

## THE REST OF THE STORY: DOCUMENTATION

1971

### *The Pew Story:*

New Mexico Game & Fish Department finds no fish in the Red River below molybdenum mine. Between 1966 and 1976, the mine has 80 spills. The site is added to the Superfund National Priority List in 2000.

### *The Rest of the Story:*

MolyCorp's Questa mine is a classic example of a historic mine that remained in operation through the promulgation of modern mining laws and regulations. The mine and mill began operation in the 1920s and operated generally in a continuous pattern to the present on private, patented land. It was designed long before any environmental regulations. As noted on the PEW timeline, the "80 spills" occurred prior to enactment of the Federal Water Pollution Control Act (1966 - 1976). Placement on the NPL was a direct result of pre-law actions. Also of note is that effective state regulation of hard rock mining did not begin until promulgation of the New Mexico Mining Act of 1993 that created the New Mexico Mining Commission and the Mining and Minerals Division of the Energy, Minerals and Natural Resource Department.

1975

### *The Pew Story:*

Mike Horse dam fails, flushing 100,000 tons of tailings into Montana creek and Upper Blackfoot River. The spill kills all aquatic life in a 10-mile stretch. In 2004, the Forest Service declares the dam "compromised;" toxic metal releases continue in 2006.

### *The Rest of the Story:*

Mining of the Mike Horse Mine began in 1898 and was expanded into a larger operation in 1919. In 1938, the Mike Horse Mining and Milling Company leased the mine and built a 150 tons-per-day flotation mill. In 1941, the Mike Horse Dam was built across Beartrap Creek to contain the tailings generated from the flotation mill. In 1975, heavy rains caused a partial failure of the dam and high creek waters eroded contaminated tailings into Beartrap Creek and the Upper Blackfoot.

In 2005, a U.S. Forest Service (Forest Service) Dam Safety Report determined that the dam was unsafe, and recommended that it be removed from service. The Forest Service released an action memorandum in 2007 calling for the removal and disposal of the dam, mill tailings, and wastes. The dam sits in a floodplain at the headwaters of the Blackfoot River, and the tailings behind it will be moved to a repository on higher ground on ASARCO property. The project also will include cleanup of tailings along the Upper Blackfoot River, Beartrap Creek and Mike Horse Creek and the state will restore those streams to eventually bring back west slope cutthroat and

bull trout. The project will be fully funded by Atlantic Richfield Co. (ARCO; now owned by British Petroleum) and ASARCO LLC.

Mike Horse was in operation long before either federal regulations or State of Montana regulations were promulgated.

1978
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*The Pew Story:*

Sudden subsidence at a Colorado underground mine drains an overlying lake entirely.

*The Rest of the Story:*

The Sunnyside Mine in Lake Emma Basin was discovered in 1873. Several owners mined it almost continuously from 1880-1930. It was forced to shut down for a short period in 1920 due to the fall in metal prices after World War I and again in 1930 due to the stock market crash. It reopened and closed within a year in 1937-1938 due to a quick rise and fall in metal prices.

Standard Uranium Company reopened the Sunnyside Mine in 1959 with the extension of the American Tunnel beneath the Washington Shaft. Even though the mine suffered bankruptcies, company changes, and a major flood caused by mining into Lake Emma in 1978, it was San Juan County's largest producer and employer until 1991.

Numerous underground mines worked the rich veins around and under Lake Emma since the late 19<sup>th</sup> century. The workings of the Sunnyside that ultimately stopped into the lake had been in generally continuous operation without incident from 1959, significantly prior to any environmental laws or regulations at any governmental level. At the time of the incident, the Colorado Mined Land Reclamation Act was less than two years old.

1979
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*The Pew Story:*

New Mexico tailings dam breaks, releasing nearly 94 million gallons of acidic, radioactive wastewater into Rio Puerco. Groundwater contamination results in a 1983 Superfund listing. (*Un-named mine. Believed to be Northeast Church Rock site*)

*The Rest of the Story:*

The Northeast Church Rock mine and mill site, like many of the Uranium mining sites in McKinley County, New Mexico was discovered in the late 1940s and mined extensively from the 1950s into the early 1980s. At that time, production of uranium ore and processed yellowcake was sold directly to the U.S. Government. These operations were largely unregulated by the Nuclear Regulatory Commission and its precursor, the only federal agency with authority over these operations at the time. Effective state regulation of mining did not begin until promulgation of the New Mexico Mining Act of 1993 that created the New Mexico Mining

Commission and the Mining and Minerals Division of the Energy, Minerals and Natural Resource Department. The lack of regulation of these New Mexico uranium operations occurred prior to the advent of modern New Mexico environmental laws and regulations, including strict bonding and reclamation requirements. The processes and lack of sound engineering that led to the tailings dam failure that led to the 1983 listing on the NPL were the result of pre-regulatory operations. This site was remediated under Superfund and funded in part by the principal PRP, United Nuclear Corp.

<b>1981</b>
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*The Pew Story:*

Cyanide heap leach operation in Washington is abandoned one year after start-up. The state takes emergency action to protect water supplies. EPA completes cleanup in 1997.

*The Rest of the Story:*

The Silver Mountain Mine site is an abandoned silver and gold mine site located in Horse Springs Coulee, approximately six miles northwest of Tonasket, Washington. The site covers five acres. The mine operated sporadically from 1928 to the 1960s. From 1980 to 1981, Precious Metals Extraction, Ltd. (a Canadian junior company), constructed a cyanide heap leach pile located north of the mill foundation and attempted to extract silver and gold from the previously mined materials and existing mill tailings. By 1983, the site was abandoned, and the mine tailings and holding basin, which contained cyanide-contaminated water, were left behind. (EPA deleted this site from the National Priorities List (NPL) in September 1997.)

As with other sites such as Summitville in Colorado, Zortman-Landusky in Montana, Formosa in Oregon, and others, the Silver Mountain case is one in which an under-capitalized company attempted to re-enter a historic mining area that had been disturbed long before enactment of any environmental laws and regulations. The Washington Metals Mining and Milling Operations Act that established a scheme for promulgation of strict mining and milling rules and regulations was not passed until 1994, more than a decade following the Silver Mountain incident. The key elements of Washington's present rules that were not available to the state at the time of Silver Mountain are provisions for strict mandatory inspections, specific bonding, engineering design criteria, waste rock management plans, specific cyanide regulations, and citizen involvement rules.

<b>1982</b>
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*The Pew Story:*

New Mexico's Northeast Church Rock uranium mine closes. Twenty-two years later, the company submits a plan to reclaim the mine.

*The Rest of the Story:*

This story is part of the Pew Story listed and responded to herein in "1979".

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*The Pew Story:*

Mine dewatering pumps are turned off at Montana's Berkeley mine. The massive pit begins to fill with acidic water. In 1995, more than 300 snow geese perish in the pit. In 2002, costs to protect local drinking water are projected to run to \$110 million.

*The Rest of the Story:*

The Berkeley Pit is located in Butte, Montana. It stands at the headwaters of the Clark Fork River and has been a center of extensive underground mining since the 1870s. When underground mining finally ended in the vicinity of the pit in 1975, the workings included over 49 miles of vertical shafts and over 5,600 miles of horizontal drifts and workings. The Anaconda Company estimated there were over 10,000 miles of workings when all other passages were included. The Anaconda Company began open pit mining at the Berkeley Pit in 1955. The Atlantic Richfield Company (ARCO; now owned by British Petroleum) bought the Anaconda Company in 1977 and continued to operate the underground pumping system until April 1982, when the decision was made to suspend mining in the Berkeley Pit.

This example is yet another of a historic mine that was in operation long before the current environmental laws were passed that regulate mining today at either the state or the federal level. The "modern-era" environmental challenges at this site are the direct result of historic, pre-regulation mining practices. Modern Montana State and federal regulations for mining mandate the use of sound engineering practices and effective environmental pollution control technology that would prevent these problems from developing in the first place. For example, BLM and the State of Montana have stringent data collection requirements, including waste characterization studies to identify potentially acid-generating materials. A substantial portion of the environmental problems at Butte are due to acid drainage. If Butte were being permitted as a new mining proposal under current regulations, specific mine waste management techniques would be required to manage the acid-generating materials. Additionally, the closure design would have to document that acid generation would not become a problem in the future. Current regulations could also require the project proponent to establish a long-term trust fund to serve as an additional safeguard should unanticipated problems develop in the future.

It should also be noted that the environmental restoration work in the Butte – Anaconda district is some of the most impressive in the country, turning what used to be unusable, contaminated land into scenic and desirable recreational resources. This work has been paid for by private sector funds.

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*The Pew Story:*

Four years after start-up, operation to recover metals from previously mined ores is abandoned. Cyanide and lead contamination at the New Mexico site brings 1983 Superfund listing. (*Unnamed mine. Believed to be the Cimarron mill site*)

*The Rest of the Story:*

The Cimarron mill site, located in Lincoln County, New Mexico operated a toll mill from 1979 to 1982. Mining did not occur on the privately owned 5-10 acre site. Ore was transported to the mill from off-site. The State of New Mexico cited the Cimarron Mining Corporation for water pollution violations in 1983, and the company declared bankruptcy in October 1984. The site was finally listed on the National Priorities List in 1989, not 1983 as noted in The Pew Story.

As with most of the Pew cases, this case occurred prior to the enactment of modern metal mining regulations and requirements. The New Mexico Mining and Minerals Division strictly regulates metal mining and milling in New Mexico. The Division, and the mining regulations it promulgated, was authorized by the New Mexico Mining Act of 1993, a decade after the Cimarron case and four years following site NPL listing.

<b>1986</b>
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*The Pew Story:*

Chino mine spills 16,200 gallons of wastewater into New Mexico's Whitewood Creek. Investigators find that the mine has released significant quantities of heavy metals and acids to the creek and groundwater.

*The Rest of the Story:*

Chino is an open pit copper mine that opened in 1909 within a 1800s mining district. The mine has been in generally continuous operation from 1909 to the present using both milling and SX/EW processes. In 1986, during inclement weather, a major power failure caused recycled process water to cycle to an emergency containment basin. Under heavy rainfall, this basin overflowed causing the noted incident. The company remedied the operational problem and was fined by the New Mexico Environmental Improvement Division.

This case is an example of an operation and maintenance (O&M) failure that was quickly remedied. Such O&M incidents can occur in any industry or business. As noted elsewhere herein, this case occurred prior to modern state metal mining regulations and requirements at a long operating, historic mine that, to this day, continues to upgrade its systems and its environmental management. The New Mexico Mining and Minerals Division strictly regulates metal mining and milling in New Mexico. The Division, and the mining regulations it promulgated, was authorized by the New Mexico Mining Act of 1993, seven years following this case.

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*The Pew Story:*

Newly opened California gold mine experiences spills and equipment failures. Operations cease in 1994; as the mine pit fills, arsenic levels rise unexpectedly. After state and county lawsuits, cleanup begins in 2006. (*un-named operation; thought to be Jamestown*)

*The Rest of the Story:*

The Jamestown mine is among the earliest California gold discoveries and operated in the Jamestown district discontinuously since the late 1840s. The Sonora Mining Corporation (SMC) constructed new facilities and mined the patented site via three open pits from 1986 until 1994 when it closed permanently. During SMC's period of operations there were incidents of internal equipment failure leading to minor spills, all of which were contained. As noted by the EPA in 1995, "*In all cases, the mechanical causes of the spills have been repaired or replaced. All waste have been contained and returned to the site; all water was collected by sumps and returned to the appropriate portion of the facility.*" (U.S. EPA, Office of Solid Waste, "Human Health and Environmental Damages from Mining and Mineral Processing Wastes". Dec. 1995.)"

Upon closure, two of the pits were completely back-filled, while the Harvard pit was allowed to fill. As noted, the pit water contained elevated levels of arsenic. The mine was bonded for \$2.7 million.

The California Surface Mining and Reclamation Act of 1975 was enacted to establish mining and reclamation rules and regulations for metal mines within the state.

Again, Jamestown is not an 1872 Mining Law reform issue. Rather, as with most of these cases, it is an example of how regulatory bodies, both state and federal, have strengthened existing laws and regulations in recent years in response to past experiences.

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*The Pew Story:*

Over 1500 birds are killed at newly opened Paradise Peak heap leach operation. In 1993, mining and milling ends, and the Nevada site changes ownership. After the new owner's bankruptcy, the site is abandoned. Reclamation costs may top \$21 million.

*The Rest of the Story:*

The Migratory Bird Treaty Act of 1918 protects all migratory birds (including, but not limited to waterfowl), and has considerable civil and criminal penalties attached to its violation. The U.S. Fish and Wildlife Service (USFWS) administers provisions of the act. Violations of the Act are not unique to mining, but rather, cut across a wide swath of industries and facilities. For example, bird mortalities from petroleum ponds, livestock feedlot catchments, open municipal wastewater treatment systems, over-chlorinated swimming pools, and backyard garden ponds over-treated with herbicides or pesticides are violations.

As precious metal heap leach operations using sodium cyanide and SX/EW copper operations using acid in arid settings became more numerous in the early 1980s, it was noted that these sites with open water impoundments were a natural attractant to migrating waterfowl, shorebirds, and local migratory passerines. Mortalities occurred. As this problem was recognized, the Bureau of Land Management (BLM), Forest Service, and state agencies quickly changed their regulatory approaches, requiring that safeguards be installed at those facilities. Mitigation technologies such as, but not limited to, cyanide neutralization in tailing impoundments, netting, or capping with

balls or mats were developed and employed to deter migrating birds from landing on these facilities.

During this same period, the USFWS began taking an increased interest in the situation and worked directly with mine operators and various state and federal regulatory agencies to eliminate the problem. The following excerpt from the USFWS' website (<http://www.fws.gov/news/cyanide3.html>) documents the success of this collaboration:

Over the past decade, we've worked closely with the mining industry to address the problem of bird mortality, said Kevin R. Adams, chief of the Service's law enforcement division. Education, enforcement, and teaming to find solutions are helping to safeguard a natural resource every bit as valuable as gold.

Cyanide heap leaching, which uses cyanide solutions to recover gold from large piles of low- grade ore, set off a new U.S. "gold rush" in the late 1980s and early 1990s by making it profitable to "mine" rock containing only small amounts of metal. Heap leach gold mines, however, collect cyanide-laden wastewater in huge holding ponds, some of which cover as much as 60 acres.

In the semiarid west, these ponds attract migratory birds; they promise water, food, and rest, but deliver instead a lethal dose of cyanide. Every bird fatality occurring at one of these ponds violates the Migratory Bird Treaty Act, a longstanding federal law that makes it illegal to kill any of more than 800 protected bird species.

Service law enforcement officers have investigated bird deaths at heap leach gold mines in Colorado, Nevada, South Dakota, and Montana. "We've seen fines and penalties assessed in many cases, but more importantly, we've alerted the industry to the problem. Many companies are working with us to protect birds," Adams said.

The industry has successfully identified ways to help eliminate bird fatalities. Smaller ponds are now netted to keep birds out, and new techniques for applying cyanide solutions to ore heaps prevent toxic liquids from collecting and attracting birds. Companies have installed cyanide recovery systems to treat mine wastes, removing cyanide for reuse at the mine and detoxifying the large holding ponds, making them safe for birds.

In one recent case, for example, the Service documented the deaths of hundreds of birds at a Montana gold mine. Charged with the illegal take of migratory birds, the mine agreed to a negotiated settlement involving payment of a \$10,000 fine and the installation of a \$5.1-million cyanide recovery system to prevent future bird mortalities.

In Nevada, this collaboration led to the development of the Industrial Artificial Pond permit program administered by the Nevada Division of Wildlife. According to the Nevada Department of Conservation and Natural Resources, as a result of this permit program, overall wildlife

mortalities at mine sites decreased from over 2,000 individuals in 1986 to just over 300 in 1997. Less than 50 percent of the 1997 mortalities were the result of contact with permitted ponds containing cyanide (<http://dcnr.nv.gov/nrp01/res05.htm>).

Rather than indicating any shortcomings with the 1872 Mining Law, the industry's and regulatory agencies' response to bird mortalities at mining operations proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions.

<b>1989</b>
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*The Pew Story:*

Carson Hill gold mine in California spills 91,450 gallons of cyanide solution into the Melones Reservoir.

*The Rest of the Story:*

Gold mining in the historic Carson Hill district was conducted intermittently since about 1850 (among the earliest California gold discoveries). Western Mining Corporation constructed new heap leach facilities and mined at the site from the mid-1980s until 1992 when it closed permanently. In 1989, a loose pipe coupling caused the release of solution as noted. Upon discovery, operations staff made repairs and immediately notified all regulating agencies as required. Water quality testing at the reservoir 6 hours following the spill revealed a very low free cyanide level of 100 parts per billion. Sampling that followed eight days later found no detectable traces of either cyanide or metals (U.S. EPA, Office of Solid Waste, "Human Health and Environmental Damages from Mining and Mineral Processing Wastes". Dec. 1995.)

The California Surface Mining and Reclamation Act of 1975 was enacted to establish mining and reclamation rules and regulations for metal mines within the state. The act created the California State Mining and Geology Board to promulgate rules and regulations for mining in the state. Since the first rules were issued, the SMGB has continuously revisited and amended the regulations as gaps were discovered. Consequently, California arguably is among the most stringent regulator of mining operations in the nation. Engineered facility designs presently are more carefully scrutinized in order to eliminate or minimize the type of O&M failure such as occurred at Carson Hill in 1989. The SMGB's latest revision of its rules was in January 2007.

The Carson Hill incident was an isolated O&M issue at a permitted and established mining operation with a good compliance record.

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*The Pew Story:*

Norse-Windfall site in Nevada is abandoned without reclamation. A 1995 investigation identifies contamination with arsenic, mercury, cyanide and other pollutants.

*The Rest of the Story:*

The Norse-Windfall Mill Site is located 5 miles south of Eureka, Nevada. It is located in the Diamond Valley hydrographic basin in which perennial springs are prolific in the mountainous regions south of Eureka. The Windfall Mine was discovered in 1908, and was operated intermittently for about 30 years as an underground operation with a cyanide vat leach facility. Around 1968, Idaho Mining Corp. acquired the property and mined the same ore body via open pit methods. Between 1975 and 1978, the Windfall Pit, and associated cyanide heap-leach piles, waste dumps, mill process building, office and laboratory were constructed. The last operator of the site was Norse Windfall Mines, Inc. The site has been abandoned since 1989. Reclamation was minimal. In July 1994, the Nevada Division of Environmental Protection (NDEP) conducted a compliance inspection of the site and noted an essentially unreclaimed condition.

The Norse-Windfall site is considered an abandoned site, given its history of mining activity over a 100-year period. As with several similar scenarios, state and federal mining regulations have been strengthened significantly over the two decades since the 1980s. Under the present BLM and NDEP regulations, bonding for complete reclamation is required for mining and milling operations. BLM and NDEP now use customized reclamation cost estimating software to provide a comprehensive and standardized approach to calculating reclamation bonding requirements. In addition, requirements for compliance inspections by state and federal regulators have been enhanced significantly.

1990
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*The Pew Story:*

More than 1000 waterfowl die at McCoy/Cove gold mine. Nevada wildlife officials contend that bird deaths escalated after mine expansion in 1988.

*The Rest of the Story:*

The Migratory Bird Treaty Act of 1918 protects all migratory birds (including, but not limited to waterfowl), and has considerable civil and criminal penalties attached to its violation. The U.S. Fish and Wildlife Service (USFWS) administers provisions of the act. Violations of the Act are not unique to the mining, but rather, cut across a wide swath of industries and facilities. For example, bird mortalities from petroleum ponds, livestock feedlot catchments, open municipal wastewater treatment systems, over-chlorinated swimming pools, and backyard garden ponds over-treated with herbicides or pesticides are violations.

As precious metal heap leach operations using sodium cyanide and SX/EW copper operations using acid in arid settings became more numerous in the early 1980s, it was noted that these sites with open water impoundments were a natural attractant to migrating waterfowl, shorebirds, and local migratory passerines. Mortalities occurred. As this problem was recognized, the Bureau of Land Management (BLM), Forest Service, and state agencies quickly changed their regulatory approaches, requiring that safeguards be installed at those facilities. Mitigation technologies such as, but not limited to, cyanide neutralization in tailing impoundments, netting, or capping with

balls or mats were developed and employed to deter migrating birds from landing on these facilities.

During this same period, the USFWS began taking an increased interest in the situation and worked directly with mine operators and various state and federal regulatory agencies to eliminate the problem. The following excerpt from the USFWS' website (<http://www.fws.gov/news/cyanide3.html>) documents the success of this collaboration:

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Service law enforcement officers have investigated bird deaths at heap leach gold mines in Colorado, Nevada, South Dakota, and Montana. "We've seen fines and penalties assessed in many cases, but more importantly, we've alerted the industry to the problem. Many companies are working with us to protect birds," Adams said.

The industry has successfully identified ways to help eliminate bird fatalities. Smaller ponds are now netted to keep birds out, and new techniques for applying cyanide solutions to ore heaps prevent toxic liquids from collecting and attracting birds. Companies have installed cyanide recovery systems to treat mine wastes, removing cyanide for reuse at the mine and detoxifying the large holding ponds, making them safe for birds.

In one recent case, for example, the Service documented the deaths of hundreds of birds at a Montana gold mine. Charged with the illegal take of migratory birds, the mine agreed to a negotiated settlement involving payment of a \$10,000 fine and the installation of a \$5.1-million cyanide recovery system to prevent future bird mortalities.

In Nevada, this collaboration led to the development of the Industrial Artificial Pond permit program administered by the Nevada Division of Wildlife. According to the Nevada Department of Conservation and Natural Resources, as a result of this permit program, overall wildlife

mortalities at mine sites decreased from over 2,000 individuals in 1986 to just over 300 in 1997. Less than 50 percent of the 1997 mortalities were the result of contact with permitted ponds containing cyanide (<http://dcnr.nv.gov/nrp01/res05.htm>).

The mine operator voluntarily shut down the mill for a couple of months to install a state-of-the-art SO<sub>2</sub> cyanide destruction circuit. The use of this technology eliminated future avian mortality problems due to cyanide exposure at this mine.

Rather than indicating any shortcomings with the 1872 Mining Law, the industry's and regulatory agencies' response to bird mortalities at mining operations proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions. Moreover, the mine operator's voluntary shut down of the mill to install the cyanide destruction circuit is an example of a mine operator going the extra mile to identify and implement an effective solution when a problem occurred.

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*The Pew Story:*

Construction begins on pipeline to carry wastewater from the Mountain Pass mine. Between 1984 and 1993, 727,000 gallons spill from the mine in the Mojave National Preserve. In 1996, spills exceed 350,000 gallons.

*The Rest of the Story:*

The Mountain Home mine, owned by MolyCorp, is located on patented claims in the Ivanpah Mining District adjacent to the Mojave National Preserve. The historic mining district was founded on gold. However, in 1949, rare earth elements were discovered, and in 1952, production began recovering these rare earths. The mine was in continuous production until 2000 when it was placed on temporary closure status. Production continued to be processed from stockpiled materials. In 2007, planning was initiated to bring the mine back into production with increased commodity prices. At that time, the reclamation plan and P-16 permit were updated.

The mine constructed a 14-mile long pipeline to dispose of process water. The noted spills occurred during a pipe-cleaning operation, a common O&M procedure. The Lahontan Regional Water Quality Control Board fined MolyCorp for the incident and negotiated a cleanup. The National Park Service and the BLM were involved with the cleanup on their lands. The cleanup was completed in 1998 and funded by MolyCorp. MolyCorp also reimbursed the federal agencies for their costs.

This incident was operations & maintenance (O & M) related, and not an issue of reform of the 1872 Mining Law.

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*The Pew Story:*

Morning Star mine closes. In 1984, the California underground mine is converted to an open pit and heap leach. The National Park Service cites a range of problems, including dead wildlife, heavy metal contamination and cyanide leaks. In 2007, the mine remains unreclaimed.

*The Rest of the Story:*

The Morning Star mine is located within the historic Ivanpah Mining District. It operated as primarily an open pit, heap leach facility from 1983 until 1990. The owner and operator, Vanderbilt Gold Corporation carried the site in its corporate reserves until it went out of business in 2000. The site was included within the boundary of the Mojave National Preserve when it was formed in 1994, four years after Morning Star closed. The restrictions imposed by the National Park Service on future mining at the site made it's reopening untenable and was one of the specific stated reasons by Vanderbilt for its liquidation. However, following liquidation of the company, elements continued to work with the National Park Service to reclaim the site. As noted in *Nystrom, E.C. 2003. From Neglected Space to Protected Place: An Administrative History of Mojave National Preserve. Chapter Eight*, "As of mid-2002, four mines have activity pending park approval. The Morning Star Mine has proposed a reclamation operation...."

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*The Pew Story:*

Tailings leak from Alaska's Red Dog mine, discoloring Red Dog Creek and the Ikalukrok Creek. In 2001, the National Park Service finds elevated levels of lead, cadmium and zinc in Cape Krusenstern National Monument. A 2004 study finds wide areas of the Monument with elevated levels of metals.

*The Rest of the Story:*

The Red Dog mine is a zinc and lead mine and mill operated by Teck Cominco. The operation is located above the Arctic Circle in a harsh climatic environment northeast of Cape Krusenstern National Monument. The mine trucks concentrates 52 miles to its port site along an unpaved road that traverses the north boundary of the monument. The mine has been in continuous operation since 1989.

As noted, the mine experienced an operational issue at start-up that caused a release of process waters. The Alaska Department of Health and Social Services conducted a thorough study and analysis of this release shortly after it occurred and determined: "The results documented that the communities had not been exposed to lead as a result of the mining operations." (*Alaska Division of Public Health. 2001. Public Health Evaluation of Kivalina and Noatak Residents to Heavy Metal from Red Dog Mine.*). The same report also discussed elevated metals levels in the area surrounding the transport road including areas on adjacent monument lands. Their conclusion regarding the risk of metals contamination from this source was that it was safe to continue eating subsistence foods. The contamination posed no risk.

Teck Cominco, under oversight from the Alaska Department of Conservation (ADEC), Division of Spill Prevention and Response voluntarily initiated a source analysis and risk assessment in

2001. The study was designed to evaluate the potential for risk to human health and the environment from exposure to metals in fugitive dust in areas between the mine and the port, including along the 52 mile haul road.

The final report incorporates comments from a wide range of government agencies (including extensive input from the National Park Service) and stakeholders, including local village residents. The risk assessment concludes it is safe to consume subsistence foods in all areas without restrictions. ADEC has reviewed the final report, given its approval (December 2007) and will continue working with Teck Cominco on the development of a risk management plan to address current and future risks.

As with other sites in this evaluation, the Red Dog situation has nothing to do with reform of the 1872 Mining Law. Rather, it is another example of O&M issues that arise, as they do in any business and industry, and are quickly addressed and rectified by operations management and local, state and federal regulators. Regulations, and implementation of those regulations, in Alaska are more stringent at present than at the time when the Red Dog incidents occurred. The State's response to this issue clearly demonstrates the strength and breadth of its regulatory authorities.

<b>1991</b>
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*The Pew Story:*

Nevada's Johnston mill closes after five years of operation. A 1997 investigation finds elevated levels of arsenic, cyanide and other contaminants.

*The Rest of the Story:*

The Johnston Mill in Lincoln County operated with a small heap leach facility from 1985 to 1991 under an approved BLM Plan of Operations. The site covers 4-6 acres and was abandoned when the operator went bankrupt. Reclamation of the site was completed in 2006 under Nevada's abandoned mine land program.

Present day mining regulations in Nevada at both the state and federal levels are not comparable to those of the 1980s. These rules are significantly more stringent and demanding. Under the present BLM and NDEP regulations, bonding for complete reclamation is required for mining and milling operations. BLM and NDEP now use customized reclamation cost estimating software to provide a comprehensive and standardized approach to calculating reclamation bonding requirements. In addition, requirements for compliance inspections by state and federal regulators have been enhanced significantly.

*The Pew Story:*

Colorado calls on EPA emergency crews to prevent overflow of acidic, cyanide-laden wastewaters from abandoned gold mine. The Summitville gold mine becomes a Superfund national priority in 1994. Acid and cyanide drainage kills nearly 20 miles of the Alamosa River.

*The Rest of the Story:*

The Summitville mine site is located in the southern San Juan Mountains of southwestern Colorado at an elevation of 11,500 feet. Most of the operation was on private land (e.g., patented mining claims), with some use of unpatented mining claims on National Forest System lands. Mining at Summitville started in 1870. Summitville Consolidated Mining Company began mining 1987 and continued operations until December 1992 when it abandoned the site after declaring bankruptcy.

The leach pad liner, which was installed during adverse winter weather conditions, cracked during construction and was never repaired. This allowed water containing dilute cyanide and heavy metals to leak from the heap leach pad. The company installed a water treatment plant to treat the cyanide-bearing water leaking from the facility. In 1992, the Colorado Department of Public Health and Environment imposed new discharge limits on the operation that established limits for the discharge of some metals, including silver, that were below detectable levels. The operator then attempted unsuccessfully to treat water to meet these new discharge requirements of its permit. The water was not discharged, but returned to the heap leach pad. The Colorado Department of Natural Resources required the operator to submit a closure plan with a cost estimate. This plan, when submitted in November, 1992, estimated closure costs at \$21 million. Unable to provide such an amount, the company was placed in receivership in early December, 1992. Because the state did not have adequate emergency authority to take over the site, the state requested that the U.S. Environmental Protection Agency (EPA) take jurisdiction under the Superfund laws and initiate emergency cleanup efforts.

The mining industry through the Colorado Mining Association (CMA) formed the Summitville Task Force, a group that devoted thousands of man-hours of advice and assistance to the agencies engaged in the site remediation efforts. In addition, the industry arranged for the donation of equipment and treatment facilities for use by the EPA at Summitville; took action to encourage persons/entities to contribute to the cleanup; and generally served as a conduit for advice and information about the site.

The mining industry also studied the circumstances and events that led to the Summitville incident and worked with representatives of the state, the environmental community and others to develop legislation that greatly strengthened the laws in Colorado to ensure that such an incident would never happen again. In 1993, the Colorado General Assembly enacted a comprehensive law, Senate Bill 93-247, which strengthened the requirements governing the financial guarantees (bonds) that operators must post to ensure that they will reclaim the site in accordance with applicable laws and permits. The law also recognized a new category of "Designated Mining Operations" which heightened regulatory scrutiny of operations that present

certain environmental risks either because of the conditions or methods of operation. Among other things, the law provides that:

- Facilities cannot operate prior to state approval and inspection of their construction;
- Environmental protection facilities (liners on leach pads) must be certified for each applicable operation;
- Bond amounts are increased substantially and there are limitations on the types of instruments that may be posted to secure reclamation obligations;
- Environmental protection plans are now required for applicable operations and longer permit review time is also provided; and
- The state now has emergency authority to respond to emergency situations.

Rather than indicating any shortcomings with the 1872 Mining Law, Summitville demonstrates how the mining industry, state regulators and legislators, and other stakeholders worked together to enact legislation and develop new regulations to close gaps, eliminate shortcomings, and implement other responsible measures to ensure a similar incident cannot recur. In other words, Summitville does not suggest that dramatic changes to the 1872 Mining Law are needed – to the contrary, the problems that occurred at Summitville have already been solved.

**Finally, it should be noted that Pew’s statement: “acid and cyanide drainage kills nearly 20 miles of the Alamosa River” is completely false.** The Office of Mined Land Reclamation in Colorado reported no evidence of a fish kill in the river and subsequent studies – including the Summitville Use Attainability Study by the state of Colorado – have raised questions about whether several portions of the Alamosa River system have ever supported aquatic life. The United States and Colorado Geological Surveys also studied the Summitville incident and reached similar conclusions. (USGS Bulletin 2220; Colorado Geological Survey Special Publication 38 (Proceedings of 1995 Summitville Forum). A more recent report by the Colorado Geological Survey entitled “Naturally Degraded Surface Waters Associated with Hydrothermally Altered Terrain in Colorado,” open-file Report 00-16, analyzed the Alamosa River system. That report concluded that natural acid rock drainage is the major factor causing the stream’s poor water quality upstream of the influence of the Summitville mine. Moreover, while the environmental impacts of the Summitville incident are subject to considerable debate, there has never been any report of any impact to the public health and safety.

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*The Pew Story:*

South Dakota finds trout fishery impacted from acid mine discharge four years after issuance of mine permit. (*Un-named operation. Believed to be Richmond Hill mine.*)

*The Rest of the Story:*

This Pew story is vague and unidentified, but is believed to be the Richmond Hill mine site. Richmond Hill was permitted as an open pit, heap leach operation in 1988. Presently, the site is owned and managed by LAC Minerals USA. Acidic seepage was noted emanating from the toe of a waste rock in 1992, at which time the operation was fined by the State of South Dakota. The state required Richmond Hill take immediate steps to curtail the seepage and to develop a mitigation plan. Richmond Hill complied. In 1994, based on results of the mitigation study, LAC

submitted a \$10 million reclamation surety with the state. Reclamation commenced that year and was completed in 1999. Long-term monitoring illustrates success of the program to date.

Once again, this case is one of an O&M failure that was quickly caught by state regulators and corrected by the operator at the operator's expense. South Dakota passed its first mining regulations in 1971, recodified its mining laws in 1982, and added additional and stricter regulations in 1987 when the state passed a law authorizing the South Dakota Board of Minerals and Environment to promulgate tough and very specific rules regarding reclamation specifications and bonding requirements. Following the Richmond Hill release, regulation revisions occurred and additional rules were imposed on mining making the state arguably the most difficult precious metal-bearing state in which to conduct mining operations. Presently, there is little mining in South Dakota.

The industry's and regulatory agencies' response to Richmond Hill proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions.

## 1994

### *The Pew Story:*

Cyanide leaking from the Pony Mill's wastewater ponds is discovered in a residential drinking water well in Montana.

### *The Rest of the Story:*

The story of the Pony mill is one where a very small operator exploited a gap in state mining regulations. The Pony mill, located in the historic Mineral Hill Mining District (gold first discovered in 1866) at Pony, Montana, is an approximate 4 acre site on which the Chicago Mining Company sited a vat leach operation using cyanide to recover gold from previously mined materials. The operation began in 1989 and the company filed for bankruptcy several years later. Cyanide was detected in groundwater down gradient of the mill. In 1998, the Montana Department of Environmental Quality (DEQ) completed clean up of the cyanide contamination but did not complete total site reclamation until the bankruptcy issue was resolved.

At the time that the operation started, the DEQ, Hard Rock Bureau regulations contained provisions for a "small miner exclusion", effectively allowing an operation as small as the Pony mill on patented ground to operate without any permit, reclamation plan, or financial warranty for closure. In 1989, after the Pony mill operation was approved, the DEQ implemented rule revisions that required an operating permit with a reclamation plan and bonded closure for any size operation proposing to use cyanide in the process (*Patton, S.B., H. Gerbrandt, and C. Wassmann. 1998. Pony mill site closure: healing a black eye of the mining industry. In: Proceedings of the Seventh International Conference on Mine Planning and Equipment Selection of 1998*).

The Pony mill was grandfathered and effectively slid under the regulatory wire. Since 1989, Montana has revised its mining rules and regulations numerous times, with the latest revision in 2006. With each amendment, the rules have become significantly more stringent. Permitting a new hard rock mining operation in Montana today is very difficult, time-consuming, and expensive.

The industry's and regulatory agencies' response proves that the current state and federal regulatory framework for mining can fill regulatory gaps (in this case the small miner exemption) to respond to unanticipated problems and develop effective solutions.

<b>1995</b>
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*The Pew Story:*

Seven million gallons of leaching solution is released from storage ponds to the East Fork of Beaver Dam Wash in Utah. (*Un-named operation. Believed to be USMX Goldstrike mine*)

*The Rest of the Story:*

The Goldstrike mine was opened as an open pit, heap leach gold operation by Tenneco Minerals in 1989. The mine operated until 1994, at which time USMX, Inc. purchased the operation from Tenneco. USMX leached mined and residual materials until 1997, when the operation was permanently closed. The site was completely reclaimed in 1998. All indications are that the site was reclaimed to the satisfaction of BLM. Recent aerial photographs also indicate a reclaimed site.

The case of the noted release of leaching fluid is difficult to verify. Other than the note in the cited Pew reference (in a table), nothing has been located regarding this incident.

<b>1996</b>
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*The Pew Story:*

After 15 years, Montana's Zortman Landusky mine closes. Water quality problems persist after the owners declare bankruptcy. By 2005, the state puts nearly \$20 million into a trust fund for perpetual treatment of water pollution.

*The Rest of the Story:*

The Zortman and Landusky mines are located in an historical mining district dating back to underground mining and vat leaching that started in the 1880s. **Open-pit mining and heap leaching activities began in 1977** – four years before BLM's surface management regulations for hardrock mining went into effect in 1981. In 1979, the State of Montana developed an EIS to evaluate the mine and issued operating permits. Following enactment of the 43 C.F.R. Subpart 3809 regulations in 1980, BLM approved a Plan of Operations. The operator filed and the agencies approved numerous amendments to the operating plan during the period 1979 through 1991.

In 1992, acid rock drainage was noted in conjunction with a mine expansion proposal. The state and federal agencies required the operator to modify the reclamation plan in response to the discovered water quality problems. Litigation between the operator, the State, EPA, and the Fort Belknap Indian Tribe started in 1993. The company filed for bankruptcy in 1998, noting an \$8.5 million shortfall in the reclamation bond. Despite the complex litigation that ensued (some of which is still pending), BLM has achieved substantial on-the-ground reclamation progress using the agency's CERCLA authority.

Zortman and Landusky are perhaps the "poster child" for the problems that occurred at a limited number of under-bonded mines that were evaluated and permitted prior to enactment of some or all state and federal regulations and bonding requirements for hardrock mines. These mines also document some of the inadequacies in the environmental data collection and analysis requirements in the early years of state and federal regulatory programs.

In response to Zortman and Landusky and a few other mines of this era with similar problems, BLM and the State of Montana enacted substantial revisions to the federal and state regulations governing mining. These changes include much stricter data collection requirements, including waste characterization studies to identify potentially acid-generating materials, and revised closure and reclamation bonding requirements that are designed specifically to eliminate the problems and shortfalls that occurred at mines like Zortman and Landusky where operators were under-bonded, went bankrupt, or abandoned the site. If permit applications for Zortman and Landusky were submitted today and evaluated and bonded under current federal and state environmental and bonding requirements, a satisfactory outcome would result because today's requirements are much different than they were 20 to 30 years ago. In fact, even compared to the mid-1990s, current environmental and bonding requirements are much more stringent.

The industry's and regulatory agencies' response to the problems at Zortman and Landusky proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions.

<b>1997</b>
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*The Pew Story:*

The Gold Quarry mine in Nevada releases about 245,000 gallons of cyanide-laden waste into James Creek. Cyanide levels are measured at more than 60 times the drinking water limit.

*The Rest of the Story:*

The Gold Quarry mine is a large open pit gold operation owned and operated by the Newmont Gold Company. The site is located north of Carlin, Nevada on the Carlin Trend. Mining in the area started with small underground operations in the late 19<sup>th</sup> century. Newmont began large-scale open pit mining in 1964. The main ore zone at Gold Quarry was discovered in 1979, and initial production began in 1985.

The above described incident was an isolated operational issue to which Newmont responded in an immediate and responsible fashion. They made the necessary repairs and timely notified the

appropriate authorities that a spill had occurred. This incident – and the other isolated operational incidents included in Pew’s report – has nothing to do with either the scope or the substance of the Mining Law.

For each of the operational incidents described in Pew’s report, the important questions to ask are whether there was any negligence involved and how did the company respond when it became aware of the incident. In the case of the Gold Quarry incident, as well as the other operational incidents described in Pew’s report, there was no negligence and the company responded in a swift and effective manner to control, contain, and cleanup the spill; to mitigate the impacts of the spill; to make the necessary equipment and facility repairs to prevent a reoccurrence; and to report the spill as required by law.

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*The Pew Story:*

More than 300,000 yards of waste rock and tailings spill into Pinto Creek at an active Arizona copper mine. More than eight acres of creek bed and upland area are buried under as many as 42 feet of debris.

*The Rest of the Story:*

The Pinto Valley Mine, owned by BHP Copper, opened in 1972 and is located within the historic copper mining region of Globe-Miami, Arizona. At the time of the slope failure, BHP was capping a closed tailings impoundment with benign mine rock as part of the final closure plan approved by the regulating agencies.

When the slope failure occurred on October 22, 1997, mine rock and tailings slid into the dry bed of Pinto Creek, located in the Pinto Valley in Arizona, covering approximately 8 acres of creek bed and surrounding upland. Immediately, a multi-agency task force of state and federal agencies organized to provide direction and support to BHP for remediation and restoration efforts. “BHP Copper Mines responded quickly and worked around the clock removing debris until the area was completely cleared of mine tailings in July 1998. Hydroseeding and revegetation with native grasses and forbs have brought about a rapid recovery.” (*U.S. Fish and Wildlife Service, Division of Environmental Quality. 1999. Pinto Creek Restoration, Arizona*). BHP was commended by all agencies involved and by the public for its rapid response and attention to detail during this incident.

This case occurred during active reclamation of a pre-regulation tailings impoundment that likely had pre-existing stability issues long before to implementation of modern Arizona and BLM mining and reclamation regulations.

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*The Pew Story:*

Blowout from the tailings impoundment of an Idaho mine sends 30,000 cubic yards of contaminated wastes into Montezuma Creek, leaving 25 acres of wetlands covered with tailings to a depth of one foot. (*Un-named operation. Believed to be Talache mine.*)

*The Rest of the Story:*

The Talache mine and tailings site is located near Atlanta, Idaho, an historic area where gold first was discovered in 1866. The Talache mine, known as the Boise-Atlantic mine until 1938, operated from approximately 1932 until 1956, leaving two tailings impoundments. These tailings impoundments were known by state and federal agencies to have failed a number of times prior to the incident in 1997. Monarch Greenback LLC purchased the patented site as part of a plan to investigate re-furbishing and re-opening the mine. However, the company never operated on the site. When the old and unstable tailings impoundments failed during snowmelt in May 1997, the Idaho Department of Environmental Quality, the U.S Forest Service, and Monarch Greenback initiated a clean up. However, because of the proximity to the Middle Fork of the Boise River and the extent and nature of remediation, the Environmental Protection Agency initiated an emergency action under CERCLA authority. Following the CERCLA process, final clean up of the depositional area was initiated in 2002.

The site was a pre-regulation operation in an historic mining district that would have been declared a typical AML site were it not for an unrelated interest purchasing the property. This site is another excellent example of the need for Good Samaritan legislation and AML funding for historic hardrock sites. As with many similar sites throughout the west, this site could just as easily have been abandoned by unknown individuals or owned by an innocent and unaware property owner.

<b>1998</b>
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*The Pew Story:*

Heavy metal and cyanide-contaminated wastewater from the Homestake mill operation causes a fish kill in South Dakota.

*The Rest of the Story:*

The Homestake mine, now owned by Barrick Gold and located in Lead, South Dakota, was in continuous operation as an underground (with a small surface operation) gold mine since 1876. The operation closed in 2002 and since, has been awarded the National Deep Underground Science and Engineering Laboratory (DUSEL) project.

In May 1998, tailings from the west sand plant, escaped containment by eroding a concrete steel plug that separated an abandoned historic storm drain from the current tailings sluicing system. The tailings entered an old sewer line, which was combined with the City of Lead sewer system, and eventually flowed into Gold Run Creek and Whitewood Creek. The discharge contributed to a fish kill downstream in the Deadwood area. It was estimated that 10,000 gallons of tailings containing 10 pounds of cyanide were discharged into the creek. Homestake took immediate steps to mitigate the effects of the discharge. The leak was plugged and sealed to prevent future discharges. Additionally, Homestake performed an immediate biological assessment on Whitewood Creek to assess the impact of the spill while simultaneously removing 12 to 15 tons of tailings from Gold Run Creek. Homestake paid a \$150,000 penalty to the emergency response fund and paid the city of Lead \$50,000 for the sewer separation project.

Since 1876 until early modern era regulations went into effect, Homestake and the nearby towns of Lead and Deadwood, used Whitewood Creek for disposal of tailings and municipal sewage wastes. For nearly 100 years, the creek was so designated by the State of South Dakota. When the laws and regulations changed, the practice ceased, at which time, following the passage of CERCLA, the Environmental Protection Agency (EPA) listed Whitewood Creek on the National Priorities List (NPL). At that time, Homestake assumed the responsibility for cleaning, remediating and restoring Whitewood Creek to a trout fishery, something that the creek was not in decades past. This remediation project was completed successfully in 1994, and the EPA delisted the site from the NPL in 1996.

As with many other sites herein, this case was an O&M issue unrelated to reform of the 1872 Mining Law. As noted in other cases, O&M issues arise in every industry, business, and private concern. Handling such matters quickly, effectively, and responsibly – as Homestake did in this instance – is the real issue.

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*The Pew Story:*

Spills from the Lucky Friday mine, opened in 1987, pollute Idaho’s South Fork River. The state predicts seven years for the affected fishery to return to pre-mining population levels.

*The Rest of the Story:*

As with many examples herein, the Lucky Friday operation is an historical operation dating back more than 100 years. **The statement that the mine opened in 1987 is patently incorrect.** The noted copper sulfate spill did not occur in 1998, but in 1988, according to mine officials. Since “pre-mining population levels” would be defined as prior to mining over 100 years ago, Pew’s statement regarding pre-mining populations is ludicrous as no pre-mining studies were conducted in the 1800s. As to the phrase “the state predicts”, it should be noted that no actual instream monitoring was conducted by the state to support such a “prediction”. At the time of the release, the legal designated beneficial uses of the South Fork in the affected area did not include cold-water biota. Even with historic impacts on the South Fork below the Lucky Friday (channelization due to I-90, and historic mining/milling), the State of Idaho is on record as saying in 1993 that the South Fork above Wallace (about seven miles below the Lucky Friday) fully supported a cold-water biota use. This is also noted in EPA’s basin superfund investigations.

1999
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*The Pew Story:*

Company fails to complete cleanup, and waste from Idaho mine threaten portions of the Salmon River fishery. In 2001, the Stibnite mining area is added to the Superfund priority list.

*The Rest of the Story:*

Stibnite is another private-land, patented historic mining site pre-dating World War II and all current environmental regulations. Prospecting and development at the site began in 1919. Contamination was entirely related to the historic mining activities conducted just prior to and during WWII for the federal government as part of the war effort.

The site's owner, Stibnite Mine, Inc. (SMI), entered into an Administrative Order of Consent (AOC) with EPA in 1995 to mitigate contaminated seeps and groundwater entering Meadow Creek from the historic Bradley tailings impoundment (WWII era operation). SMI expended significant resources on the project from 1995-97, but declared bankruptcy and was unable to complete the project. EPA terminated the AOC with SMI in December 1997, and then pursued Mobil Oil as the PRP for the "deep pocket" to complete the project. Mobil entered into an AOC with EPA in 1998 and completed the project.

After completion of the project, Mobil filed a lawsuit against the federal government for cost recovery. The federal judge ruled in favor of Mobil, determining that the federal government was indeed liable for the contamination because it was a direct result of the war effort. In the case of Stibnite, the environmental damage was caused by historic mining practices. It is well documented in the Site Characterization and Risk Evaluation reports that the modern era (1982-97) mining and reclamation practices resulted in substantial improvement to the environmental condition at Stibnite.

2000
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*The Pew Story:*

Over 100 migratory birds and resident waterfowl die at the Phelps Dodge Tyron mine in New Mexico.

*The Rest of the Story:*

The Migratory Bird Treaty Act of 1918 protects all migratory birds (including, but not limited to waterfowl), and has considerable civil and criminal penalties attached to its violation. The U.S. Fish and Wildlife Service (USFWS) administers provisions of the act. Violations of the Act are not unique to the mining, but rather, cut across a wide swath of industries and facilities. For example, bird mortalities from petroleum ponds, livestock feedlot catchments, open municipal wastewater treatment systems, over-chlorinated swimming pools, and backyard garden ponds over-treated with herbicides or pesticides are violations.

As precious metal heap leach operations using sodium cyanide and SX/EW copper operations using acid in arid settings became more numerous in the early 1980s, it was noted that these sites with open water impoundments were a natural attractant to migrating waterfowl, shorebirds, and local migratory passerines. Mortalities occurred. As this problem was recognized, the Bureau of Land Management (BLM), Forest Service, and state agencies quickly changed their regulatory approaches, requiring that safeguards be installed at those facilities. Mitigation technologies such as, but not limited to, cyanide neutralization in tailing impoundments, netting, or capping with

balls or mats were developed and employed to deter migrating birds from landing on these facilities.

During this same period, the USFWS began taking an increased interest in the situation and worked directly with mine operators and various state and federal regulatory agencies to eliminate the problem. The following excerpt from the USFWS' website (<http://www.fws.gov/news/cyanide3.html>) documents the success of this collaboration:

Over the past decade, we've worked closely with the mining industry to address the problem of bird mortality, said Kevin R. Adams, chief of the Service's law enforcement division. "Education, enforcement, and teaming to find solutions are helping to safeguard a natural resource every bit as valuable as gold.

Cyanide heap leaching, which uses cyanide solutions to recover gold from large piles of low- grade ore, set off a new U.S. "gold rush" in the late 1980s and early 1990s by making it profitable to "mine" rock containing only small amounts of metal. Heap leach gold mines, however, collect cyanide-laden wastewater in huge holding ponds, some of which cover as much as 60 acres.

In the semiarid west, these ponds attract migratory birds; they promise water, food, and rest, but deliver instead a lethal dose of cyanide. Every bird fatality occurring at one of these ponds violates the Migratory Bird Treaty Act, a longstanding federal law that makes it illegal to kill any of more than 800 protected bird species.

Service law enforcement officers have investigated bird deaths at heap leach gold mines in Colorado, Nevada, South Dakota, and Montana. "We've seen fines and penalties assessed in many cases, but more importantly, we've alerted the industry to the problem. Many companies are working with us to protect birds," Adams said.

The industry has successfully identified ways to help eliminate bird fatalities. Smaller ponds are now netted to keep birds out, and new techniques for applying cyanide solutions to ore heaps prevent toxic liquids from collecting and attracting birds. Companies have installed cyanide recovery systems to treat mine wastes, removing cyanide for reuse at the mine and detoxifying the large holding ponds, making them safe for birds.

In one recent case, for example, the Service documented the deaths of hundreds of birds at a Montana gold mine. Charged with the illegal take of migratory birds, the mine agreed to a negotiated settlement involving payment of a \$10,000 fine and the installation of a \$5.1-million cyanide recovery system to prevent future bird mortalities.

The industry's and regulatory agencies' response to bird mortalities at mining operations proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions.

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*The Pew Story:*

Nevada's Yerington mine site is abandoned, with 92 million gallons of acidic, metal-laden wastewater left on-site. The abandoned facility poses serious problems from radionuclide contamination.

*The Rest of the Story:*

The Yerington mine is a historic open pit copper operation in Lyons County, Nevada. It is 51 percent privately owned with the remaining 49 percent BLM. Copper was discovered in 1865, and an underground mine operated on the present site in 1918. In 1953, Anaconda Mining Company, predecessor to Atlantic Richfield Company (now British Petroleum) began large-scale open pit mining of copper oxides. This operation lasted until 1965 when a mill and concentrator were constructed to process sulfide ore. Anaconda sold the site in 1978. Between 1978 and 1988, private owners and lessees operated the site intermittently. Arimetco purchased the site in 1988 and established an SX/EW leaching operation on the existing infrastructure under a corporate guarantee bond with the Nevada Department of Environmental Protection (NDEP). The site operated until Arimetco declared bankruptcy in 1997. NDEP assumed site maintenance in 2000, and in 2004, the Environmental Protection Agency initiated remedial action under CERCLA, with Atlantic Richfield as the principal responsible party for funding. Remediation of the site continues at present.

The Yerington case is another example of a historic mining operation that was designed, constructed and operated prior to passage of modern environmental laws and regulations and then sold to a secondary operator that was not adequately bonded by either of the principal regulating agencies (NDEP/Bureau of Mining Regulation and Reclamation and BLM) for site closure in the event of bankruptcy.

Present day bonding regulations in Nevada at both the state and federal levels were substantially changed in response to the experience at Yerington and a few other under-bonded sites in the early 2000s to eliminate inadequate reclamation bonds. First, BLM eliminated the use of corporate guarantees and Nevada developed stringent financial qualification criteria that ensure that only financially robust companies may continue to use corporate guarantees to secure their reclamation obligations on private land. Secondly, BLM and NDEP developed reclamation cost estimating protocols that consider all likely contingencies based on agency costs to implement, manage, and complete reclamation of sites requiring governmental intervention. These new policies result in comprehensive and conservative bonds that require bonding for complete reclamation and closure for exploration, mining and milling operations. BLM and NDEP now use customized reclamation cost estimating software to provide a comprehensive and standardized approach to calculating reclamation bonding requirements. In addition, requirements for compliance inspections by state and federal regulators have been enhanced significantly.

Rather than indicating any shortcomings with the 1872 Mining Law, the industry's and regulatory agencies' response to the bonding shortfall at Yerington and a few other Nevada sites

proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions.

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*The Pew Story:*

South Dakota governor asks EPA to place Gilt Edge mine on the Superfund list. Request comes after the state spends \$1.3 million to prevent overflow of acid wastewaters at the mine opened in 1986.

*The Rest of the Story:*

The Gilt Edge mine site was first mined in 1876. The present open pit, heap leach operation on private land was permitted in 1986 and opened in 1988 by Brohm Mining Corporation, a predecessor company of Dakota Mining Corp. Prior to issuance of the permit to operate, Brohm was required to conduct an assessment as to the potential for the mine to generate acid. The study that was done by a reputable engineering consulting firm indicated that acid-generating materials would not be a problem. The Gilt Edge mine was permitted and bonded for reclamation on the conclusions of that study.

In 1993, the South Dakota Department of Environment and Natural Resources (DENR) cited Gilt Edge for discharging acidic waters from the toe of its waste rock dump. At this time, the DENR required Brohm to submit a mitigation plan and additional bonding as a permit amendment. In 1995, Brohm submitted an additional \$8 million bond to the state, and the amendment was approved. Shortly thereafter, Gilt Edge entered into an EIS agreement with the Forest Service to mine on adjacent Anchor Hill, using the waste material to reclaim the Gilt Edge site. This EIS was delayed for a number of reasons, placing serious stress on Brohm's financial situation, and in 1988, the mine shut down awaiting the outcome of the delayed NEPA process. Later in 1998, Dakota Mining Corporation (by then the owner of Brohm operations) notified the state of its intent to abandon the Gilt Edge mine for financial reasons. A temporary restraining order kept the mine in operation until 1999 when Dakota filed for bankruptcy in Canada. The state assumed maintenance of the mine infrastructure to treat acidic waters. In 2000, the site was listed on the National Priorities List under CERCLA, and the Environmental Protection Agency initiated emergency response actions to treat water and reclaim the site. Site remediation at Gilt Edge continues at present.

South Dakota passed its first mining regulations in 1971, re-codified its mining laws in 1982, and added additional and stricter regulations in 1987 when the state passed a law authorizing the South Dakota Board of Minerals and Environment to promulgate tough and very specific rules regarding reclamation specifications and bonding requirements. Had the initial baseline acid rock study and assessment of the potential for acid-generating materials at Gilt Edge been positive and less optimistic of the true nature of the potential, the permitting and bonding requirements for the site and operation would have been significantly more aggressive. Regulation revisions in South Dakota have occurred since, and additional rules imposed on mining making the state, arguably, the most difficult precious metal-bearing state in which to conduct mining operations. Presently, there is little gold mining in South Dakota.

Waste characterization study protocols have been refined and improved since the late 1980s. Had this project been evaluated under current waste characterization study protocols, like those mandated by BLM's surface management regulations at 43 C.F.R. §3809.420(b)(11), the acid generating potential of the materials would have been identified and the mine would have been designed to manage these materials in a manner to minimize acid generation.

2002

*The Pew Story:*

Libby vermiculite mine that operated through 1990 becomes a Superfund priority. Ore from the mine contains a dangerous form of asbestos, hundreds of mine workers and Libby residents are diagnosed with asbestos-related diseases.

*The Rest of the Story:*

Prospectors first located vermiculite deposits in the early 1900s on Rainy Creek northeast of Libby. In 1919, E.N. Alley bought the Rainy Creek claims and started the Zonolite Company. While others thought the material was useless, he experimented with it and discovered it had good insulating qualities. Through his marketing skills, it became a product used in insulation, plaster, and to lighten garden soil. Many people used vermiculite products for insulation in their houses in Libby and in their gardens.

The W. R. Grace Company bought the mine and operated it from 1963 until its closure in 1990. They then sold the property to Kootenai Development Co. While in operation, the vermiculite mine in Libby may have produced 80 percent of the world's supply of vermiculite and was a significant employer of many Libby townspeople.

In late 1999, the mine was blamed for dozens of asbestos-related deaths and illnesses among Libby residents and former employees due to exposure to asbestos-containing vermiculite. The Environmental Protection Agency has been working legally to intervene and remove asbestos-contaminated soil from the screening plant, and to dispose of that soil and continue cleanup operations at the former mine site just down the road

The vast majority of the disturbance at this mine occurred before current environmental laws and regulations were passed. In addition, the lands involved with this mine are all privately owned and thus not subject to regulation by federal surface management agencies. The State of Montana was the principal regulator prior to the site being declared a CERCLA site for cleanup by EPA. This site was developed long before asbestos was known to occur in this vermiculite deposit (not all vermiculite deposits contain asbestos) and before the adverse health effects associated with exposure to airborne asbestos fibers were recognized.

The issues at this operation are not relevant to reform of the 1872 Mining Law.

*The Pew Story:*

Idaho's Grouse Creek mine is declared an "imminent and substantial endangerment." "...site once hailed as "state of the art". Cleanup costs are estimated at \$60 million.

*The Rest of the Story:*

Approximately 90 percent of the Grouse Creek site is on patented claims. The site has undergone historical mining and milling since 1900 when the Sunbeam mill operated. After 1907, the Sunbeam mill operated as a toll mill for other nearby early mines.

The "imminent and substantial endangerment" declaration imposed on the Grouse Creek mine was due to the rising water level in the impoundment caused by the NPDES 8:1 dilution ratio imposed by EPA at Outfall 002 in October 2002, preventing the operators from being able to discharge treated water. The issue was not water quality, but rather water quantity.

The only regulatory method to allow dewatering (direct dewatering of essentially drinking water quality water) in light of the National Marine Fishery Service (NMFS) timeframes was to declare the rising water an "endangerment". This enabled NMFS to "allow" dewatering to start per the USFS/EPA decision memo that approved the selected EECA remedy (direct dewatering of the tailings impoundment supernatant). In reality, there never was any direct endangerment from water over the impoundment. The top of tailings embankment is at an elevation of 7250 ft. The embankment was designed to contain the Probable Maximum Flood between the elevations of 7240 to 7250 feet. The highest elevation of supernatant during this period was approximately 7234 feet, well within the design limits for the facility.

The \$60 million estimate originated from the Forest Service and their consultant. \$20 million of that estimate is attributed to agency indirect costs. Additionally, this estimate included a second water treatment plant to treat for cyanide residuals. However, the cyanide in the tailings supernatant subsequently attenuated naturally, and this second plant was never required. Of interest is that the 650 acres of Grouse Creek includes 550 acres that are 80% reclaimed, and the 100 acres of tailings impoundment that is the CERCLA AOC. This area is currently being reclaimed and all reclamation will be completed by 2010. No public funding has been utilized for final closure of Grouse Creek, as Hecla has paid the entire cost. All monitoring to date has shown no adverse impact to the environment.

As with many other cases herein, the issues at Grouse Creek are not issues with the 1872 Mining Law or its reform. However, the Grouse Creek Mine is an excellent example of how modern regulations compel companies to achieve responsible and comprehensive closure and reclamation.

**2005**

*The Pew Story:*

Washington's Midnite uranium mine is added to the Superfund list. After operations ceased in 1981, investigation reveals contamination of surface water, sediments and groundwater.

*The Rest of the Story:*

The Midnite Mine operated on the Spokane Indian Reservation from 1955 to 1981. Because this mine is on an Indian Reservation, it was not developed on lands governed by the 1872 Mining Law. Rather, the deposit was made available under a leasing system that is controlled by federal land managers (Bureau of Indian Affairs and its agent, the BLM).

**2006**

*The Pew Story:*

Forest Service costs for Beal Mountain mine reach \$4.2 million; Montana's share is \$2.5 million. The government takes over cleanup, after the owners abandon operation that began in 1989.

*The Rest of the Story:*

The situation with the Beal Mine is similar to regulatory problems at Summitville and Zortman and Landusky. The operation was developed during a period when state and federal regulations were significantly less stringent than at present. Since that time both the State of Montana and the U.S. Forest Service have taken a much stronger role regarding its authority to regulate and bond mines. Both the State and the U.S. Forest Service have developed much more stringent bonding standards and are continuing to improve regulations.

**2007**

*The Pew Story:*

Oregon's Formosa mine is added to the Superfund list. The Canadian mining company that operated the copper and zinc mine between 1990 and 1993 abandoned it in 1994. Contamination covers 18 miles, affecting protected coho and steelhead salmon.

*The Rest of the Story:*

The Formosa story is similar in some respects to those of Summitville and Zortman-Landusky (discussed previously) and occurred during the same time frame (late 1980s – early 1990s; it is NOT a story that began in 2007). As with those referenced cases, Formosa was a permitted and under-bonded operation on a historic abandoned mine site involving an under-capitalized Canadian junior company. In the years since the first problems developed at Formosa, the State of Oregon (as did the States of Colorado, Montana, and many others) has intensified its

regulatory base, and requirements for design, operations, reclamation, bonding, and investigation of company finances.

The 76-acre Formosa site is located on Silver Butte in Douglas County near Riddle, Oregon. It was first operated as a copper-zinc mine from 1910-1937. It was abandoned and continued to leak contaminated waters into Middle Creek and the South Fork of Riddle Creek. In 1984, patented and unpatented claims and some fee lands on and around the site were consolidated and exploration initiated. Access to the main portal was on BLM-administered land, but no permit was required at this stage. In 1989, Formosa Exploration, Inc. (FEI) went through the Oregon Department of Geology and Mineral Industries (DOGAMI) permitting process, obtained a state approved reclamation and closure plan, filed a \$500,000 bond, and commenced operations. DOGAMI strongly believed their plan would work, and FEI was very accommodating with the state.

In late 1992, a state inspection revealed that FEI was not following its mine plan, was producing more than permitted, and had dumped waste materials into the creek. DOGAMI issued a desist order, closed the operation, and brought FEI to the table with an increased bond to \$1 million. Reclamation began in 1994. When it was evident that the closure plan was not working, FEI liquidated, leaving the state and BLM with the closure and remediation.

The DEQ then enlisted the resources of the EPA, BLM, and the Cow Creek Band of the Umpquas to participate in a site remediation and clean up. EPA formally listed the site on the NPL in September 2007 to initiate the process for CERCLA monies and corrective actions.

A great deal has changed since this scenario unfolded. Back when the Formosa Mine secured its operating permit from the State of Oregon and provided the reclamation bond, DOGAMI's regulations capped reclamation bonding requirements at \$10,000 per acre. Today reclamation bonds for operations that do not use cyanide are capped at \$100,000 per acre and DOGAMI is in the process of trying to remove this cap and change the regulations to require bonding for actual calculated costs. Oregon has additional bonding requirements for operations that use cyanide in their processing circuits.

The regulatory agency's response to the situation at the Formosa Mine proves that the current state and federal regulatory framework for mining can respond to unanticipated problems and develop effective solutions. The problems that occurred at the Formosa Mine were due to shortcomings in the State's regulatory and bonding requirements in the late 1980s when the permit applications for this project were submitted, evaluated, and approved. The State of Oregon has eliminated these shortcomings and is in the process of increasing its bonding authority for projects that do not use cyanide.