other: Not on the NPL; Other Cleanup Activity: Tribal-Lead Cleanup		Uranium and other heavy metals	Air, soil, and surface water	Navajo Superfund Program (928) 871-0859	Yes.
407	ORACLE RIDGE MINE	9	AZ	AZ0000309146	22M SOUTH-SOUTHEAST, ORACLE, AZ	~27 ACRES	Milling operation. (Mining not part of site). Years of operation: 1881 - 1946, 1977 - present. (with DEQ)	Oracle Ridge Mining Partners	1994 Discovery 2000 PA	Rural	Other: Not on the NPL; PA Ongoing		Metals	Soil, sediment, and surface water		
408	PHELPS DODGE CORP - COPPER BASIN BRANCH	9	AZ	AZ0000309179	8M SW OF PRESCOTT, AZ	~715 ACRES	Years of operation: mining 1906 - 1968, small smelter 1904 -1906	Phelps Dodge Corp.	1994 Discovery		Other: Not on the NPL; Site Reassessment Ongoing		Metals	Ground water, surface water, soil, and sediment		
409	PHELPS DODGE CORP DOUGLAS REDUCTION WRKS	9	AZ	AZD008397143	US 80 & HWY 666, DOUGLAS, AZ		Reduction works. Years of operation: 1902 - 1987.	Phelps Dodge Corp.	SI 1989		Other: Not on the NPL; NFRAP		Metals	Ground water, surface water, soil, and sediment		
410	PHELPS DODGE CORP NEW CORNELIA BRANCH	9	AZ	AZD081687063	MAIN ST, AJO, AZ	~1,600 ACRES of tailings	Mining, processing, and smelter. Years of operation: 1854 - 1859, 1922 - 1984.	Phelps Dodge Corp.	1979 Discovery 1990 SI	~3,500 - 4,500 in 1989 (town of Ajo)	Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup		Copper and metals	Air and soil		
411	PHELPS DODGE VERDE MINE	9	AZ	AZD983475773	1/2 WAY BETWEEN CLARKDALE, AZ & JEROME ALT89	~116 ACRES of tailings (4 million tons of waste)	Mining and smelting. Years of operation: 1880 - 1950s.	Phelps Dodge Corp.	1992 Discovery 1993 ESI	Rural	Other: Not on the NPL; Site Reassessment Ongoing		Metals	Soil, sediment, surface water, and ground water		
412	PINTO VLY COPPER CORP (CITIES SERV CO)	9	AZ	AZT050010040	SE 1/4 NW 1/4 SEC30 T1N R15E, MIAMI, AZ	~750 ACRES	Copper mining and milling. Years of operation: 1870s - present.	Magma Copper Co.	1993 SI Prioritization	~8,000	Other: Not on the NPL; NFRAP		Arsenic, chromium, and lead	Air, soil, sediment, ground water, and surface water		
413	RICHEY MILLSITE	9	AZ	AZ0002378024	3 MILES SOUTH OF PAYSON, AZ		Gold-cyanide heap leaching operation (possible methamphetamine manufacturing). Years of operation: 1979 - 1988. **Mr. Richey was arrested for selling marijuana and methamphetamines**	Forest Service	1998 Discovery	~10,000 in 1990	Other: Not on the NPL; Fed Fac Site Inspection Review Start Needed		Cyanide and metals	Sediment, soil, ground water, and surface water		Some
414	RICHEY MILLSITES	9	AZ	AZD983484783	NORTH OXBOW ESTATES, 4M S OF PAYSON, AZ		No file.				Not a valid site or incident					
415	SAN FRANCISCO RIVER MINE TAILINGS	9	AZ	AZ0000032433	N. INTERSEC. HWY 191 1.5 M SOUTH, CLIFTON (SOUTH), AZ	~24 ACRES	Copper mining and smelting. Years of operation: 1880s - 1920s.	Phelps Dodge Corp.	1993 Discovery 1999 SI	~2,700	Other: Not on the NPL; ESI Start Needed		Arsenic, cadmium, copper, lead, and zinc	Soil, sediment, and surface water		
416	SAN JUAN MINE	9	AZ	AZ0000309203	9M N-NW ON SAN JUAN ROAD, SAFFORD, AZ	~188 ACRES (~3 million square feet of tailings)	Mine/leaching operations for copper. Years of operation: 1900; 1968 -1975.	Phelps Dodge Mining Company	1994 Discovery	Remote	Other: Not on the NPL; NFRAP		Copper, sulfuric acid, metals	Soil		

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417	SANOSTEE AGGREGATED URANIUM MINES	9	AZ	NN0001166297	36'22'30'-37'30'N,108'52'30'N,109'07'30W, SANOSTEE, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation ongoing		Other: Not on the NPL; PA Start Needed					
418	SENATOR MINE	9	AZ	AZ0000309211	7MI S. ON SENATOR HWY., PRESCOTT, AZ	~18, 786 square feet of tailings	Copper, silver, gold, lead, and iron mine. Years of operation: 1871 - 1930s, 1950s.		1994 Discovery 1999 PA	640 (1 MILE)	Other: Not on the NPL; PA Ongoing		Antimony, arsenic, barium, copper, lead, and cadmium	Soil, air, surface water, ground water		
419	SHELDON MINE	9	AZ	AZ0000309245	2M SE OF WALKER, PRESCOTT, AZ	~75,000 square feet of tailings	Mining.		1994 Discovery 1999 PA		Other: Not on the NPL; PA Ongoing		Arsenic and metals	Soil, surface water, and ground water		Some.
420	SHUMWAY MILLSITES	9	AZ	AZD983484775	W OF HWY 87/S OF PAYSON, MILEPOST 248, PAYSON, AZ		Small mill site. Years of operation: 1978 - early 1990s.	Forest Service	1993 Discovery	500	Other: Not on the NPL; PA Start Needed		Various leaking tanks, drums, ponds	Soil and surface water		
421	SMITH MILL SITE	9	AZ	AZSFN0905414	TOWNSHIP 5 N, RANGE 4 W, MARICOPA COUNTY, AZ	~20 ACRES	Milling. Years of operation: 1873 -1880.	Arizona State Land Department	1998 Discovery, PA/SI 2002	~15 (1 MILE)	Other: Not on the NPL; Combined PA/SI		Metals	Soil, sediment, and surface water		
422	SUNDANCE MINE	9	AZ	AZ0001039379	T.12 1/2 N, R. 2 W, SEC 1, PRESCOTT, AZ	2,150 square feet of tailings	Copper, silver, gold, lead, and zinc mine. Years of operation: early 1900s - mid 1900s.		1995 Discovery 1999 PA	640 (1 MILE)	Other: Not on the NPL; PA Ongoing		Antimony, arsenic, barium, copper, lead, and cadmium	Soil, air, surface water, ground water		
423	SWEETWATER AGGREGATED URANIUM MINES	9	AZ	NN0001166305	T38-41N, R27-29E, SWEETWATER, NAVAJO NATION		PA needed.		1995 Discovery		Other: Not on the NPL; PA Start Needed					
424	TAYLOR REID #1 & 2 MINES	9	AZ	NND988071932	37 02' 47' ; 110 20' 51', MONUMENT VALLEY, NAVAJO NATION		Abandoned uranium mine. Years of operation: 1956 - 1966.	Navajo Nation	1990 Discovery 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	Very small	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals.	Soil and air	Navajo Superfund Program (928) 871-0859	
425	THORNE MILLSITE	9	AZ	AZD983484791	E OF HWY 87, MILEPOST 248, 3 MI S OF PAYSON, AZ		Small mill site. Ceased operation in 1980s.	Forest Service	1993 Discovery	500	Other: Not on the NPL; PA Start Needed		Sulfuric acid, drums			
426	THREE R MINE	9	AZ	AZ0000309260	THREE R CANYON RD, PATAGONIA, AZ	~388 ACRES	Mining. Years of operation: 1897 -1946.	S. Clark, Brancote Mining Limited, and Silver Eagle	1994 Discovery	Remote	Other: Not on the NPL; Site Reassessment Ongoing		Metals	Soil, sediment, and surface water		
427	TSE-TAH AGGREGATED URANIUM MINES	9	AZ	NN0001166321	T40N, R28E-R29E, TEEC NOS POS, NAVAJO NATION		PA needed.		1995 Discovery, Reclamation Complete (per information from Navajo Superfund Program)		Other: Not on the NPL; PA Start Needed					

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428	TUBA CITY ACID TANK	9	AZ	AZD981621899	COPPER MINE, TUBA CITY, AZ		10,000 gallon tank of sulfuric acid.	Navajo Indian Nation	Inactive, Removed in 1982		Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Other, Soil		
429	UNITED VERDE EXTENSION MINE	9	AZ	AZ0000309344	ADJ TO AZ STATE PARKS MINING MUSEUM, JEROME, AZ		No PA or SI report in file		1994 Discovery		Other: Not on the NPL; Site Reassessment Ongoing					
430	VULTURE MILL SITE	9	AZ	AZ0000262725	1067 TEGNER ST, HWY 90, WICKENBURG, AZ	~11 ACRES	Gold milling operation. Years of operation: 1863 - 1890s, 1959 - 1962.	G. Underdown	1994 Discovery 1999 SI	Apt. complex within 200 feet. 4,000 (2 MILES)	Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup		Lead and mercury	Soil, ground water, and surface water		
431	VULTURE MINE	9	AZ	AZ0001037282	12 M S ON VULTURE MINE RD, WICKENBURG, AZ	~110 ACRES	Mining and milling. Years of operation: 1864 - 1890s, 1988 - 1990.	AF Budge Mining	1995 Discovery, PA/SI 2002, NFRAP	Remote	Other: Not on the NPL; Combined PA/SI Ongoing		Metals and cyanide	Soil		
432	WHIRLWIND MINE	9	AZ	NND988071924	37 14' 53' ; 110 26' 40' MONUMENT VALLEY, NAVAJO NATION				1990 Discovery		Other: Not on the NPL; PA Start Needed					
433	WORLD'S FAIR MINE	9	AZ	AZ0000309351	5M SE OF AZ HWY 82 FLUX CANYON RD., PATAGONIA, AZ		Mining. Years of operation: 1879 - 1942 intermittently.	Coronado National Forest	1994 Discovery		Other: Not on the NPL; Fed Fac Preliminary Assessment Review Start Needed		Metals			
434	YAZZIE NO. 1 MINE	9	AZ	NND983466764	12.6M SE OF CAMERON/5M E OF COLORADO RIV, NAVAJO NATION	15 ACRES	Abandoned uranium mine.	Navajo Nation	1990 Discovery 1992 PA, Reclamation Complete (per information from Navajo Superfund Program)	Low	Other: Not on the NPL; SI Start Needed		Uranium and other heavy metals	Soil	Navajo Superfund Program (928) 871-0859	
435	ZULA MINE	9	AZ	AZD983484809	5M NORTHWEST OF RYE, AZ				1993 Discovery		Other: Not on the NPL; PA Start Needed				Forest Service Lead	
436	AEROJET GENERAL CORP.	9	CA	CAD980358832	HWY US 50 & AEROJET RD, RANCHO CORDOVA, CA	8,500 ACRES	Since 1953, Aerojet and its subsidiaries have manufactured liquid and solid propellant rocket engines for military and commercial applications; in addition, the Cordova Chemical Company operated chemical manufacturing facilities on the Aerojet complex from 1974 to 1979.		1980 Discovery, 2001 ROD	0 (1 MILE), 0 (3-4 MILES)	NPL Final	1983	VOCs, perchlorate and metals including arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, and zinc	Ground Water, Soil, Surface Water	Charles Berrey, (415) 972-3146	Don Hodge, 1-800-231-3075 or (415) 972-3240

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437	ALMADEN QUICKSILVER PARK	9	CA	CAD982029613	ALMADEN & MINE HILL RDS, SAN JOSE, CA	3,750 ACRES	Cinnabar (mercury) mine and processing. Years of operation: 1845 -1975.	Santa Clara County Park	1987 Discovery, 1989 SI	1,000 (1 MILE); 15,000 (4 MILES)	Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup		Mercury	Surface water, soil, air, and fish		
438	APPLE VALLEY MERCURY SITE	9	CA	CAN000905899	HURONS AVE., PIONEER RD., & ISATIS AVE., APPLE VALLEY, CA				2002 Removal		Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Solid Waste		
439	ARGONAUT MINE	9	CA	CAD983650011	ARGONAUT LANE, JACKSON, CA	60 ACRES	Large gold mining and milling operation. Years of operation: 1850 - 1942.	Ms. Van Horn	1992 Discovery, 1999 PA	Adjacent to homes, school	Other: Not on the NPL; PA Ongoing		Aresenic, lead, mercury, and cyanide	Soil, surface water, and ground water		
440	ATLAS ASBESTOS MINE	9	CA	CAD980496863	LOS GATOS CREEK RD NW OF FRESNO, COALINGA, CA	435 ACRES	The Atlas Asbestos Mine site operated from 1963 until 1979 and consists of the asbestos mine, a processing mill, support buildings, and extensive asbestos mine tailings.	federal government and private parties/ Wheeler properties	1979 Discovery, 1999 Construction Completion	0 (1 MILE), 2,700 (3-4 MILES)	NPL Final	1984	Asbestos, chromium, nickel	Air, Debris, Other, Sediment, Soil, Surface Water	Shea Jones, 415-972-3148	Jackie Lane, 1-800-231-3075
441	AURORA CANYON MILLSITE	9	CA	CA5141190566	NEAREST CITY BRIDGEPORT, CA	~5 ACRES	Gold and cinnabar (mercury) mine. Years of operation: 1960s - 1978.	BLM	1989 Discovery, 1992 SI	Rural, 1,400 (4 MILES)	Other: Not on the NPL; Site Reassessment Ongoing		Mercury and arsenic	Ground water, surface water, and soil		
442	BALAKLALA MINE	9	CA	CAD980814867	3 MI W OF I-5, 11 MI NW OF REDDING, CA		Copper mine with underground tunnels. Years of operation: 1902 - 1956. Included in the Shasta Mining District.	Silver King Mines	1973 Discovery, 1990 SI	Rural	Other: Not on the NPL; Site Reassessment Ongoing		Copper, zinc, and cadmium	Surface water, soil, food chain, drinking water		
443	BLACKROCK MINE	9	CA	CA4141190567	NEAREST CITY BISHOP, CA	50 ACRES	Gold and tungsten mine and mill site. Active to present.	BLM, Claimants	1989 Discovery	Rural	Other: Not on the NPL; PA Start Needed		Cyanide, lead, arsenic, and zinc	Sediment and soil		
444	CACTUS GOLD MINES COMPANY	9	CA	CASFN0905417	CACTUS ROAD, MOJAVE, CA		Gold mine. Years of operation: 1930s to present.	Cactus Gold Co.	1997 Discovery, 1999 PA	Rural	Other: Not on the NPL; PA Ongoing		Mercury, cyanide, and lead	Air and soil		
445	CELTOR CHEMICAL WORKS	9	CA	CAD980638860	BETW NORTON FLD & TRINITY RIV, HOOPA, CA	2 ACRES	The Celtor Chemical Works site, located in the northern Hoopa Valley Indian Reservation, is a former ore concentrating facility that processed sulfide ore for copper, zinc, and precious metal extraction. From 1958 until 1962, copper, zinc, and precious metals were recovered on site from sulfide ore mined and trucked to Celtor from the nearby Copper Bluff Mine. In 1962, Celtor Chemical Corporation abandoned the site and mine tailings generated from the milling operations were left on site.	Hoopa Valley Indian Reservation	1981 Discovery, 1989 Construction Completion IR action in 1983 included excavation and offsite disposal of all visibly contaminated material.	0 (1 MILE), 900 (3-4 MILES)	NPL Final	1982	Arsenic, cadmium, copper, lead, zinc, acidic leachate	Air, Ground Water, Soil, Surface Water	Beatriz Bofill, (415) 744-2235	1-800-231-3075

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446	CENTRAL EUREKA MINE	9	CA	CA0000726539	HWY 49 AT BRYSON DR., SUTTER CREEK, CA	10 ACRES			1994 Discovery		Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Soil		
447	CIMA ROAD MINE WASTE SITE	9	CA	CAN000905903	1 MIL W OF INTE. 15 OFF CIMA ROAD, CA						Other: Not on the NPL; PA Start Needed					
448	COALINGA ASBESTOS MINE	9	CA	CAD980817217	PINE CYN 15 MI NW OF COALINGA, CA	557 ACRES	The mill was operated by the Coalinga Asbestos Company from 1962 to 1974. All operations ceased in 1977. The site consists of partially demolished mill buildings and a process waste mine tailings pile that occupies about 20 acres. Two large open-pit mines are located above the mill site and were used as the sources of ore for the Coalinga Asbestos Company milling operations.		1979 Discovery, 1998 Deletion	7,500 (1 MILE), 8,000 (3-4 MILES)	Deleted from the Final NPL	1984	Asbestos	Air, Sediment, Soil, Surface Water	Shea Jones, 415-972-3148	Jackie Lane, 1-800-231-3075
449	COPPER MOUNTAIN MINE	9	CA	CAD983641366	OFF HWY 299 4MI NW OF REDDING, CA				1992 Discovery, 2001 PA		Site is Part of NPL Site					
450	GAMBONINI MERCURY MINE	9	CA	CA0002322469	1403 WILSON HILL ROAD, PETALUMA, CA	10 ACRES	Mercury mine. Years of operation: 1968 - 1972.		1998 Discovery, 2001 PA	Rural	Other: Not on the NPL; Combined PA/SI Ongoing		Mercury, methyl-mercury	Soil, Surface Water		
451	GIBRALTAR MINING CO.	9	CA	CA1122390437	6144 CALLE REAL, GOLETA, CA	15 ACRES	Mercury mine. Years of operation: 1860 - 1969.	Forest Service	1987 Discovery, 1995 PA	Rural, 10 (4 MILES). Adjacent to drinking water reservoir	Other: Not on the NPL; SI Start Needed		Mercury, methyl-mercury	Surface water and drinking water		
452	GREY EAGLE MINE	9	CA	CAD000629923	BORDERING INDIAN CREEK; 5 MI NORTH OF, HAPPY CAMP, CA	20 ACRES, 475,000 cubic yards	Copper, gold, and silver mine and mill. Years of operation: 1895 - early 1900s, 1941 - 1945, 1981 -1986.	Norando Mining	1999 Removal	Rural	Other: Not on the NPL; PA Start Needed		Arsenic, iron, copper, zinc, sulfuric acid	Soil, Surface Water		
453	IRON MOUNTAIN MINE	9	CA	CAD980498612	OFF HWY 299 9 MI NW OF, REDDING, CA	1900 ACRES	1897-1978 iron, silver, gold, copper, zinc and pyrite mine; Production Facility	Iron Mountain Mines, Inc.	1981 Discovery 2001 RD Inactive	12 (1 MILE), 500 (3-4 MILES)	NPL Final	1983	Sulfuric acid, copper, zinc, and cadmium	Air, Ground Water, Other, Sediment, Soil, Solid Waste, Surface Water	Richard Sugarek, 415-744-2226	David Cooper, 1-800-231-3075
454	KLAU/BUENA VISTA MINE	9	CA	CA1141190578	T 26S, R 10E, SEC 33, S1/2 MT DIABLO MER, PASO ROBLES, CA	20 ACRES	Mercury processing. Years of operation: approximately 100 years.	Private	1991 Discovery	Rural/recreational	Other: Not on the NPL; HRS Completed		Mercury and acid mine drainage	Other, Sediment, Soil, Surface Water	Matt Mitguard, (415) 972-3096	
455	LAVA CAP MINE	9	CA	CAD983618893	14501 LAVA CAP MINE ROAD, NEVADA CITY, CA	>20 and <100 ACRES	1861-1943		1991 Discovery 1999 Listing	>100, <=1,000 (1 MILE), >10,000, <=100,000 (3-4 MILES)	NPL Final	1999		Soil	David Seter, 415-744-2212	Don Hodge, 1-800-231-3075
456	LEONA HEIGHTS SULPHUR MINE	9	CA	CASFN0905409	END OF MCDONNELL AVE NEAR, OAKLAND, CA				1999 PA		Other: Not on the NPL					
457	LEVIATHAN MINE	9	CA	CAD980673685	MARKLEEVILLE, CA	>100 ACRES	1863-1962; Production Facility		1981 Discovery 2001 Listing Inactive	0 (1 MILE), 0 (3-4 MILES)	NPL Final	2000		Liquid Waste, Surface Water	Kevin Mayer, (415) 972-3176	Vicki Rosen, (415) 972-3244
458	MAMMOTH MINE	9	CA	CAD980814925	5 MI W OF I-5, 13 MI NW OF, REDDING, CA	7,000 ACRES	Inactive copper mine. Years of operation: 1860s - 1960.	Mining Remedial Recovery Company	1973 Discovery 1990 SI	Rural/recreational	Other: Not on the NPL; ESI Ongoing		Acid mine drainage, cadmium, copper, and zinc	Soil, sediment, and surface water		

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459	MAMMOTH MINE AKA Shasta Mining District	9	CA	CASFN0905576	2 MILES NORTH OF SHASTA DAM, SHASTA LAKE, CA	7,000 ACRES	Includes these mines in the Shasta Mining District - Keystone, Stowell, Balaklala, Shasta King, Early Bird, and Golinsky Mines	Mining Remedial Recovery Company	1999 Discovery	Rural/recreational	Other: Not on the NPL; HRS Completed		Acid mine drainage, cadmium, copper, and zinc	Soil, sediment, and surface water		
460	MORNING STAR MINE	9	CA	CA0000466748	15M NE OF CIMA, CA				1994 Discovery		Other: Not on the NPL; Referred to Removal - Further Assessment Needed					
461	NEW IDRIA MERCURY MINE	9	CA	CA0001900463	TOWNSHIP: 17S, RANGE: 12E, NEW IDRIA, CA	20 ACRES	Mercury processing operation. Operated for approximately 100 years.	Private	1996 Discovery 1998 SI	Rural	Other: Not on the NPL; HRS Start Needed		Mercury and acid mine drainage	Sediments	Matt Mitguard, (415) 972-3096	
462	POLAR STAR MINE	9	CA	CASFN0905494	0.5 MI N OF DUTCH FLAT, CA	500 feet of sluice tunnel	Gold mining operation. Years of operation: 1850s - 1880s.	Private	2000 Removal	Rural	Other: Not on the NPL; PA Start Needed		Mercury	Soil and sediment		
463	RINCONADA MINE	9	CA	CA0141190579	T 30S, R 14E, SEC 21, S 1/2 MT DIABLO ME, PASO ROBLES, CA			BLM	1991 Discovery		Other: Not on the NPL; PA Start Needed					
464	SISKON MINE	9	CA	CA0000878058	T14N, R5E, SECS. 20-29, SOMES BAR, CA	1,280 ACRES	Gold and silver mine, including open pits, adits, and processing operations. Years of operation: early 1900s - 1991.	Forest Service - patent holders	1994 Discovery 1995 PA	Rural	Other: Not on the NPL; SI Start Needed		Cyanide, arsenic, copper, and mercury	Surface water and soil		
465	SOLAMBO MINE	9	CA	CA2141190569	NEAREST CITY COULTERVILLE, CA	10 ACRES	Active copper mine. Years of operation: 1886 - 1908, present.	BLM	1989 Discovery	Rural, adjacent to a reservoir	Other: Not on the NPL; PA Start Needed		Mercury, copper, silver, lead, and zinc	Soil, sediment, and surface water		
466	SOUTHERN CROSS MINE	9	CA	CASFN0905456	0.5 MI N OF DUTCH FLAT, CA						Other: Not on the NPL; PA Start Needed					
467	STAR KING MINE	9	CA	CASFN0905529	A.P.#062-240-05-0, 2 MI TUOLUMNE CITY, CA				1994 Discovery		Other: Not on the NPL; PA Start Needed					
468	SULPHUR BANK MERCURY MINE	9	CA	CAD980893275	SULPHUR BANK ROAD, CLEAR LAKE, CA	143 ACRES	Mined for sulfur from 1865 to 1871. Mercury ore was mined intermittently by underground methods from 1873 to 1905. The site periodically was opened for pit mining from 1915 to 1957. The mine, once one of the largest producers of mercury in California, has been inactive since 1957.		1985 Discovery 1990 Listing	0 (1 MILE), 2,150 (3-4 MILES)	NPL Final	1990	Mercury, arsenic	Air, Ground Water, Soil, Surface Water	Richard Sugarek, (415) 972-3151	Wenona Wilson, 1-800-231-3075
469	US FOREST SERV - CAL COPPER CO	9	CA	CA7122390084	SEC 1-5,9,10,12,25 T21N R13E, QUINCY, CA				1979 Discovery 1980 PA		Other: Not on the NPL; SI Start Needed					
470	WALKER MINE	9	CA	CA9141190570	SEC18 T24 R12E 20 MI E OF QUINCY, CA		Milling and mining operation. Operated for 25 years.		1986 Discovery 1993 PA		Other: Not on the NPL; SI Start Needed					

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471	ANACONDA COPPER CO	9	NV	NVD083917252	YERINGTON MINE, YERINGTON, NV	~3,500 ACRES	Low grade copper mining and ore processing facility. From 1951 - 1978 was owned and operated by Anaconda Copper Co. Currently owned by ARCO. Years of operation: 1953 -1965 mined Yerington Pit for copper.	ARCO	1979 Discovery, 2000 ESI	~5,000	Other: Not on the NPL; Status Not Specified		Copper and arsenic	Ground water and surface water	Bonnie Arthur, (415) 972-3030	
472	ARGENTUM MILL	9	NV	NVD980637540	NE1/4 SEC 17 T3N R36E, COLUMBUS MARSH, DYER, NV	300 ACRES	Inactive 1950s until current. Years of operation: gold an silver flotation mill 1952 -?, gold and silver processing facility 1893 -1917, borax milling facility 1880 -1893.	BLM	1981 Discovery, 1992 PA	in 1992 < 10, very few people live nearby	Other: Not on the NPL; SI Start Needed		Heavy metals and cyanide	Surface water (wetland) and ground water	Dana Barton, (415) 972-3087	
473	BARRICK GOLD STRIKE MINE - BLM	9	NV	NVD000626531	27 M NORTH OF CARLIN-T36N R493 SEC 9-16, EUREKA, NV	7,679 ACRES	Gold mining, milling, and refining facility. Active mine.	Barrick	1991 Discovery, 1993 SI	no one lives within 4 miles of the site	Other: Not on the NPL; Other Cleanup Activity: Federal Facility-Lead Cleanup		Arsenic, cadmium, chromium, mercury, iron, lead, and manganese	Ground water and surface water	Dana Barton, (415) 972-3087	
474	CARSON RIVER MERCURY SITE	9	NV	NVD980813646	DEER RUN RD TO DAYTON IN RIV, DAYTON, NV	50 MILE	The site includes mercury-contaminated soils at former mill sites, mercury contamination in waterways adjacent to the mill sites, and mercury contamination in sediments, fish and wildlife over more than a 50 mile length of the Carson River, beginning near Carson City, Nevada and extending downstream to the Lahontan Valley and Carson Desert. Contamination at the site is a legacy of the Comstock mining era of the late 1800s, when mercury was imported to the area for processing of gold and silver ore.	various	1983 Discovery, 2000 RA Mercury laden tailings were excavated and treated in 1990 and 1992.	0 (1 MILE), 0 (3-4 MILES)	NPL Final	1990	Mercury, lead, arsenic	Other, Sediment, Soil, Solid Waste, Surface Water	Wayne Praskins, (415) 972-3181	Wenona Wilson, 1-800-231-3075 or (415) 744-2182
475	EAGLE 1 MILL SITE	9	NV	NV0001995604	T26S, R64E, SEC 14, NELSON, NV				1997 Discovery		Other: Not on the NPL; PA Start Needed			Soil, Solid Waste		
476	EGAN MILLING CO INC	9	NV	NVD980419550	1 MI N OF CY OF ELY SAN LDFL, ELY, NV	60 ACRES	Gold and silver processing/milling plant. In addition, lead, zinc, tungsten, and silver was processed. 1963. Drums have been removed. Site is addressed as Brownfields project.	City of Ely	1980 Discovery, 2000 ESI	5,600	Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup			Soil	Dana Barton, (415) 972-3087	
477	GLENDALE	9	NV	NVD981622780	NR I-5, SPARKS, NV		Production Facility				Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)			Air, Ground Water, Other, Soil, Surface Water		
478	MINERALS MGMT INC ARGENTUM MILL See Argentum mill (same site)	9	NV	NVD980817670	BETWEEN HWY 6 & 95, COLUMBUS MARSH, NV						Not Valid Site or Incident					

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479	RIO TINTO COPPER MINE	9	NV	NV3141190030	SEC 10 & 11 T45N R53E MDM, MOUNTAIN CITY, NV	~2,000 ACRES	High-grade copper ore was mined from 1932 until 1947 utilizing underground mining techniques and a flotation mill. The mine produced over 1 million tons of ore. From 1966 through 1972 an acid leaching operation processed existing tailings.	Doris Widerburg, Kansas. However, four former owners/operators (ARCO, Cleveland Cliffs Iron Co., E.I. Dupont de Nemours and Co., and Cominco American, Inc.) have entered an AOC for site cleanup w/NDEP.	1979 Discovery 2000 ESI	Rural 182 (3 MILES)	Other: Not on the NPL; Status Not Specified		Copper, cadmium, and zinc	Surface water		
480	STANDARD SLAG CO-ATLANTA MINE	9	NV	NVD062943865	OFF I 93 50 MI NE OF PIOCHE, NV	33 ACRES	Inactive gold and silver mine. Milling occurred between 1975 and 1985 although the mine operated in 1872 - ?	BLM	1980 Discovery 1982 PA	no one lives within 4 miles of the site	Other: Not on the NPL; SI Start Needed		Metals and cyanide	Soil	Dana Barton, (415) 972-3087	
481	UNITED MINING CORP. AKA Comstock Gold Mine	9	NV	NVD981989627	BRUNSWICK CYN 8 MI E CARSON, VIRGINIA CITY, NV	~25 ACRES	United Mining was a cyanide extraction mill for gold ores brought in from nearby pit mines. Years of operation: 1920 - 1936, milling 1978 - 1983.	Siskon Corp.	1987 Discovery 1990 SI	~2,000	Other: Not on the NPL; HRS Start Needed		Sodium, cyanide, sodium hydroxide, barium, zinc, and lead	Ground water, surface water, and air		
482	THOMPSON CREEK MINING COMPANY	10					This is an active mine site.								Matt Wilkening, 208-378-5760	
483	CINNABAR CREEK MINE AKA ALASKA ST OF CINNABAR CREEK	10	AK	AKD981774698	T8N R55W SEC 13, KASHEGELOK, AK				1988 Discovery, 2001 SI		Other: Not on the NPL; Status Not Specified					
484	KIMSHAM COVE	10	AK	AK0002364776	T48S R57E SEC24, CHICHAGOF ISL, SITKA, AK				1998 Discovery 1999 ESI		Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup					
485	MOUNTAIN TOP MINE	10	AK	AKSFN1002134	T15S R49W SEC12, SEWARD MERIDIAN, ANIAK, AK				1999 Discovery		Other: Not on the NPL; Status Not Specified					
486	USDA FS TONGASS NF: BOKAN MOUNTAIN MINE AKA ROSS ADAMS MINE	10	AK	AK0001897586	PRINCE OF WALES IS, 33 MI SE OF CY, HYDABURG, AK				1997 Discovery		Other: Not on the NPL; Fed Fac Site Inspection Review Ongoing					
487	USDOI BLM BOSTIK INC HOOSIER CREEK	10	AK	AKSFN1002091	80 MI NW OF FAIRBANKS, RAMPART, AK						Other: Not on the NPL; NFRAP					

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488	USDOI NPS DENALI NP RED TOP MINE	10	AK	AK0000638015			High-grade lead-silver ore; operational from 1920-1973				Other: Not on the NPL; NFRAP		Heavy metals	Surface water, soils		
489	USDOI NPS KENAI FJORDS NP&P:BEAUTY BAY MINE	10	AK	AK0001209063	1 MI NW OF BEAUTY BAY BEACHHEAD, SEWARD, AK				1995 Discovery		Other: Not on the NPL; Other Cleanup Activity: Federal Facility-Lead Cleanup					
490	USDOI BLM RED DEVIL MINE WASTE PONDS	10	AK	AKD980495618	8 MI DOWNSTREAM FROM SLEETMUTKUSKOKWIM RIVER, RED DEVIL, AK 99656		Mercury mine, operated from 1933-1971. Federal facility on Indian Land. Possible sources include mine adits, inclined shafts, a retort, a tailings pile, settling ponds, five large above ground fuel tanks, and drum storage areas.				Other: Not on the NPL; Status Not Specified		Mercury, arsenic, antimony, lead	Soils, maybe some sediments		
491	BLACKBIRD MINE	10	ID	IDD980725832	BLACKBIRD MINE, LEMHI COUNTY, ID	>100 ACRES	Since the late 1800s, several companies have mined cobalt and copper on the site with both mine tunnels and open-pit methods. The current owner, the Noranda Mining Company, ceased operations in 1982.		1983 Discovery, 1993 Proposal	0 (1 MILE), >0, <=10 (3-4 MILES)	NPL Proposed		Heavy metals such as copper, cobalt and arsenic	Ground Water, Sediment, Soil, Solid Waste, Surface Water	Fran Allans, 208-378-5775	Mark Masarik, 208-378-5761
492	BUNKER HILL MINING & METALLURGICAL COMPLEX	10	ID	IDD048340921	834 MCKINLEY AV, SMELTERVILLE, ID	21 SQ MI	Mining operations began in 1889, with lead smelting starting in 1917. Production Facility, 1890-1982	ASARCO	1980 Discovery, 1992 ROD 1986 removal action of 6 inches contaminated soil from 16 public properties, 1989 removal of 6 - 12 inches from 81 homes and 2 apartment complexes. OU2 ROD amended in 1996 to require containment of all principal threat material, except mercury, instead of	3,500 (1 MILE), 5,000 (3-4 MILES)	NPL Final	1983	Antimony, arsenic, cadmium, copper, lead, mercury, zinc, pcbs, asbestos	Debris, Ground Water, Liquid Waste, Other, Sediment, Soil, Solid Waste, Surface Water	Earl Liverman, (208) 664-4858; Mary Kay Voytilla, (206) 553-2712; Sean Sheldrake, (206) 553-1220; Cami Grandinetti (206) 553-8696	Site wide - Marianne Deppman, (206) 553-1237; Backup - Debra Sherbina, (206) 553-0247; Peoples Action Coalition, Barbara Miller, (208) 784-8891
493	CINNABAR MINE	10	ID	ID980665160	15 MILES OUTSIDE YELLOW PINE, VALLEY COUNTY, ID ON FS RD 412 TO 374; LONG 115 17' 16", LAT 44 55' 26"	50 ACRES	Mercury mining operation from 1921-1958, included mine adits, ore and mercury processing and disposal of tailings.		1996 and 1998, Removal of chemicals, stabilization of tailings, and re-routing of creek drainage		Other: Not on the NPL; Status Not Specified		Primarily mercury, but arsenic present also		Jeffry Rodin	

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494	CLAYTON SILVER MINE	10	ID	IDD000135798	1.5 MILES NORTH OF CLAYTON, CUSTER COUNTY, ID, SECTION 13, TOWNSHIP 11 NORTH, RANGE 16 EAST	33 ACRES	The site is an abandoned silver, lead, and zinc mine and mill that operated from approximately 1932 to 1985. Tailings fines from the mill process were deposited behind a dike structure that resulted in a 16 acre tailings pile. Site also includes an adit discharge.		1999, Removal to inventory and remove mill and lab chemicals left at the site when abandoned; 2001, Removal to stabilize tailing pile and construct a stable creek channel		Other: Not on the NPL; Status Not Specified		Various metals, including lead, arsenic, zinc and cadmium	Surface water and sediments	Matt Wilkening, 208-378-5760	
495	COMEBACK MINE	10	ID		1.5 MILES NORTH OF PIONEERVILLE, BOISE COUNTY, ID, SECTION 25, TOWNSHIP 8 NORTH, RANGE 5 EAST		The site is an inactive (abandoned) gold mine that operated from 1984-1986. The mine utilized a heap leaching process using sodium cyanide to treat ore. Cyanide contaminated water was contained in two on-site impoundments.		1986, EPA Removal; 1999 State work to close out the impoundments		Other: Not on the NPL; Status Not Specified		Cyanide, arsenic, and lead	Surface water, site soils	Matt Wilkening, 208-378-5760	
496	CONTINENTAL MINE	10	ID	IDN001002317	END OF BLUE JOE CREEK ROAD, PORTHILL, ID						Other: Not on the NPL; Removal Only Site (No Site Assessment Work Needed)					
497	EASTERN MICHAUD FLATS CONTAMINATION	10	ID	IDD984666610	HWY 30, 3 MI W OF POCATELLO, ID	2,530 ACRES	Within the site boundaries are two adjacent phosphate ore processing facilities, the FMC Corporation and the J.R. Simplot Company, both of which are active facilities that have been in operation since the 1940s.	FMC Corporation and J.R. Simplot	1979 Discovery, 1998 ROD	34 (1 MILE), 47,000 (3-4 MILES)	NPL Final	1990	phosphorous, fluoride, arsenic, beryllium, cadmium, chromium, vanadium, uranium-238 and decay products	Air, Ground Water, Liquid Waste, Sediment, Soil, Surface Water	Wallace Reid, 206-553-1728	Charles Bert, 206-553-0225
498	GOLD CREEK-SHOSHONE MILL F	10	ID	IDN001002266	FS ROAD 1017, BAYVIEW, ID				2001 Discovery		Other: Not on the NPL; PA Start Needed					
499	GROUSE CREEK	10	ID	ID 1002152	NEAR SUNBEAM, CUSTER COUNTY, ID	67 ACRES (AREA OF POND BEING ADDRESSED UNDER CERCLA)	Inactive hardrock facility operations ceased in April, 1997. Open pit mining, cyanide leaching process to extract gold. Tailings and process water stored in pond 1, approximately 500,000,000 gallons of water in the pond.		Non-time critical removal actions with USFS as lead agency				Cyanide, ammonia, selenium, and mercury (potential acid generating tailings in the pond currently covered by effluent)	Ground Water, surface water	Matt Wilkening, 208-378-5760	
500	KINROSS DELAMAR MINE	10	ID		OWYHEE COUNTY IN SE ID, AT APPROXIMATELY N43, W117.	1000 ACRES	This is an inactive gold mine that was operated from approximately late 1970's to late 1990's. The facility is located in an historic mining district and there are historic workings dating to the 1870's throughout the area. Most recent generation of mining employed open pit mining methods. Processing primarily using cyanide vat leach, with tailings disposed of into large unlined impoundments. Previous operators also used cyanide heap leaching for a time. This site has serious reclamation challenges. The State of Idaho is providing oversight of reclamation, and holds a reclamation bond for the site. EPA believes the financial assurance for the site is grossly inadequate, and is tracking progress of reclamation.		EPA tracking progress of reclamation on site, currently being supervised by State of ID.				Various contaminates including metals, CN, Se acid drainage.		Matt Wilkening, 208-378-5760	
501	MINNIE MOORE MINE	10	ID	IDN001002295	2 MI W ON BRADFORD RD FROM BELLEVUE, ID				2001 Discovery		Other: Not on the NPL; PA Start Needed					

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
502	MONSANTO CHEMICAL CO. (SODA SPRINGS PLANT)	10	ID	IDD081830994	HWY 34, 2 MI N OF CY, SODA SPRINGS, ID	530.0 ACRES	1952-1988 phosphate ore processing plants	Monsanto	1979 Discovery 2000 Construction Completion	23 (1 MILE), 3,000 (3-4 MILES)	NPL Final	1990	Arsenic, beryllium, cadmium, manganese, silver, vanadium, zinc, molybdenum, fluoride, lead,radium, thorium, uranium, zinc, lead, nitrate, selenium, vanadium	Air, Ground Water, Other, Sediment, Soil, Surface Water	Wallace Reid, 206-553-1728	Charles Bert, 206-553-0225
503	STIBNITE/YELLOW PINE MINING AREA	10	ID	IDD980665459	T18N R9E S3, 14 MI E OF YELLOW PINE, ID ON FOREST RD, STIBNITE, ID	>20 AND <100 ACRES	Mining and milling of gold-antimony ore was begun in the 1930s. A smelter was constructed at Stibnite in 1948 to refine concentrates from the mill. Exploration of gold reserves in the area resumed in 1970, and from 1979 through 1991 the Canadian Superior Mining (CSM) Company constructed and operated a successful cyanide heap-leaching process to recover gold from low-grade ore.		1979 Discovery 2001 HRS Package	0 (1 MILE), 0 (3-4 MILES)	NPL Proposed		Arsenic, cyanide	Solid Waste, Surface Water		
504	TALACHE MINE	10	ID	ID0002007250	INTERSECTION MINE HILL & MIDDLE FORK RDS, ATLANTA, ID				1997 Discovery 2001 SI		Other: Not on the NPL; Pre-proposal Site			Solid Waste, Soil, Surface Water		
505	TRIUMPH MINE TAILINGS PILES	10	ID	IDD984666024	TRIUMPH, ID	>20 AND <100 ACRES	From 1882 until 1957, the Triumph Mine processed silver, zinc, and lead ore. These operations involved crushing, grinding, and flotation activities. The slurry remaining from the flotation process was pumped into the upper pile from 1882 until 1930, and into the lower pile for the remaining years of site operations.		1988 Discovery 1998 ROD	>10, <=100 (1 MILE), >100, <1,000 (3-4 MILES)	NPL Proposed		Lead, arsenic	Air, Ground Water, Sludge, Soil, Surface Water	Mark Masarik, 208-378-5761	
506	USDA FS CARIBOU NF:SOUTH MABEY CANYON CROSS VALLEY FILL SITE	10	ID	ID0002340214	T8S R44E S10, 11, 14, 15, CONDA, ID				1998 Discovery		Other: Not on the NPL; Other Cleanup Activity: Federal Facility-Lead Cleanup					
507	USDA FS SAWTOOTH NF:BASSETT GULCH MILL	10	ID	ID0001766815	T4N R17E S20 NE1/4 SE1/4, KETCHUM, ID				1997 Discovery		Other: Not on the NPL; Other Cleanup Activity: Federal Facility-Lead Cleanup					
508	BALD MOUNTAIN MINE	10	OR	ORSFN1002193	T9S R36E SEC3, WILLAMETTE MERIDIAN, SUMPTER, OR						Other: Not on the NPL; NFRAP					
509	BELLE OF BAKER MINE	10	OR	ORSFN1002194	T8S R36E S35, WILLAMETTE MERIDIAN, SUMPTER, OR				1999 Discovery, 2001 PA		Other: Not on the NPL; SI Start Needed					
510	BRETZ MINE	10	OR	ORN001002311	BRETZ MINE RD OFF CTY RD 592, 12 MI NW, BASQUE, OR				2001 Discovery		Other: Not on the NPL; PA Start Needed					
511	CALIFORNIA MINE/MILL	10	OR	ORN001002343	N OF NF DEVELOPMENT RD 5540, SUMPTER, OR				2002 Discovery, 2002 PA		Other: Not on the NPL; PA Ongoing					
512	COLUMBIA MINE	10	OR	ORSFN1002196	0.5 MI W OF BOURNE ON FRUIT CREEK ROAD, BOURNE, OR				1999 Discovery		Other: Not on the NPL; SI Start Needed					

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
513	EUREKA & EXCELSIOR MINE	10	OR	ORSFN1002197	0.5 MI NW OF BOURNE ON BOURNE ROAD, BOURNE, OR				1999 Discovery		Other: Not on the NPL; SI Start Needed					
514	FORMER NONPAREIL MINE	10	OR	ORN001002261	NONPAREIL RD & LONG VALLEY RD, SUTHERLIN, OR						Other: Not on the NPL; NFRAP					
515	FREMONT NATIONAL FOREST/WHITE KING AND LUCKY LASS URANIUM MINES (USDA)	10	OR	OR7122307658	524 N G STREET, LAKEVIEW COUNTY, OR	140 ACRES	The site encompasses 140 acres affected by uranium mining activities which occurred during the 1950s and 1960s: acid mine drainage affected a wetlands and creek; radioactive ore and soil stockpiles cover the site and pose some risk to residents or recreational users. After mining ceased, the open mine pits filled with water.		1989 Discovery, 2001 ROD	0 (1 MILE), 0 (3-4 MILES)	NPL Final	1995	Heavy metals and radioactivity	Ground Water, Sediment, Soil, Solid Waste, Surface Water	Bill Adams, 206-553-2806	
516	GOLCONDA MINE	10	OR	ORSFN1002198	7.5 MI N OF SUMPTER ON FRUIT CREEK RD, BOURNE, OR				1999 Discovery		Other: Not on the NPL; SI Start Needed					
517	GRAND TRUNK MINE	10	OR	ORSFN1002199	T9S R36E S3, WILLAMETTE MERIDIAN, SUMPTER, OR				1999 Discovery 2001 PA		Other: Not on the NPL; SI Start Needed					
518	HIGHLAND MINE	10	OR	ORN001002305	1 MI OFF ROCK CREEK RD/USFS RD #5520, HAINES, OR				2001 Discovery		Other: Not on the NPL; PA Start Needed					
519	IBEX MINE	10	OR	ORSFN1002200	USFS RD #100, 6 MI E OF GRANITE, OR				1999 Discovery 2001 PA		Other: Not on the NPL; SI Start Needed					
520	IMPERIAL MINE/MILL	10	OR	ORN001002345	N OF NF DEVELOPMENT RD 5540, SUMPTER, OR				2002 Discovery		Other: Not on the NPL; Combined PA/SI Ongoing					
521	MAMMOTH MINE	10	OR	ORSFN1002201	T3S R36E SEC 35, WILLAMETTE MERIDIAN, SUMPTER, OR						Other: Not on the NPL; NFRAP					
522	MARTIN-MARIETTA ALUMINUM CO.	10	OR	ORD052221025	3313 W 2ND ST, THE DALLES, OR	325.0 ACRES	1958-1984 aluminum processing	Martin Marietta	1981 Discovery 1996 Deletion three units of operation taken out of service after ROD approval: lined pond, discharge channel, recycle pond	0 (1 MILE), 0 (3-4 MILES)	Deleted from the Final NPL	1984	VOCs, TCE, PAHs, asbestos, cyanide, arsenic	Ground Water, Leachate, Soil, Surface Water	Kathy Ivy, 206-553-0040	
523	NORTH POLE MINE	10	OR	ORSFN1002203	1.15 MI N OF BOURNE OFF NFD 5505 ROAD, BOURNE, OR				1999 Discovery		Other: Not on the NPL; SI Start Needed					
524	OPALITE MINE	10	OR	ORN001002255	T4OS R40E S33, 15 MI E OF HWY 95, 4 MI N, BASQUE, OR				2001 Discovery 2001 PA		Other: Not on the NPL; PA Ongoing					

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
525	REYNOLDS METALS COMPANY	10	OR	ORD009412677	NE SUNDIAL RD TROUTDALE, OR MULTNOMAH COUNTY	>100 ACRES	Primary aluminum reduction plant where alumina from bauxite ore was converted to aluminum, 1941-1991		1979 Discovery 1994 Listing	>10, ≤ 100 (1 MILE), >10,000, ≤ 100,000 (3-4 MILES)	NPL Final	1994	Aluminum, barium, manganese, cyanide, fluoride, arsenic, beryllium, fluoride, and tetrachloroethene (PCE)	Debris, Ground Water, Sediment, Soil, Surface Water	Chip Humphrey, 503-326-2678	Judy Smith, 206-553-6246
526	TELEDYNE WAH CHANG	10	OR	ORD050955848	MILLERSBURG, OR	60 ACRES	The Oremet-Wah Chang (OWC) plant (formerly Teledyne Wah Chang) plant is one of the country's largest producers of zirconium and other rare earth metals and alloys. Production at the site began in 1957.		1995 RI, NPL Listing 1983	20,000 (3 MILES)	NPL Final	1983	Thorium, uranium, radium, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), heavy metals	Ground Water, Soil, Sediments, Sludges	Kevin Rochlin, 206-553-2106	
527	USDOI BLM GLASS BUTTES MINE & RETORTS SITE	10	OR	ORN001002307	3 MI S OF MILEPOST 82 OFF HWY 20, BROTHERS, OR						Other: Not on the NPL; Status Not Specified					
528	ALCOA (VANCOUVER SMELTER)	10	WA	WAD009045279	5509 LOWER RIVER RD, VANCOUVER, WA	300 ACRES	The Aluminum Company of America (ALCOA) operated an aluminum smelter in 1940 on a 300-acre site next to the Columbia River in Vancouver, Washington.		1980 Discovery, 1996 Deletion	210 (1 MILE), 49,636 (3-4 MILES)	Deleted from the Final NPL	1990	Cyanide, fluoride, alumina	Ground Water, Sludge, Soil	Beverly Gaines, 206-553-1066	Washington Department of Ecology
529	ALDER MILL	10	WA	WAD980722847	T33N R22E S17,18, TWISP, WA				1981 Discovery, 1986 SI		Other: Not on the NPL; Referred to Removal - Further Assessment Needed			Ground Water		
530	ALDER MINE	10	WA	WASFN1002142	3 MI SE OF TWISP ON ALDER CREEK, TWISP, WA				1999 Discovery, 2001 PA		Site is Part of NPL Site					
531	ANDERSON-CALHOUN MINE	10	WA	WAN001002309	1 MI N OF LEADPOINT, LEADPOINT, WA				2000 Discovery		Other: Not on the NPL; Status Not Specified					
532	BELLA MAY MINE	10	WA	WAN001002318	T39N R43E S29 SW1/4, METALINE, WA				2000 Discovery, 2001 PA		Other: Not on the NPL; Status Not Specified					
533	BLUE BUCKET MINE	10	WA	WAN001002319	T39N R43E S32 N1/2, METALINE, WA				2000 Discovery		Other: Not on the NPL; Status Not Specified					
534	BONANZA MILL	10	WA	WASFN1002221	LAT 48 34' 45"N, LONG 17 57' 24"W, LOCATED APPROXIMATELY 3 MILES NOTH OF COLVILLE, WA, ALONG US HWY 395		Inactive hardrock mine accessed via adit; extracted ore was transported to off-site mill where it was processed, including crushing, grinding, gravity separation, and concentration; operated from 1885-1952.		2002, Time critical removal action memorandum signed and will be initiated on or about 10/15/02		Other: Not on the NPL; Status Not Specified		Aresenic, cadmium, mercury, and lead		Earl Liverman, 208-664-4858	

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
535	COMMENCEMENT BAY, NEAR SHORE/TIDE FLATS	10	WA	WAD980726368	ADJ TO RUSTON WAY & TIDEFLATS IND. AREA, PIERCE COUNTY, WA	12 SQ MI	Prior to 1890, sawmills were active in the area and deposited wood waste along the shoreline. From 1890 through 1912, the property was used as a lead smelter and refinery. Asarco purchased the property in 1905 and converted it in 1912 into a facility to smelt and refine copper from copper-bearing ores and concentrates shipped in from other locations. By-products of the smelting operations were further refined to produce other marketable products, such as arsenic, sulfuric acid, liquid sulfur dioxide, and slag. Asarco ended operation of the smelter in 1985. Many of the smelter buildings and structures were constructed on slag fill. The shoreline was extended when molten slag from smelting operations was poured into Commencement Bay.	various	1979 Discovery, 2000 ROD Modifications to the ROD include new estimate of 78,600 cy soil to be treated; revised cleanup goals; larger cap area, modifications to stabilization mix; increase remediation costs of $15-$18 million (OU23).	0 (1 MILE), 10,000 (3-4 MILES); 158,501 people in Tacoma	NPL Final	1981	Benzene, PAHs, PCBs, lead, mercury, zinc, arsenic, 4-methylphenol, cadmium, nickel, asbestos, antimony, hexachlorobutadiene, chlorinated benzenes, chlorinated ethenes, phenol, 2-methylphenol	Air, Debris, Ground Water, Other, Sediment, Sludge, Soil, Solid Waste, Surface Water	Peter Contreras (Hylebos), 206-553-6708; Kevin Rochlin (Asarco Smelter - Ruston/N.Tacoma Residential Area), 206-553-2106; Lee Marshall (Asarco Sediments), 206-553-2723; Ken Marcy (St. Paul, Sitcum), 206-553-2782; Piper Peterson Lee (Thea Foss, Wheeler Osgood), 206-553-4951; Wallace Reid, 206-553-1728; Kris Flint (Source Control), 206-553-8155; Nancy Harney (Middle), 206-553-6635; Karen Keeley (Olympia View Resource Area), 206-553-2141	Jeanne O'Dell, 206-553-6919
536	DIAMOND R MINE	10	WA	WAN001002320	T39N R43E S30 NEAR CENTER, METALINE, WA				2000 Discovery, 2001 PA		Other: Not on the NPL; Status Not Specified					
537	HECLA KNOB HILL MINE	10	WA	WAD980988075	KNOB HILL COUNTY ROAD 3 MI NW OF CY, REPUBLIC, WA				1986 Discovery 2001 PA		Other: Not on the NPL; Site Reassessment Start Needed					
538	HOAGE MINE	10	WA	WAN001002321	T40N R43E S22 S1/2 CENTER, METALINE FALLS, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
539	JOSEPHINE MINE	10	WA	WAN001002322	T39N R43E S16 SE1/4 N1/2, METALINE FALLS, WA				2000 Discovery		Other: Not on the NPL; Status Not Specified					
540	KAABA-TEXAS MINE AND MILL	10	WA	IDD9806651160	LAT 49 57' 21"N; LONG 119 38' 57"W; LOCATED 1 MILE SOUTH OF NIGHTHAWK, OKANOGAN COUNTY, WA	22 ACRES	Inactive hardrock facility (late 1880s to 1983). Ore accessed via adit, extracted ore was processed, including crushing and grinding, gravity separation, and concentration.		1999, Removal to excavate tailings from mine-waste contaminated sediments; 2001, Removal and demolition of mill building		Other: Not on the NPL; Status Not Specified		Arsenic and cadmium		Earl Liverman, 208-664-4858	

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
541	KAISER ALUMINUM MEAD WORKS	10	WA	WAD000065508	SPOKANE COUNTY, MEAD, WA	240 ACRES	The 240 acre Kaiser Aluminum Mead Works site is an aluminum reduction facility located near Mead, Washington. From 1942 - 1978, pot linings were disposed of in the northwestern section of the plant property.		1983 NPL Final, 1980, 1995 studies	5,500 (served by local water system)	NPL Final	1983	Cyanide, fluoride	Ground Water, Soil, Sludges	Paul Skyllingstad, 360-407-6949	Beverly Gaines, 206-553-1066
542	LEAD HILL MINE	10	WA	WAN001002323	T40N R44E S14 NE1/4 S1/2, METALINE FALLS, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
543	LEAD KING MINE	10	WA	WAN001002324	T40N R43E S27 NEAR CENTER, METALINE FALLS, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
544	LEHIGH NO 1 MINE	10	WA	WAN001002325	T39N R43E S29 NE1/4 NE1/4, METALINE, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
545	LEHIGH NO 2 MINE	10	WA	WAN001002326	ST39N R43E S30 W1/2, METALINE, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
546	LUCKY STRIKE MINE	10	WA	WAN001002327	T40N R43E S35 NE1/4 NW1/4, METALINE FALLS, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
547	METALINE MINE	10	WA	WAN001002328	T39N R43E S32 NE1/4, METALINE, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
548	MIDNITE MINE	10	WA	WAD980978753	35 MILES NORTHWEST OF SPOKANE, WELLPINIT, WA		1955-1981; uranium mine		1985 Discovery 2000 Listing	0 (1 MILE), UNKNOWN (3-4 MILES)	NPL Final	2000			Ellen Hale, (206) 553-1215	Debra Sherbina, (206) 553-0247
549	MOUNTAIN LION MINE/MILL	10	WA	WAN001002315	REPUBLIC, WA				2001 Discovery		Other: Not on the NPL; PA Start Needed					
550	NORTHPORT MILL	10	WA	WAN001002329	T40N R40E S30 NW1/41/4 W.M., NORTHPORT, WA				2000 Discovery 2001 PA		Other: Not on the NPL; PA Ongoing					
551	ORIOLE MINE	10	WA	WAN001002330	T39N R43E S19 SE CORNER, METALINE, WA				2000 Discovery		Other: Not on the NPL; Status Not Specified					
552	REPUBLIC MINE/MILL	10	WA	WAN001002316	REPUBLIC, WA				2001 Discovery		Other: Not on the NPL; PA Start Needed					
553	SILVER MOUNTAIN MINE	10	WA	WAD980722789	SEC 34, T38N, R26E, WM, LOOMIS, WA	5 ACRES	Abandoned mine dump, extraction of silver, gold, and copper from ore, 1928-1981	Precious Metals Extraction Ltd.	1982 Discovery 1997 Deletion	0 (1 MILE), 20 (3-4 MILES)	Deleted from the Final NPL	1986	Arsenic, cyanide	Ground Water, Soil, Surface Water	Anne Dailey, 206-553-2110	

No.	Site Name	Region	State	Site Identification Number (CERCLIS ID #)	Site Address, Including City or Town and State	Site Size	Type of operation, metal/mineral extracted, years of operation	Site Owner	Activity Status; Cleanup Status (Discovery & Most Recent Action)	Surrounding Population	NPL Status	Year Listed on NPL	Contaminants of Concern	Media Affected	Contact Name and Phone Number	Public Involvement
554	SOUTH PENN MINE	10	WA	WAN001002346	REPUBLIC, WA				2002 Discovery 2002 PA		Other: Not on the NPL; PA Ongoing					
555	STERLING MINE	10	WA	WAN001002331	T39N R43E S32 E1/2, METALINE, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
556	USDOI BLM CLEVELAND MINE & MILL SITE	10	WA	WA0002340222	T30N R38E S9, HUNTERS, WA				1998 Discovery		Other: Not on the NPL; Other Cleanup Activity: State-Lead Cleanup					
557	USDA FS WENATCHEE NF HOLDEN MINE	10	WA	WA91223007672	HOLDEN, WA		Underground copper mine, also produced zinc, silver, gold. Operated 1938-1957. The PRP, Intalco, is paying for the RI/FS and will pay for the RA.	Intalco			NPL Final		Copper, cadmium, zinc, lead, beryllium, and arsenic	Soil, Ground Water, surface water, sediments	Dave Einan, 509-376-3883	
558	WEST CONTACT MINE	10	WA	WAN001002332	T39N R43E S30 E1/2 METALINE, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
559	YELLOWHEAD MINE	10	WA	WAN001002333	T39N R43E S16 NE1/4 METALINE FALLS, WA				2000 Discovery 2001 PA		Other: Not on the NPL; Status Not Specified					
560	JOHNS-MANVILLE COALINGA ASBESTOS						Asbestos Milling, manufacturing, storage and transport center - (OU2); Asbestos processing area and chromite mine - (OU1)	Southern Pacific Transportation Company - (OU2); Johns-Manville Corp. (OU1)				1984	Asbestos, nickel			
														Air, Ground Water, Soil, Surface Water		

Appendix B

Other Non-Federal AML Data Resources

Appendix B provides a compilation of other non-federal AML data resource web pages, including the website name, website host, a description of the information provided through the website, and the Internet address for each resource.

Appendix B
Other Non-Federal AML Data Resources

Website Name	Website Host	Description	Internet Address
Collection of Online Books	National Academy Press	Links to various free online books which include discussions on multiple topics of interest to abandoned mine lands	http://search.nap.edu/nap-cgi/napsearch.cgi?term=abandoned+mine+lands
Research and Training in Environmental Management in Mining	Australian Centre for Mining Environmental Research	Provides information about the centre's research, training and advisory activities as well as links to publications	http://www.acmer.com.au/
AMIRA International	AMIRA International	Provides information about the AMIRA association and its work in collaborative research for the minerals industry	http://www.amira.com.au/
Ministry of Energy & Mines	Government of British Columbia	Provides information on the Ministry of Energy&Mines research, publications and mining-related activities in the British Columbia	http://www.em.gov.bc.ca/mining/
Mining Environment Database	J.N. Desmarais Library	Free, internet-based database which provides references and abstracts to over 20,000 journal articles, books, and government reports dealing with abandoned mines, acid mine drainage and land reclamation - subjects focus on hard rock mining and is international in scope	http://www.laurentian.ca/library/medb/medlib_e.php

Website Name	Website Host	Description	Internet Address
Mining Life-Cycle Center	Mackay School of Mines - University of Nevada, Reno	Describes the MLC and its focus on the key environmental and life-cycle issues facing mining in the U.S. and abroad	http://www.unr.edu/mines/mlc/
EnviroMine	InfoMine	Provides information about and links for environmental technology for mining	http://www.infomine.com/technology/enviromine/
Mining Information.com	Mining Journal Ltd.	Provides links to multiple mining related websites including publications, project information, events, research services, “rules of thumb”, as well as an online version of the Mining Journal	http://212.87.82.146/index1.htm
The Society for Mining, Metallurgy, and Exploration, Inc. (SME)	The Society for Mining, Metallurgy, and Exploration, Inc.	Provides information about and links for background into the SME, its current newsletter, publications, mining engineering and mining education	http://www.smenet.org/
Eastern Mineral Law Foundation	Energy and Mineral Law Foundation	Provides information about and links for current information on the energy and mineral law industry as well as historical background	http://www.emlf.org/
Mining USA	Mining Internet Services, Inc.	Provides information about and links for various mining industry topics	http://www.miningusa.com/
Compilation Listing of Mining Associations	Industry Organizations	Listing of mining industry associations	http://www.mining-technology.com/industry/united_states.html

Website Name	Website Host	Description	Internet Address
Rocky Mountain Mineral Law Foundation (RMMLF)	Rocky Mountain Mineral Law Foundation	Provides information about and links for RMMLF courses, publications, newsletters, and conferences	http://www.rmmlf.org/
International Council on Mining and Metals (ICMM)	International Council on Mining and Metals	Provides information about and links for the ICMM charter, publications, news, events	http://www.icme.com/
Project Underground	Project Underground	Organization which supports the human rights of communities resisting mining and oil exploration - includes information about their campaigns and reports	http://www.moles.org/

Appendix C

Current Information on Mine Waste Treatment Technologies

Appendix C provides a compilation of various mine waste treatment technologies currently in use or actively being developed. The technologies presented are organized into the following groups: Waste Treatment Technologies and Waste Containment and/or Prevention Technologies. Information including the technology/method, vendors (if applicable), applicable sites, and a description of the technology are provided for each mine waste treatment presented.

Appendix C

Current Information on Mine Waste Treatment Technologies[1]

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Waste Treatment Technologies			
Alkalinity-Producing Systems (APS)	Not Available	The Douglas Highwall AML site, Tucker County, WV	Alkalinity-Producing Systems (APS) combine the use of an anoxic limestone drain (ALD) and anaerobic compost wetlands. Ponded water about 3 to 6 feet in depth overlies an 18-inch layer of organic material, usually compost, which is over an 18- to 24-inch layer of limestone. Acid water is ponded over the materials and the head created by the column of water forces the water through the organic material **to filter out or precipitate ferric iron and to consume oxygen through organic matter decomposition**. Alkalinity may be increased by microbial sulfate and iron reduction. The acid water, now low in dissolved oxygen and ferric iron after passing through the organic substrate, is then directed down into the layer of limestone under the organic matter or through pipes into a conventional ALD.

[1] Some technologies noted in this table may not have been commercially applied.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Aluminator® Passive Treatment System	Damariscotta, Inc. Clarion, PA	Metro Site, PA; Casselman River Watershed in Somerset County, PA	Aluminator® is a patent-pending adaptation of a limestone drain in which **aluminum hydroxide will accumulate for recovery, and the aluminum-recovery and processing system**. The Aluminator® was developed by Damariscotta, Inc., a small company located in Clarion, PA. It is being used in Phase II of the Metro site project, performed in conjunction with PA Department of Environmental Protection, U.S. Office of Surface Mining, Southern Alleghenies Conservancy, Somerset Conservation District, Western Pennsylvania Watershed Protection Program and local land-owners and partners.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Anoxic Limestone Drains (ALD)	Mackenzie Burnett, Burnett Engineering, Inc. 816 Traver Trail Glenwood Springs, CO 81601 (970) 928-8504	Two unnamed mine sites in Tennessee; Fabius Coal Preparation Plant, AL (non-NPL)	A limestone drain is a simple treatment method which involves the burial of limestone in air-tight trenches that **intercept acidic discharge water**. Keeping carbon dioxide within the drain can enhance limestone dissolution and alkalinity production. Furthermore, keeping oxygen out of contact with the discharge water minimizes the potential for oxidation of dissolved iron and the consequent precipitation of solid iron hydroxide [$Fe(OH)_3$], which could armor the limestone and clog the drains.
Bauxsol	Virotec Administration Building 50b Pinewood Drive Sanctuary Drive, 4212 Queensland Australia (07) 5530 8014	Gilt Edge Mine, SD	Bauxsol is a complex mix of Fe- and Al-oxyhydroxides and complex alumino-hydroxy-carbonates. Consisting of predominantly fine particles (with a high surface area to volume ratio and a high charge to mass ratio), it **allows difficult and toxic metals to seek out their least soluble (least mobile) compound**. Bauxsol generally sequesters over 99.99 percent of all heavy metals from soils and water including acid, arsenic, cyanide, and toxic metal combinations. Its acid neutralization capacity is high, due to the abundance of amorphous and finely crystalline mineral phases that form weak bases. When fine-grained Bauxsol is added to metals-laden wastewater or soil, reagents quickly drop out of any solution and settle within 48 hours to form a thin layer of sediment.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Biological Treatment/ Constructed Wetlands	Not Available	Burleigh Tunnel wetland, CO (pilot-sized system); Asarco's West Fork Site, MO (non-NPL); Somerset Wetland, Somerset County, PA (non-NPL); Latrobe wetland, Westmoreland County, PA (non-NPL); Friendship Hill Wetland, Fayette County, PA (non-NPL)	Biological treatment consists of a series of shallow ponds planted with cattails. These constructed wetlands utilize soil- and water-borne microbes associated with wetland plants to **remove dissolved metals from mine drainage**. Initial design and construction costs may be significant. Unlike chemical treatment, however, wetlands are passive systems requiring little or no continuing maintenance. Wetlands are generally more effective in removing iron than manganese and the greatest utility of wetlands appears to be in the treatment of small flows of a few gallons per minute. This is a relatively new treatment technology with many specific mechanisms and maintenance requirements not yet fully understood. Seasonal variations in metal removal efficiency have been noted, with lesser amounts removed in cold weather.
Biological Reduction of Selenium (BSeR™)	MSE Technologies 200 Technology Way Butte, Montana 59702 Phone: 406-494-7367 Fax: 406-494-7230 www.mse-ta.com Applied Biosciences Corporation (AB) PO Box 520518 Salt Lake City, UT 84152-0518 (800) 280-7852	Kennecott North, UT	This process uses specially developed biofilms that contain specific proprietary microorganisms in anaerobic solids bed reactors to reduce selenium (in the form of selenite and selenate) to elemental selenium. The end product is a fine precipitate of elemental selenium that is removed from the bioreactor with backflushing. The process has a **97% rate of selenium reduction**.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
	(801) 468-1897 info@bioprocess.com www.bioprocess.com		
Catalyzed Cementation of Selenium	MSE Technologies 200 Technology Way Butte, Montana 59702 Phone: 406-494-7367 Fax: 406-494-7230 www.mse-ta.com	Kennecott North, UT	Catalyzed cementation **removes heavy metals from solution** by cementation on an iron surface. The process is optimized by adding catalysts that increase selenium removal efficiency. Feed water is fed through a series of static mixers where pH is lowered before entering the elemental iron reactor. The reactor is a specialized tank designed to fluidize iron particles. The iron particles carried out are trapped in a small, cone-bottom tank and pumped back to the reactor for reuse. The processed feed water exiting the small, cone-bottom tank is routed to an 80-gallon reactor where the pH is raised again with a lime slurry and an oxidizer is added which completes the required reaction.
Ceramic Microfiltration	BASX Systems LLC Fort Collins, CO	Black Hawk and Central City, CO	This treatment system is designed for the **removal of heavy metals** from an acid mine drainage system. It utilizes ceramic microfiltration to remove the precipitated solids. The first step in treatment is the conversion of heavy metals into a form that can be precipitated. If the metal finishing operation contains hexavalent chromium, it must first be reduced to trivalent chromium. The next step is to add the remaining metal-containing wastewater. The wastewater will then proceed through a hydroxide precipitation step, which consists of adding sodium hydroxide. The pH will be adjusted to between 8.5 and 9.5 in a two-stage pH adjust system. The wastewater is then transferred to the concentration tank. At this point the wastewater will be pumped through the cross flow ceramic membrane. The absolute pore size of the membrane is 0.2 microns. Therefore, the only metals that will remain in the filtered water will be dissolved metals.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Colloid Polishing Filter Method (CPFM)	The Filter Flow Technology, Inc. (FFT)	DOE Rocky Flats Plant, CO	The CPFM system is designed to **remove a wide range of ionic, colloidal, and complex non-tritium radionuclides and heavy metals** from water. Pollutants are removed from water predominantly by sorption or chemical complexing down to parts per million (ppm) or parts per billion (ppb) levels. The CPFM technology can be used as a stand alone unit to treat low-total suspended solids (TSS) water or in a treatment train, downstream from other technologies such as soil washing, or conventional wastewater treatment using flocculation and solids removal. In general, low levels of radionuclides and heavy metals are the most suitable for treatment by the CPFM system.
Conventional neutralization	Not Available	Not Available	This is a commonly used treatment method whereby acid mine drainage is pumped to a central location to be mixed with an alkaline chemical, such as lime or sodium hydroxide, and mechanically aerated in large basins. The pH is raised to a level between 9 and 11, which **causes most metals to hydrolyze and precipitate as a sludge**. Some metals, such as iron, must be oxidized to be precipitated as a stable compound, which is why aeration is required. The resultant sludge-water mixture then flows to a clarifier or a series of settling ponds. This process is generally considered to be simple, but inefficient and expensive.
EcoBond™ Acid Rock Drainage (ARD)	MT^2, LLC 2801 Youngfield Street, Suite 300 Golden, Colorado 80401 303-205-7935 303-205-7925 Fax info@metalstt.com	Gilt Edge Mine, SD; Clear Creek (Gregory Gulch OU), CO	EcoBond™ is a treatment that effectively **inhibits the oxidation of pyrite, curtailing the pyrite oxidation cycle before it begins**. EcoBond™ forms a chemical chain that binds with metal ions forming insoluble metal complexes, thus reducing bioavailability. It produces a reaction that proceeds at ambient temperatures and does not produce secondary waste streams or gases. EcoBond™ can be applied in-situ or ex-situ in a wet or dry form. It stabilizes metals within 24 to 48 hours of application, reduces the solubility of treated metals by as much as 10 to 1,000 times, and increases the volume of waste by only one to five percent.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
In-Line Aeration and Neutralization System (ILS)	US Bureau of Mines, US DOE	Not Available	The In-Line Aeration and Neutralization System (ILS) utilizes a jet pump or eductor to **entrain the air and alkaline chemical** by Venturi action and a static mixer. Sodium hydroxide or sodium carbonate is added to the AMD with aeration to create flocculation. The flocculant is directed through a static mixer, to a clarifier and then to settling ponds. The overflow of the settling ponds is then treated with Biobeads or Zeolites for ion exchange. The ILS has no moving parts and operates by water pressure generated by the existing mine-water pumps. It is a pipeline version of a conventional water treatment system, and is more efficient and less expensive to install, operate, and maintain.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Inundation	Not Available	Eagle Mine, CO	Constructing impoundments to inundate isolated areas of surface mines has been used to **minimize or eliminate AMD**. Saturation of acid-producing spoils may not always improve pH, but there is usually some reduction in metal concentrations. However, the drainage often has a less deleterious effect on downstream water quality than that from unreclaimed areas. The creation of an impoundment in the final cut of a surface mine forms recreation areas, aids in recharging the water table in the local area, and can eliminate or greatly reduce the amount of pollution from AMD and silt. The impoundment can also be designed so the body of water will completely flood any deep mine workings or auger mining holes, thereby limiting pyrite oxidation. Inundation is only suggested where a water table may be re-established to cover the materials (such as below drainage deep mines) and has not been recommended for surface mined lands or above drainage deep mines in the mountainous Appalachian region. Complete inundation has been successful in other areas where acid-producing materials are submerged in lakes or other permanent impoundments. Inundation of an underground mine can be an effective method of decreasing AMD by depriving pyrite of oxygen. In addition, if overlying rocks contain carbonate minerals, flooding can provide additional alkalinity by increasing the volume of alkaline strata in contact with mine water. On the other hand, if the mine walls contain readily soluble oxidation products of sulfides, inundation will cause a temporary increase in acid concentrations that should decline over time. If the water table fluctuates and the mine does not remain inundated, oxidation of pyrite can cause continued water pollution and the temporary increase in acid concentrations becomes an increase that does not decline over time.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Ionic State Modification Process (ISM)	HPT Research, Inc. 13010 Loma Rica Drive Grass Valley, CA 95945 530-274-7631	Iron Mountain Mine, CA; Leviathan Mine, CA	This process relies upon technology that **provides the means of altering the chemical and physical properties of metal contaminants within aqueous solutions**. It begins with the injection of a proprietary chemical additive into the raw influent. The waste stream then enters the Ionic State Modification (ISM) Reactor. The ISM Reactor contains electrodes surrounded by patented magnets capable of producing strong, focused magnetic fields. When a current is applied to the electrodes, the combined forces have the ability of modifying the ionic composition of targeted metal ions within the waste stream, **causing these contaminant materials to either be reduced or oxidized to a chemical state that allows them to precipitate using conventional precipitation chemistry**.
Limestone Pond	Not Available	Not Available	Limestone ponds are a passive treatment idea in which a pond is constructed on the upwelling of an AMD seep or underground water discharge point. Limestone is placed in the bottom of the pond and the water flows upward through the limestone. Based on the topography of the area and the geometry of the discharge zone, the water can be from 1 to 3 meters (m) deep, containing 0.3 to 1 m of limestone immediately overlying the seep. The pond is sized and designed to retain the water for 1 or 2 days for limestone dissolution, and to keep the seep and limestone under water. Like anoxic limestone drains (ALDs), this system is **recommended for low dissolved oxygen (DO) water containing no Fe3+ and Al3+**. However, the advantage of this system is that the operator can observe if limestone coating is occurring because the system is not buried. If coating occurs, the limestone in the pond can be periodically disturbed with a backhoe to either uncover the limestone from precipitates or to knock or scrape off the precipitates. If the limestone is exhausted by dissolution and acid neutralization, then more limestone can be added to the pond over the seep. Three limestone ponds have been installed but no information is available on their treatment.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Nanofiltration membrane technology	Hydranautics 401 Jones Road Oceanside, CA 92054 760-901-2500 www.membranes.com Dow Chemical www.dow.com	Kennecott South, UT	Nanofiltration is a form of filtration that uses a semi-permeable membrane. The pores are typically much larger than those used in Reverse Osmosis (RO) - close to one nanometer diameter - thus it is not as fine a filtration process as RO. Typical nanofiltration membranes **pass a higher percentage of monovalent salt ions than divalent and trivalent ions**. Most nanofiltration membrane polymers carry formal charges which exclude higher valence ions more than monovalents from passing through the membrane with the solvent water.
Open Limestone Channels/	Not Available	Not Available	Open limestone channels are the simplest treatment systems where **limestone fragments are added directly to the stream channel semiannually or less frequently**. Slow dissolution rates, armoring, burial, and transport of limestone from the channel during high flow are concerns.
Passive Bioreactor	Knight Piesold 1050 17th St., Suite 500 Denver, CO 80265-0500 303-629-8788	West Fork Mine (Non-NPL), MO	The passive bioreactor at West Fork Mine is a gravity-flow system covering about five acres. The system is composed of a settling basin for **solids removal**; two anaerobic bioreactors that are arranged in parallel for **lead removal**; a rock filter polishing cell that **removes manganese, reduces biological oxygen demand (BOD), and sulfide and increases dissolved oxygen (DO)**; and an aeration pond **for final BOD and DO polishing**. The system is designed to treat influent having a pH of 8.0, and containing 0.4 - 0.6 mg/L of Pb and 0.18 mg/L of Zn. The design flow rate is 1,200 gallons/minute.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Reverse Osmosis	GE Osmonics 800-848-1750 http://www.gewater.com/index.jsp Karcher www.karcher-vps.com	Kennecott South, UT	Reverse Osmosis (RO) is also known as hyperfiltration and is the finest form of filtration. It allows the **removal of particles as small as ions from a solution**. The process uses a semi-permeable membrane that allows purified fluid to pass through while rejecting the contaminants that remain. It utilizes pressure to reverse the flow of fluids towards a state of equilibrium, usually with a pump. At the Kennecott South site, RO is used with nanofiltration for pre-treatment to avoid RO membrane clogging, fouling, or damage. Fouling is a broad, generic term used to identify a multitude of time-dependent phenomena, which, singly or in combination, impact membrane performance.
Silica Micro Encapsulation	Klean Earth Environmental Company (KEECO) www.KEECO.com	Not Available	Silica Micro Encapsulation (SME) **encapsulates metals in an impervious microscopic silica matrix (essentially locks them up in very small sand-like particles) which prevents the metals from migrating or otherwise adversely affecting human health or the environment**. Its physical/chemical components include an initial exothermic reaction and pH adjustment followed by an electrokinetic reaction and metal hydroxyl formation which leads to silica encapsulation. SME is a very robust technology, demonstrated to work effectively on heavy metals (such as chromium, copper, lead, mercury and zinc), metalloids (such as arsenic), and radionuclides (such as uranium). It can be applied to wastewater, sediment, sludge, soil, mine tailings, and other complex media. In addition to the control of metals, SME chemicals have been shown to reduce dissolved solids (such as sulfates) and, through a high-energy oxidation process, to break down organics and hydrocarbons (i.e., gasoline and fuel oil).

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Waste Containment and/or Prevention Technologies			
Dewatering	Not Available	Falconbridge Fault Lake tailings site, WV	**Removing water (or dewatering) removes one of the principal reactants in pyrite oxidation, and should theoretically stop the production of AMD**. Without water to move reaction products from the surfaces of pyrite, no contamination of waters should occur. While this can be done in a laboratory setting, complete removal of water in nature is nearly impossible. However, reducing the amount of water contacting pyritic material and containing water that is in contact with acid-producing materials may reduce the impacts of AMD to off-site water bodies and streams. Removing water before it contacts pyritic material by pumping may also be done. Draining water away from pyritic materials as rapidly as possible may keep water from reacting and forming acid products. Chimney drains, highwall drains, french drains, and blanket or bottom drains are all reliable methods for moving water from spoil, refuse, and fills.
Grout Curtains and Walls	Not Available	Academic studies performed	Grouts can be used to separate acid-producing rock and groundwater. Injection of grout curtains may significantly **reduce the volume of groundwater moving through spoils and thereby greatly reduce the amount of AMD coming from a site**. In one sense, grouting to form curtains or walls is analogous to underground water diversion.
Revegetation	Not Available	Summitville Mine, CO; Big River Tailings Site, MO	Establishing vegetation is an important step in reclaiming AML. It helps **control soil erosion, encourages mine soil development, creates an aesthetically pleasing landscape, and contributes to productive post-mining land uses**. Two keys to successful revegetation of AML are the selection and placement of a mine soil that is well suited for the intended post-mining vegetation, and the selection of plant species that are well suited to both the mine soil properties and intended post-mining land use.
Soil Covers and	Not Available	Upshur Mining	Covers are constructed from natural or man-made materials that retard or divert the

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Plastic Liners		Complex, WV	movement of water and oxygen into areas containing acid-producing rock. Soil covers can achieve substantial **reductions in water flow through piles, but generally do not control AMD completely**. Plastic liners are rarely used in mining because covering large volumes of waste with a liner is usually too expensive. However, this method may be appropriate in settings where isolation of small pods of acid-producing material is possible.
Surface Diversion and Diversion Wells	Not Available	Rausch Creek, Dauphin County, PA (non-NPL); Lick Creek, Tioga County, PA (non-NPL)	Diverting surface water above a mined site to decrease the amount of water entering the mined area is highly recommended in acid-producing areas. This technique can **control water volume and direction and minimize the effects of AMD on receiving streams**. Surface diversion of runoff involves construction of drainage ditches to move surface water quickly off the site before infiltration or to limit its movement into the backfill. The diversion is accomplished either by ditching on the uphill side of surface mines or by providing new channels or impervious channels of existing surface streams to convey water across the disturbed area. Diversion wells utilize a strategy for alkaline loading that can be accomplished by diverting surface water into receptacles or beds of alkaline material (slag, crushed limestone, or other lime materials) to pick up alkalinity and allowing the alkaline water to flow into spoils or underground mine pools. This process needs periodic replenishment of limestone. Alkaline loading of water upgradient of mined areas or before it enters the backfill buffers the effects of subsequent contact with acid water.
Underground Mine Filling and Injection	Not Available	Longridge Mine, WV; Frazee Mine, MD; Mettiki mine, MD	Due to the miles of passages in underground mines where minerals have been removed, huge volumes of void space are available for mine pools to develop, and due to the local geological rock types, this water is often acidic. Filling the mine voids completely or creating barriers inside the mine to break up interconnected underground pools may be used to **control flow and improve drainage quality**. Materials to fill underground mines must be cheap and readily available, so waste products such as steel slags and fly ash are generally used in these situations.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Underground Mine Sealing	Not Available	Not Available	Mine sealing can **minimize the AMD pollution associated with abandoned underground mines**. The primary factor affecting the selection, design and construction of underground mine seals is the anticipated hydraulic pressure that the seal will have to withstand when sealing is completed. A dry mine seal is a wall across a mine entrance where water does not drain from the entrance. A wet mine seal is a wall across a draining mine entrance that allows water flow through the seal but prevents air from entering the mine. Surface access seals (or dry seals) are installed in entries where little or no hydrostatic pressure will be exerted on the seals. The primary functions of these seals are to eliminate access to the mine and to decrease AMD production by limiting movement of air and water into the deep mine. Dry seals are typically constructed of concrete block, masonry, or concrete-fly ash mixtures, and are often backfilled from the front side of the seal. The lack of hydraulic head allows these seals to be simple in construction and low cost. Air trap seals (wet seals) are installed in mine entries where mine discharges flow from the mine. Wet seals almost always were constructed with concrete blocks and either holes were left or pipes were inserted into the block wall to allow drainage. Unfortunately, the long term effectiveness of these old wet seals was generally poor. Failures occur when debris and sediment clog the hole or pipe, thereby increasing the head of the impounded water and resulting in collapsing or leaking seals. Accessibility of the mine and seal location are important design considerations. Dry or wet seals placed at easily-reached portal entrances are considerably cheaper than portals with poor access.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Arsenic Oxidation	Cooperative Research Centre for Waste Management and Pollution Control Limited (CRC); Australian Nuclear Science and Technology (ANSTO)	Valley Forge/Susie Mine; Helena, Montana	Arsenic Oxidation is an innovative technology in which **Arsenite is photochemically oxidized to create Arsenate**, which is then removed through an iron co-precipitation.
Mineral-Like Precipitation; Arsenic Removal	Dr. Larry Twidwell, Montana Tech Metallurgy Department	Not Available	The object of mineral-like precipitation is to **strip arsenic from solutions so as to produce mineral-like precipitated products that are stable enough to be stored in tailing pond environments**. A series of arsenate solids are crated and these solids are then identified by x-ray diffraction pattern analysis for separation.
Alumina Adsorption Arsenic Removal	ZENON Environmental Services, Inc.	Not Available	Alumina Adsorption is an innovative approach using **alumina with microfiltration that is most effective with arsenic**. Process water at a pH of 3 to 4 is pumped into slurried activated alumina. The alumina adsorbs Arsenate anions. Microfiltration then separates activated alumina from process water. Arsenic is then desorbed from aluminum using sodium hydroxide. Concentrated sodium arsenate brine is generated, recovered, processed, and converted for safer offsite disposal. Activated alumina regenerated and recovered for further Arsenic removal.
Ferrihydrite Adsorption	Not Available	Not Available	This technology is most effective with arsenic. The ferric ion must be present (Fe+3) in water and the Iron to Arsenic mole ratio should be greater than four (but the ion is not stable at a pH greater than 7). The ferric ion changes into a solid form. Dissolved arsenic is removed by lime neutralization in the presence of Fe+3. This forms an **arsenic bearing Ferric oxide (Ferrihydrite), which is then removed by solid/liquid separation using conventional settling and flocculation with pressure filtration**.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Biological Cover	Not Available	Not Available	Used **whey and molasses based formulas to stimulate aerobic heterotrophs to consume oxygen instead of creation of pyrite oxidation and acid regeneration**. Whey was found to be more effective.
Cyanide Heap Biological Detoxification	MSE	Not Available	The goal of this method is to obtain significant reductions of weak acid dissociable cyanide. **Biological cyanide degradation is accomplished through stimulating indigenous bacterial through nutrient addition and optimizing growth conditions. Anaerobic, naturally occurring microorganisms reduce sulfides, sulfites, thiosalts, and hydrogen sulfide**. The biological treatment is non-toxic to the environment as bacteria return to natural levels when cyanide is depleted and detoxification ends.
Redox-Mediated Biotransformation	MWTP-QAPP	Gilt-Edge Mine	**In-situ biological treatment** designed to **remove the metals nitrate and sulfate** from mine waste water.
Bioremediation of Lakes	Not Available	Anchor Hill Pit	Create reducing conditions and stimulate bacteria growth activity to improve water quality and creates a long-term stable system. This is accomplished through the **addition of lime and proprietary organic material from Green World Science.**
Biocyanide removal	Pintail Systems, Aurora, Colorado	Echo Bay/McCoy Cove Mine	Provides a **natural, biological treatment process with non-toxic reactions, by-products, low application costs, and effective and quick treatment of cyanide**. Some bacteria can break down the bond between carbon and nitrogen, thereby assisting in the removal of heavy metals. As bacteria dies back to natural levels, the detoxification process completes itself.
Remote Monitoring Systems	MSE	Callilope Mine	**A wireless transmittal systems monitors the temperature, pH, flow, and water levels**. This facilitates the remote gathering of information in harsh environments. Solar power is employed to identify monitoring issues remotely while reducing labor costs. Web access to the data provided by this data transfer can be monitored world-wide.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Gas-fed sulfate-reducing bacteria (SRB) treatment	Biomet Mining Corporation, Vancouver, British Columbia	Burkley Pitt Mine	This is a common method for the treatment of acid rock drainage. **Using technology which employs hydrogen gas from partial oxidation of natural gas and other fuels as an electron donor, sulfide is changed to sulfate.** This can also be sued for the reduction of copper sulfide, zinc sulfide, sodium hydrosulfide, and possible aluminum, iron, and manganese products. This technology is not ready for use.
DuPont Passivation Technology	University of Reno, Nevada	Not Available	The passivation process creates an inert layer on the sulfide phase by **contacting the sulfide with a basic permanganate solution to produce an inert manganese-iron oxide layer**. This layer prevents contact with atmospheric oxygen during weathering on the sulfide rock, thus preventing sulfuric acid generation.
EcoBond ARD	Macmin, Ltd., and Metals Treatment Technologies (MT^2)	Not Available	These technologies use a broad range of processes that **chemically transform metal contaminants into non-hazardous and less toxic new mineral compounds** thereby achieving environmental protection. EcoBond combines with metals to form extremely insoluble new minerals, which reduces bioavailability. The process uses a proprietary additive which is a nan-hazardous, chemical binder that reacts with heavy metals. Treating pyrite with EcoBond ARD inhibits the oxidation and hydrolysis of pyrite thus curtailing the pyrite oxidation cycle.
Krystal Bond	American Sensor Technologies	Not Available	Krystal Bond Technology is an advanced process in which **inorganic materials are molecularly diffused onto a metallic surface in the presence of certain gases**. A diffusion takes place at a sufficiently high temperature that is far below the melting point of the metal. As the process occurs, the bonding materials flows while assuring that the high yield strength properties of the metal are preserved. As the temperatures are reduced, the bonding material solidifies and secures the silicon strain gauge in position. This process provides a high electrical isolation with low leakage rates at 500VAC, making this technology ideal for process control applications. Operating at low strain levels, AST's specially grown and micro-machined silicon strain gauges yield a high output with low thermal errors.

Technology/ Method	Vendor(s)	Applicable Sites	Description of Technology
Active Water Treatment	Not Available	Not Available	Most active water treatment systems at metal mines rely on **standard alkali-addition procedures**. Lime, sodium hydroxide, and/or sodium carbonate are mixed into acid-metal water in treatments tanks and mechanically mixed for a fixed period. Next, there is an addition of some drinking water-approved flocculent to promote agglomeration of small precipitated particles, precipitate is filtered from the water, and some level of drying occurs. Precipitates are then stored on- or off-site.
Biopass system	Not Available	Not available	The Biopass system has been successfully used to **treat draindown fluids from abandoned cyanide heap leach pads containing cyanide and metal cyanide species in a natural to alkaline media**. These anaerobic systems sometimes require polishing to remove metals to the finer level required for discharge regulations, but alone do not remove manganese.
Permeable Reactive Barriers	Not Available	Not Available	Permeable Reactive Barriers **minimize oxygen infiltration by sequestering oxygen, typically in a nutrient laden fine organic material**. They provide organic "food" source to sulfate reducing bacteria to reduce sulfate to sulfide and precipitate metal sulfides. Metals or sulfate is sequestered in the barrier material by providing critical reactants along a groundwater flow path.

Appendix D

Programs and Organizations Involved in AML Reclamation

As referenced on page 11 of the text, Appendix D provides a compilation of programs and organizations involved in AML reclamation. The programs and organizations presented are organized into the following groups: EPA Programs, Other Federal Programs, Non-Profit Organizations (NPO), and Other. Information including the program or organization name, sponsor, Internet/email address, and a description of the program or organization are provided for each.

Appendix D
Other Programs and Organizations Involved in AML Reclamation

D1. EPA Programs			
Program or Organization	**Sponsor**	**Description**	**Internet/Email Address**
Mine Waste Technology Program	EPA, Office of Research and Development	EPA's Mine Waste Technology Program, part of Industrial Multimedia Branch's (IMB) mission is to develop, demonstrate and evaluate timely and integrated innovative engineering and scientific approaches to reduce air, water and land toxic pollution generated by the production, processing, and use of materials.	http://www.epa.gov/ORD/NRMRL/std/mtb/mwtphome.html
Wetlands Grant Program	EPA, Office of Wetlands, Oceans, and Watersheds	Provides grants to states, tribes and local governments for wetlands restoration and protection projects.	http://www.epa.gov/owow/wetlands/initiative/index.html#financial

Program or Organization	Sponsor	Description	Internet/Email Address
Hazardous Substance Research Centers	EPA, Office of Research and Development	In 2001, EPA established five new university based Hazardous Substance Research Centers affiliated with 22 universities. The Centers will address concerns about hazardous substances in the environment by conducting basic and applied research, and providing technology transfer and community outreach. The broad objective of these new Centers is similar to that of the original HSRCs in conducting research to develop and demonstrate new methods to assess and remediate sites contaminated with hazardous substances; improve existing treatment technologies; decrease the production and use of hazardous substances; and educate hazardous substance management professionals and improve community public awareness.	http://es.epa.gov/ncer/centers/hsrc/89/

Program or Organization	Sponsor	Description	Internet/Email Address
Nonpoint Source 319 Implementation Grants	EPA, Office of Water	Provides funding to help communities prevent and control polluted runoff, or "nonpoint source pollution," from city streets, suburban lawns and rural areas. These funds, awarded by the applicable state, territory, or tribe, are used for technical assistance, education and training, stream restoration, and installation of watershed-level management practices to clean up and protect water quality in rivers, lakes and coastal areas.	http://www.epa.gov/owow/nps/cwact.html
EPA Community Grant Programs	EPA	Community grants are one category in an expanding range of tools that EPA is using to make environmental protection work better and smarter for the 21st century. Use the provided page to link to EPA's community grant programs.	http://www.epa.gov/livablecommunities/funding.htm
Tribal Drinking Water Capacity Building/Source Water Protection Grants	EPA, Office of Water	Intended to increase tribal capability to provide safe drinking water to consumers, and to keep tribal sources of drinking water from being contaminated. Eligible projects might include a source water assessment and the development and implementation of a source water protection program.	http://www.epa.gov/safewater/protect.html

Program or Organization	Sponsor	Description	Internet/Email Address
D2. Other Federal Programs			
USDA Urban Resources Partnerships (URPs)	U.S. Department of Agriculture and Forest Service	A multi-agency initiative that provides funding and technical assistance to community-led environmental projects. Forest Service staff collaborate with municipal officials and other state and federal agency stakeholders to provide assistance packages, primarily to non-profit community-based organizations. The URP works closely with community development corporations as a mechanism for making its resources available at the neighborhood level. Assistance can include grant funds, technical assistance, and/or access to existing agency resources.	http://www.il.nrcs.usda.gov/news/publications/brochures/ucabro.html
Clean Air/Brownfields Partnership Pilots	U.S. Environmental Protection Agency, U.S. Dept. of Commerce and the Economic Development Administration, U.S. Conference of Mayors	The cooperative initiative has been allocated $500,000 in federal funding and is intended to improve air quality and stimulate economic revitalization.	http://www.epa.gov/swerosps/bf/html-doc/cleanair.htm
National Tribal Environmental Council (NTEC)	NTEC	The National Tribal Environmental Council provides services including technical assistance, national advocacy for tribes, intergovernmental cooperative agreements, workshops/forums on environmental topics, a resource clearinghouse, education, and EPA workgroup participation.	http://www.ntec.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Tribal Association on Solid Waste and Emergency Response (TASWER)	TASWER	TASWER seeks to coordinate tribal solid waste and emergency response efforts with national, regional, and state programs. In partnership with the University of Tulsa College of Law and the National Energy and Policy Institute, TASWER is leading a three-year study to determine what hazardous waste contamination exists on or near Indian property.	http://www.taswer.org/
Appalachian Clean Streams Initiative	Office of Surface Mining (OSM)	The Appalachian Clean Streams Initiative was designed to create an efficient exchange of information and eliminate duplicate efforts among citizen groups, university researchers, the coal industry, corporations, the environmental community, and local, state, and federal government agencies involved in cleaning up streams polluted by acid drainage.	http://www.osmre.gov/acsihome.htm
National Science and Technology Center (NSTC)	NSTC	The NSTC supports site characterizations and the preparation of Engineering Analyses/Cost Analyses for mining sites. The NSTC has developed a National Training Center course on the characterization and remediation of AML sites. The NSTC could assist the EPA in the mapping, assessment, and PRP searches at AML sites through a partnership with the EPA and the BLM.	http://www.nsf.gov/od/oia/

Program or Organization	Sponsor	Description	Internet/Email Address
Section 108 Loan Guarantee Program	U.S. Department of Housing and Urban Development (HUD)	States and entitlement communities that participate in the Community Development Block Program (CDBP) also are eligible for funding through the Section 108 Loan Guarantee Program, which provides federally guaranteed loans for large economic development and revitalization projects. CDBP recipients are required to pledge current and/or future CDBG allocations in return for larger secured loans that may be used to pursue revitalization and economic development projects that encompass entire communities.	http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm

Program or Organization	Sponsor	Description	Internet/Email Address
Economic Development Association	U.S. Department of Commerce	The planning program provides grants to support significant new economic development planning, policymaking and implementation efforts, and to establish comprehensive economic development planning processes cooperatively with state, state political subdivisions, and regional economic development districts. The public works and development facilities program empowers communities in economic decline to revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private sector jobs and investment.	http://www.doc.gov/eda/HTML/1h_grantreq.htm; http://www.doc.gov/eda/html/pwprog.htm
Rural Economic Development Loans and Grants	U.S. Department of Agriculture, Rural Business Cooperative Service	Zero-interest loans to finance rural economic development and job creation projects based on sound economic and financial analysis. Loans and grants are made to RUS electric and telephone borrowers who use the funds for business and community development projects. Eligible organizations are RUS funded rural electric and telephone cooperatives.	http://www.rurdev.usda.gov/rbs/busp/redg.htm

Program or Organization	Sponsor	Description	Internet/Email Address
USDA Business and Industrial Loans	U.S. Department of Agriculture (USDA)	Provides loans to public entities and private parties who cannot obtain credit from other sources. Loans to private parties can be made for improving, developing, or financing business and industry, creating jobs, and improving the economic and environmental climate in rural communities (including pollution abatement). This type of assistance is available in rural areas (this includes all areas other than cities or unincorporated areas of more than 50,000 people and their immediately adjacent urban or urbanizing areas).	http://acc.arcapital.com/acc_loan/usda_business_industrial.html
Urban and Rural Economic Development Discretionary Grants	U.S. Department of Health and Human Services, Office of Community Service	Provides grants up to $500,000 to community development corporations and community action agencies that may be used for cleanup, redevelopment, or job training projects at brownfield pilot sites	Donald Sykes dsykes@acf.dhhs.gov
National Heritage Areas	National Park Service (NPS) and USDA Forest Service	Program promotes recognition of Congressionally authorized areas of unique natural, cultural or historic interest and for which there is local community support. It has 18 areas that are sustained through an array of public and private partnerships. The National Park Service provides funding and technical assistance in the creation of these areas.	http://www.cr.nps.gov/heritageareas/

Program or Organization	Sponsor	Description	Internet/Email Address
National Historic Landmarks Assistance Initiative	National Park Service (NPS)	NPS helps preserve National Historic Landmarks through technical assistance and training, as well as seed grants and public education	http://www2.cr.nps.gov/nhl/index.htm
National Scenic Byway Program	U.S. Department of Transportation	To be eligible, the road must be a state designated scenic byway. Funds can be used for a set of activities that enhance the traveling public's ability to enjoy and appreciate the resources that the byway offers. The potential exist for funding transportation activities in an American Heritage River corridor if there is a designated scenic byway in this corridor.	http://www.byways.org/
Tribal Historic Preservation Fund Grants	National Park Service (NPS)	Federal matching grant program that encourages private and non-federal investment in historic preservation efforts by providing grants to states, territories, Indian tribes, and to the National Trust for Historic Preservation. Funding is most often used to pay part of the costs of surveys and statewide historic preservation plans, and to prepare National Register nominations, architectural plans, historic structures reports, and engineering studies. Since 1966, over $800 million in grant funds have been awarded.	http://www2.cr.nps.gov/tribal/grants.htm

Program or Organization	Sponsor	Description	Internet/Email Address
NPS Historic Preservation Fund	National Park Service (NPS)	Provides matching federal funds to state funds to encourage private and non-federal investment in historic preservation nationwide funds are used to support surveys, comprehensive historic preservation plans, and nominations to the National Register of Historic Places (restoration grants are also eligible activities) - specific funding decisions are made by the state, not the federal government, based on comprehensive historic preservation plans developed with citizen involvement.	http://www2.cr.nps.gov/hpf/index.htm
Wetlands Conservation Grants	U.S. Department of the Interior	Assists states to acquire, restore, manage, and enhance their coastal wetland resources. The program's emphasis on encouraging partnerships, supporting watershed planning, and leveraging ongoing projects ensures that the use of limited funds results in maximum benefits. An estimated $1 million is available; maximum grant amount is $50,000.	http://www.fws.gov/cep/cwgcover.html
Wetlands Reserve Program	U.S. Dept. of Agriculture, Natural Resources Conservation Service, American Heritage Rivers	Financial assistance program that seeks to restore and protect farmed wetlands, previously converted wetlands, wetlands farmed under natural conditions, riparian areas, and eligible buffer areas. Landowners with eligible land agree to enter into a permanent or long-term easements.	Conservation and Environmental Protection Division, Natural Resources Conservation Service, U.S. Dept. of Agriculture, P.O. Box 2890, Washington, DC 20013

Program or Organization	Sponsor	Description	Internet/Email Address
Refuge Challenge Cost Share Program	U.S. Department of the Interior, U.S. Fish and Wildlife Service	The program works with conservation groups, private individuals, public agencies, and other non-federal sources to develop projects that assist in the operation and maintenance of service lands and improve habitat on private lands through matching funds.	http://news.fws.gov/newsreleases/R3/F41A0AB0-C574-11D4-A17B009027B6B5D3.html
Partners for Fish and Wildlife Program	U.S. Department of the Interior, U.S. Fish and Wildlife Service	Provides technical and financial assistance to private landowners who voluntarily restore degraded wildlife habitat. The program is also often a catalyst for longer-term habitat protection. Partners for Fish and Wildlife projects are often part of permanent federal or state conservation easement or acquisition programs. The Partners program also encourages funding from other organizations to help complete projects. These other organizations include federal, state, and local governments, academic institutions, tribes, and conservation organizations such as The Nature Conservancy, Ducks Unlimited and Trout Unlimited.	http://arlingtontexas.fws.gov/pfw.htm ; http://partners.fws.gov/

Program or Organization	Sponsor	Description	Internet/Email Address
North American Wetlands Conservation Act Funding Small Grants Program	U.S. Department of the Interior, U.S. Fish and Wildlife Service	Encourages voluntary, public-private partnerships to conserve North American wetland ecosystems. It establishes an infrastructure and provides a source of funding to accomplish that end. The Grants Program is focuses on projects involving: the restoration, management, or enhancement of a wetland ecosystem to benefit wildlife. The Act created a grants program to help support partners' conservation activities. Anyone can apply for a grant at anytime, but certain criteria must be met to have a project funded.	http://northamerican.fws.gov/NAWCA/grants.htm
Urban and Community Forestry	U.S. Department of Agriculture, Forest Service	Aids in managing forests and related natural resources in populated areas. The Forest Service provides program leadership and coordination. Program delivery primarily occurs at the State level, through State foresters, key partners, and the Forest Service, which contribute to a Statewide linkage of diverse groups and programs.	http://www.urbanforestrysouth.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Urbanized Area Formula Grants	U.S. Department of Transportation, Federal Transit Administration (FTA)	Provides funding for transit capital projects, such as buses, and assistance for operating expenses to urbanized areas with a population of 50,000 or more. Funds are apportioned by a formula based on population, population density, and other factors associated with transit service and ridership.	http://www.fta.dot.gov/grant_programs/specific_grant_programs/urbanized/4133_7940_ENG_HTML.htm
Watershed Protection and Flood Prevention Loans	U.S. Department of Agriculture, Rural Utilities Service	To provide loan assistance to sponsoring local organizations in authorized watershed (WS) areas for share of cost for works of improvement. Loan funds may be used to help local sponsors provide the local share of the cost of watershed works of improvement for flood prevention, irrigation, drainage, water quality management, sedimentation control, fish and wildlife development, public water abased recreation, and water storage and related costs. The total amount of WS loans outstanding in any one watershed cannot exceed $10,000,000.	http://www.cfda.gov/public/viewprog.asp?progid=137

Program or Organization	Sponsor	Description	Internet/Email Address
Rivers, Trails, and Conservation Assistance	U.S. Department of the Interior, National Park Service	Helps citizens and local groups undertake conservation projects such as protecting rivers, developing trails, and providing outdoor recreational opportunities. The National Park Service, in partnership with citizens and state and local governments, assists in the early phases of projects, usually for up to three years. This early assistance equips local groups with the tools necessary to complete projects independently.	http://www.nps.gov/rtca/
Recreational Trails Program	U.S. Department of Transportation	Provides funding for both motorized and nonmotorized recreational trail projects. Each state administers its own program, usually through a state resource or park agency, and develops its own procedures to solicit and select projects for funding. For trail project proposals, first contact the state to find out the program requirements and criteria for project selections.	http://www.fhwa.dot.gov/environment/rectrails/index.htm

Program or Organization	Sponsor	Description	Internet/Email Address
D3. Non-Profit Organizations (NPO)			
Bonneville Environmental Foundation (BEF)	BEF	The Bonneville Environmental Foundation (BEF) was founded in 1998 to support watershed restoration programs and develop new sources of renewable energy. Funding for these efforts has been provided in a way that would be called unusual for most foundations. BEF, a not-for-profit organization, markets green power products to public utilities, businesses, government agencies and individuals.	http://www.b-e-f.org
Brainerd Foundation	Brainerd Foundation	The Brainerd Foundation's mission is to protect the environmental quality of the Pacific Northwest and to build broad citizen support for environmental protection. It accomplishes this by making grants, providing value-added guidance and leveraging additional funds or encouraging collaborations within the philanthropic community. Washington, Oregon, Idaho, Montana, Alaska, British Columbia, and the Yukon Territory comprise its geographic funding region.	http://www.brainerd.org/

Program or Organization	Sponsor	Description	Internet/Email Address
The Conservation Technology Support Program (CTSP)	CTSP	The Conservation Technology Support Program (CTSP) annually awards grants of equipment plus software and training to 501c3 tax-exempt conservation organizations to build their Geographic Information Systems (GIS) capacity.	http://www.ctsp.org/
Environmental Grantmakers Association (EGA)	EGA	The EGA exists as a voluntary association of foundations and giving programs concerned with the protection of the natural environment.	www.ega.org
Grand Traverse Land Use and Conservation Planning Fund	Grand Traverse Land Use and Conservation Planning Fund	The community-based fund was created with an initial grant from the C.S. Mott Foundation to promote land use educational programs, regional planning projects, to assist in obtaining options of valuable lands at immediate risk of development, and support research on economic, environmental and social impacts of land use and conservation planning.	http://www.gtrcf.org/funds/fund.cfm?fundID=2

Program or Organization	Sponsor	Description	Internet/Email Address
The Great Lakes Protection Fund	The Great Lakes Protection Fund	The Great Lakes Protection Fund is a private, nonprofit corporation formed in 1989 by the Governors of the Great Lakes States. It is a permanent environmental endowment that supports collaborative actions to improve the health of the Great Lakes ecosystem. The Fund seeks projects which lead to tangible improvements in the health of the Great Lakes ecosystem, promote the interdependence of healthy ecological and economic systems, and are innovative, creative, and venturesome. Current Fund interests include: preventing biological pollution restoring natural flow regimes and using market mechanisms for environmental improvement.	http://www.glpf.org/
The Lawrence Foundation	The Lawrence Foundation	The Lawrence Foundation is a private charitable foundation focused on making charitable contributions and grants to support educational, environmental, health and other causes. The Lawrence Foundation was founded in mid-2000 by Jeff Lawrence and Diane Troth. Nonprofit organizations that qualify for public charity status under section 501(c)(3) of the Internal Revenue Code or other similar organizations are eligible for contributions or grants from The Lawrence Foundation.	http://www.thelawrencefoundation.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Kongsgaard-Goldman Foundation (KGF)	KGF	The Foundation's primary funding area will be in Environmental conservation and restoration in the Pacific Northwest, in civic development and civil rights in the Pacific Northwest, and in artistic expression in the State of Washington.	http://www.kongsgaard-goldman.org/
The Lumpkin Foundation	The Lumpkin Foundation	The Foundation's mission is to provide leadership, individually and collectively, both locally and globally, to enrich its respective communities and in so doing preserve the traditions and goals of the family. It is dedicated to supporting education, preserving and protecting the environment, and fostering opportunities for leadership, with special consideration to its heritage in East Central Illinois.	http://www.lumpkinfoundation.org/
The JoMIJo Foundation	The JoMIJo Foundation	The Foundation's mission is to aid disenfranchised persons or communities through targeted funding of grassroots efforts that improve the quality of people's lives and preserve the earth's natural environment.	http://www.jomijo.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Charles Stewart Mott Foundation	Charles Stewart Mott Foundation	Through two funding priorities, the Foundation aims to create institutions, policies and development models that secure environmental quality in the United States and around the world: Reform of International Finance and Trade works to reform the environmental policies and practices of international financial and trade institutions. Conservation of Freshwater Ecosystems in North America advances the conservation and restoration of freshwater ecosystems, with an emphasis on the Great Lakes region and select ecoregions in the Southeastern United States. Occasionally, the Foundation uses Special Initiatives to respond to unique opportunities to advance environmental protections.	http://www.mott.org/
The Nasasdy Foundation	The Nasasdy Foundation	The Nádasdy Academy's mission will be the establishment of a "model" institution where the arts are directly linked to the protection and rehabilitation of the environment. It will become a "Habitat" for artists, environmentalists, decision makers and creative visionaries for round table discussions, target-specific programs, in the belief that solutions can be found between those with creative ideas and those with power to make decisions.	http://www.nadasdy.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Pew Charitable Trusts	Pew Charitable Trusts	The Pew Charitable Trusts support nonprofit activities in the areas of culture, education, the environment, health and human services, public policy and religion. Based in Philadelphia, the Trusts make strategic investments that encourage and support citizen participation in addressing critical issues and effecting social change. The Environment program aims to promote policies and practices that protect the global atmosphere and preserve healthy forest and marine ecosystems.	http://www.pewtrusts.com/
U.S. Public Interest Research Group (PIRG)	PIRG	U.S. PIRG speaks for the public interest against the special interests, on issues in the news and below the surface.	http://www.uspirg.org/
Planet Dog Philanthropy	Planet Dog Philanthropy	Planet Dog Philanthropy has three program areas that it will fund: the environment, animal welfare and education. Under "Environment," a broad and expansive topic covering myriad subjects, Planet Dog Philanthropy has four areas of focus: 1. Reduction of Air and Water Pollution 2. Wilderness/Forest Protection 3. Preservation and Conservation and Management of Ecosystems 4. Waste Reduction	http://www.planetdogphilanthropy.org/

Program or Organization	Sponsor	Description	Internet/Email Address
The Prospect Hill Foundation	The Prospect Hill Foundation	The foundation's environmental grant-making concentrates on habitat and water protection in the northeastern region of the United States. In addition, a few grants are awarded each year to advance habitat and ecosystem preservation in Latin America. The Foundation encourages proposals from organizations exhibiting leadership that: 1. Offer strategies and policies for the conservation of significant private and public lands 2. Strengthen policies and initiate means of improving water quality and protecting coastal areas	http://fdncenter.org/grantmaker/prospecthill/

Program or Organization	Sponsor	Description	Internet/Email Address
Rockefeller Family Fund	Rockefeller Family Fund	Emphasizes conservation of natural resources, protection of health as affected by the environment, meaningful implementation and enforcement of the nation's environmental laws, the cessation and cleanup of pollution caused by the Department of Energy and the Department of Defense, and public participation in national environmental policy debates. Examples of past grants which fit these guidelines include support for a coalition of grassroots groups to undertake advocacy campaigns in state capitals and Washington, D.C.; funding for national environmental coalitions to encourage field organizing and public education; support for a new organization working on health and environment issues; and support for coalitions working to pressure Governors and federal agencies to enforce the law against harmful polluters.	http://www.rffund.org/

Program or Organization	Sponsor	Description	Internet/Email Address
Turner Foundation	Turner Foundation	The Turner Foundation is committed to preventing damage to the natural systems - water, air, and land - on which all life depends. The Foundation makes grants in the areas of the environment and population. The main components of its program are: 1. Protection of water and reduction of toxic impacts on the environment 2. Improved air quality through promotion of energy efficiency and renewables and improved transportation policies and practices 3. Protection of biodiversity through habitat preservation 4. Development and implementation of sound, equitable practices and policies designed to reduce population growth rates.	http://www.turnerfoundation.org/
Wilburforce Foundation	Wilburforce Foundation	The Foundation funds organizations that seek to protect wilderness and wildland areas that are vital to sustaining the ecological integrity of Western Canada and the Western United States.	http://www.wilburforce.org/

Program or Organization	Sponsor	Description	Internet/Email Address
D4. Other			
Mining and the Environment	Natural Resources of Canada	Provides information and links for the Canadian Natural Resources association's activities in mining planning, operations, restoration and research	http://www.nrcan.gc.ca/mms/scho-ecol/env/mae_e.htm
MiMi Programme - Mitigation of the environmental impact from mining waste	Swedish Foundation for Strategic Environmental Research (MISTRA)-funded Research Programme	Provides information about the MiMi program, a collaboration of various disciplines of science researching new and improved methods for management of mining waste	http://www.mistra.org/eng/index.php?nav=http://www.mistra.org/eng/program_list.php
National Mine Land Reclamation Center	University of West Virginia	Provides information about and links for the NMLRC, its partners/sponsors, projects, events, and publications	http://www.nrcce.wvu.edu/nmlrc
Western Governors' Association (WGA)	Western Governors' Association	Provides information about and links for the WGA's mission, news and reports, working groups, and its abandoned mine cleanup program including the proposed "Good Samaritan Abandoned or Inactive Mine Waste Remediation Act"	http://www.westgov.org/
National Mining Association (NMA)	National Mining Association	Provides information about the NMA, its organization, objectives, and abandoned mine land cleanup program	http://www.nma.org/
National Association of Abandoned Mine Land Programs	National Association of Abandoned Mine Land Programs	Provides information about and links for the NAAMLP, its members, by-laws, officers, newsletter, and abandoned mine hazards	http://www.onenet.net/~naamlp/members.htm

Program or Organization	Sponsor	Description	Internet/Email Address
National Association of State Land Reclamationists (NASLR)	National Association of State Land Reclamationists	Provides information about and links for the NASLR's mission, history, committees, outreach activities and educational grant program	http://www.siu.edu/~coalctr/naslr.htm
Abandoned Mine Lands Reclamation Trust Fund	U.S. Soccer Foundation (USSF)	Working with OSM, EPA, and local communities, USSF provides the field engineering expertise to ensure the quality of the soccer fields redeveloped from AML	http://www.ussoccerfoundation.org/AST/ACT/AML.html
Acid Drainage Technology Initiative (ADTI)	ADTI	ADTI-MMS uses consensus to promote scientifically sound mineral development that minimizes adverse impacts on water and maximizes beneficial post-mining land uses.	http://www.unr.edu/mines/adti/
Great Plains/Rocky Mountain Hazardous Substance Research Center	Great Plains/Rocky Mountain Hazardous Substance Research Center	Comprising two tribes and eleven other universities, Kansas State University leads the Great Plains/Rocky Mountain Hazardous Substance Research Center. The center researches hazardous substances produced through agriculture, forestry, mining, mineral processing, and other activities, throughout EPA Regions 7 & 8. Specific AML-related projects focus on soil and water contaminated by heavy metals from mining wastes.	http://www.engg.ksu.edu/HSRC/

Program or Organization	Sponsor	Description	Internet/Email Address
Interstate Mining Compact Commission (IMCC)	IMCC	The IMCC represents the natural resource interests of its 17 member and three associate member states. The Commission operates through several committees composed of duly appointed representatives of the Governors from their respective Departments of Natural Resources or Environmental Protection. Issues pursued by IMCC include groundwater and stormwater regulations, inactive and abandoned mine reclamation, and zoning and other land use restrictions.	http://www.imcc.isa.us/
Montana State University Reclamation Research Unit	Montana State University	The Montana State University Reclamation Research Unit researches and develops new techniques for repairing mine soils and damaged landscapes with the goal of developing innovative, cost-effective reclamation methods that could aid collaborators in successful AML cleanups.	http://www.montana.edu/reclamation/
Center for Mine Land Redevelopment	Center for Mine Land Redevelopment	Multi-disciplinary organization that works to bring together partners to perform research, training, technology transfer, and outreach to local communities to help promote innovative solutions to mine redevelopment and reclamation	http://www.utah.edu/uees/mlr/index.html

Program or Organization	Sponsor	Description	Internet/Email Address
Mine Environment Neutral Drainage (MEND)	MEND	The MEND partnership between the Canadian government and the mining industry of Canada works on developing technology for abandoned hard rock mine sites. MEND calls itself an "internationally recognized model of government-industry cooperation," from which other countries may benefit.	http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/mend/default_e.htm