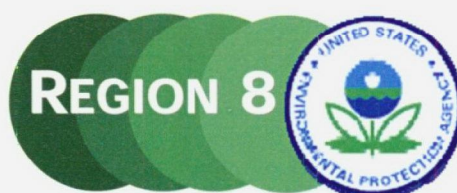
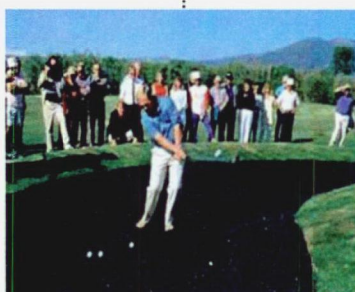
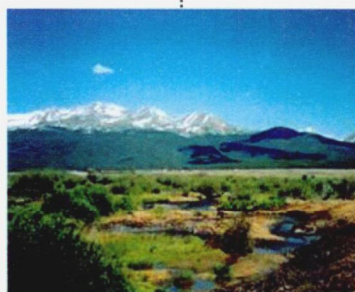


# SUPERFUND AND BROWNFIELDS

## AT WORK IN

# COLORADO

2009



# Colorado

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## EXECUTIVE SUMMARY

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Years ago people were far less aware of how the mismanagement of industrial chemicals and hazardous wastes could affect public health and the environment. On thousands of properties across the nation the result was abandoned waste sites that poisoned land, water and natural environments, and threatened the health of the inhabitants. Since 1980, when Congress and the President created the Superfund program, EPA has cleaned up over one thousand of the worst contaminated sites across the country. These cleanups have helped to make communities safer for millions of Americans. EPA Region 8 has had a substantial role in this successful effort.

Many Region 8 communities were left to deal with the consequences of decades of environmental neglect, but Superfund cleanups are changing that. Since 1980, 63 sites in the Region have been placed on the National Priority List (NPL) which contains the sites that present the greatest risk to human health, public welfare and the environment. By the end of 2008, the EPA had completed cleanup at 33 of these sites.

Along with the progress on the NPL sites, hundred of hazardous waste sites in Region 8 have been cleaned up by the Superfund Removal program. The removal program has reduced risks to the public and the environment from abandoned drums, derailed train cars leaking chlorine gas, mine wastes left in towns and sensitive ecosystems, and many other similar hazards.

In recent years Region 8's Superfund program has increased its emphasis on the reuse and redevelopment of contaminated sites. Cleaning up these properties and promoting reuse can help reinvigorate communities, preserve green space, and protect public health and the environment. In addition, we've begun incorporating new "Green Remediation" technologies into our cleanups. Examples include the use of wind, water and solar power to provide clean, renewable energy to power treatment systems.

The job of cleaning up hazardous waste sites continues to be a formidable challenge. We at EPA are blessed with an exceptionally talented and experienced workforce of environmental professionals including engineers, scientists, community involvement specialists, attorneys, and support personnel. All are dedicated to cleaning up and restoring contaminated sites to beneficial use. But as talented as the EPA workforce is, we would not be able to carry out our mission without the support and commitment of our partners in state and local government, community groups, and the general public. Together we can continue to move forward in making the communities and ecosystems of this region, safer and healthier places to live, work and play.

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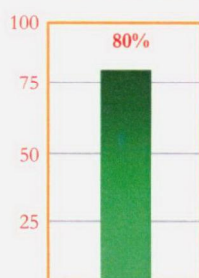
# AIR FORCE PLANT PJKS

SOUTHWEST OF DENVER, COLORADO  
CONGRESSIONAL DISTRICT NO. 6

## Recent Accomplishments:

- The final two contaminated soil areas were addressed with the completion of the excavation of the D-1 Landfill in January 2009. The primary contaminants at the landfill were petroleum hydrocarbons and PCBs. The landfill was used during the mid-1970s and covered 2.5 acres in a steep valley. Contents of the landfill were disposed of in a permitted, off-site facility.
- The interim remedy continues for seven areas on site contributing to groundwater contamination. This remedy, called in-situ bioremediation, consists of treating the TCE in place in the bedrock using microorganisms which can break down the TCE to ethane and chloride, which are non-toxic. The final remedy for contaminated groundwater at PJKS is being evaluated in part based on the results of this interim remedy, which is showing varied but promising results overall.

Percent of Construction Complete



## About the Site

The former Air Force Plant PJKS comprises 464 acres, located 25 miles southwest of Denver, in the Front Range foothills near Waterton Canyon, Colorado. From 1957 to 2001, PJKS operated as a government-owned, contractor-operated facility. Operations at PJKS included Titan I and II rocket and Titan III and IV launch-vehicle assembly, rocket engine testing, and rocket research and development.

Today, PJKS is owned by Lockheed Martin Space Systems Company (Lockheed Martin), and is surrounded by 4,700 acres of land owned by Lockheed Martin, but not included as part of the PJKS cleanup. Portions of PJKS continue to be active operational areas with activities related to designing, developing, testing, and manufacturing advanced technical systems for space and defense.

The U.S. Air Force is responsible for the cleanup at PJKS, and is addressing soil and groundwater contamination from cleaning solvents, fuels, polychlori-

nated biphenyls (PCBs), and metals. The contaminants of concern are PCBs in soils and Trichloroethene (TCE) and N-Nitrosodimethylamine (NDMA) in groundwater. All three contaminants can cause a variety of health problems in people who become exposed to them at elevated levels.

EPA placed PJKS on the National Priorities List, commonly known as the list of Superfund sites, in 1989. The Colorado Department of Public Health and Environment (CDPHE) is the lead regulator of the cleanup with EPA oversight.

To date, all of the contaminated soil areas have been addressed and interim remedies are in place to capture and/or treat contaminated groundwater. The final groundwater remedy is forthcoming.

The U.S. Air Force expects environmental remediation at Air Force Plant PJKS to continue into 2014. Long-term operation of groundwater pump and treatment systems will continue as long as necessary.



## Cleanup Approach

Many studies were done during the 1990s to determine the nature and extent of site contamination. The Air Force submitted a Supplemental Remedial Investigation Report (SRI) to CDPHE and EPA in 1999. The report details investigations about the nature and extent of soil and groundwater contamination across PJKS. The SRI was used to help assess potential risks to human health and the environment. It also supports the ongoing cleanup.

**Groundwater:** To treat TCE, a bedrock pilot study began in the fall 2003 at three locations known to be source areas of contamination to the bedrock aquifer groundwater: the engineering propulsion lab, the systems and components area, and the D-1 landfill. Results indicated that the *in situ* bioremediation process used in the study reduced TCE concentrations by two-thirds at the D-1 landfill. However, this same treatment was less successful at treating TCE at the engineering propulsion lab and the systems and components area. After conducting supplemental activities at those locations and performing additional sampling, the study demonstrated that *in-situ* bioremediation works at all three source areas.

As an interim remedy, in September 2005, the U.S. Air Force prepared and provided for public comment an evaluation of cleanup options for TCE in groundwater at seven sites at PJKS. EPA and CDPHE agreed to select *in-situ* bioremediation, as demonstrated in the promising

pilot study.

*In-situ* bioremediation has proven unsuccessful for NDMA, and the Air Force continues to look for an acceptable technology to reduce levels of NDMA in groundwater at PJKS. Meanwhile, Lockheed Martin has instituted a pump and treatment system by which groundwater leaving Lockheed Martin property is collected for TCE and NDMA treatment. This includes groundwater from PJKS.

The Air Force monitors for NDMA and TCE in the groundwater at PJKS every spring and fall. Groundwater monitoring indicates a decrease in TCE concentrations at several locations. Groundwater monitoring also indicates that the groundwater plume is stable. 2008 groundwater monitoring results will be available soon.

**Soils:** In October 2005, the Air Force completed numerous interim measures, including excavating soils in 16 locations, known as the combined soils, that had high levels of PCBs. One of these locations required an environmental covenant, which ensures restricted use because some PCBs remain capped in place in that area. Currently, remediation is complete in all of the 53 contaminated soil areas at PJKS. The last two soil areas of concern were addressed during the D-1 Landfill excavation in 2008-2009.

## Points of Interest

There has been significant community interest in the site over time. Some nearby residents believe that environmental contamination at PJKS harmed their health. In 2000, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a public health assessment for PJKS, concluding that PJKS posed an apparent public health hazard to the surrounding communities. The Air Force supports a community restoration advisory board comprised of citizens and agency representatives, that has been meeting regularly to discuss site issues since 1995.

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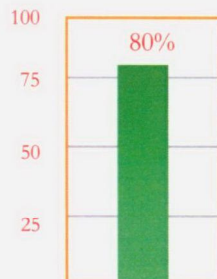
# ASARCO GLOBE PLANT

DENVER, COLORADO  
CONGRESSIONAL DISTRICT NO. 1

## Recent Accomplishments:

- In the fall of 2004, Asarco, Inc. granted the state of Colorado an Environmental Covenant on the property to restrict certain future uses.
- In 2002, EPA began placing soils removed from residential properties at Operable Unit 1 (OU1) of the Vasquez Boulevard and I-70 (VB-I70) Superfund site on the Plant to continue covering areas not yet covered with Globeville community soils.
- In late 2003, materials contained within the Former Sedimentation Pond were excavated, placed on the Former Neutralization Pond, and covered with approximately 4,000 cubic yards of clean fill material. The pond and surrounding area were graded and vegetated.

Percent of  
Construction Complete



## About the Site

The Asarco Globe Plant Site includes residential, commercial, and industrial properties surrounding the Asarco Globe Plant that were historically impacted by smelter-related contaminants. The

boundaries of the site extend east to the Platte River, west to I-25, south to the Burlington Northern Rail Road tracks (at approximately 44<sup>th</sup> Avenue) and north to 58<sup>th</sup> Avenue in Adams County.

## Site Background

The Asarco Globe Plant has been the site of various metal and refining operations since 1886.

In 1974, the Colorado Department of Public Health and Environment's (CDPHE) Water Quality Control Division collected water and sediment samples from the Industrial Drainage Ditch located directly west of the plant and detected elevated concentrations of cadmium, arsenic, lead, zinc, and other metals. In 1980 and 1981, CDPHE found the plant to be out of compliance with the Colorado Solid Waste Disposal Sites and Facilities Act. Subsequent to the investigations and inspections conducted by CDPHE, the EPA listed the Asarco Globe Plant on the open dump inventory for 1981 under the Resource Conservation and Recovery Act (RCRA). Three groundwater-monitoring wells

were installed at the plant during this time.

In December 1983, CDPHE sued Asarco for damages to natural resources under CERCLA in *State of Colorado v. Asarco, Inc.*, Civ. No. 83-C-2383, (D. Colo.). After a long legal battle, a Federal Consent Decree between the State of Colorado and Asarco, Inc. was signed on July 15, 1993.

The site was proposed for the Superfund National Priorities List (NPL) on May 10, 1993. The site was divided into four Operable Units: The Former Neutralization Pond, Groundwater and Surface Water, Community Soils and Vegetable Gardens, and the Plant Site. Asarco paid for the site's cleanup. CDPHE is in charge of administrative and technical oversight.



## Cleanup Approach

At OU1 (Former Neutralization Pond), a clean soil cover that was graded for proper drainage controls the exposure pathways that would result in unacceptable risks. Groundwater continues to be contaminated, requiring extraction from the Terrace Drain and treatment in the Wastewater Treatment Plant.

The cleanup goals for OU2 (Groundwater and Surface Water) will be attained through continued extraction and treatment as well as natural attenuation, which are expected to require several decades to

achieve. Institutional controls are preventing exposure to contaminated groundwater.

The residential cleanup for OU3 (Community Soils and Vegetable Gardens) has been completed. However, the commercial and industrial properties have not yet been thoroughly sampled or remediated.

OU4 (Plant Site) includes five components, three of which are completed: the remedial actions at the Former Sedimentation Pond, Point Source and Fugitive Air Emissions,

and the Spill and Runoff Control Pond. The remedial action for Surface Soils and Buildings has not yet been completed. Additional placement of community soils on the Plant will ensure protectiveness. Threats at the site have been addressed through stabilization and capping of contaminated soils and sediments, and the implementation of institutional controls. The remedy for buildings is protective in the short term because exposure pathways that could result in unacceptable risk are being controlled.

## Points of Interest

### Environmental Trust

In July 2002, Asarco informed the United States of its intention to sell its controlling interest in Southern Peru Copper to its parent company, America's Mining Inc. The United States Department of Justice contended that the original sale price proposed by Asarco was unreasonably low and would have jeopardized Asarco's ability to continue funding environmental remediation. Accordingly, the United States filed suit in U.S. District Court in Arizona and, in January 2003, reached a settlement with Asarco that significantly increased the amount of money Asarco

would receive in exchange for its stock.

In addition, a Consent Decree established an environmental trust that now funds environmental cleanup at Asarco sites throughout the country. The money in the trust, however, does not satisfy all of Asarco's response cost obligations. Accordingly, EPA prioritizes sites throughout the country, thereby determining which cleanup efforts will be funded, and the amount they will receive. A shortage of funding from the Trust is the reason for a lack of progress in some of the OUs, such as the remediation of commercial and

industrial properties and the Former Neutralization Pond.

### Environmental Covenant

Because the remedy at the Globe Plant Site will not be protective for all uses, Asarco will grant the state an environmental covenant. The purpose of the environmental covenant is to ensure protection of human health and the environment by minimizing the potential for exposure to any hazardous substance that remains on the property.

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# BRODERICK WOOD PRODUCTS

ADAMS COUNTY, COLORADO  
CONGRESSIONAL DISTRICT No. 7

## Recent Accomplishments:

- *The Broderick site was affected by the implementation of the Utah Junction Realignment Project that realigned railroad tracks north of Union Pacific railroad's North Yard. The project improved rail service and reduced congestion and emissions in the Denver area by straightening existing rail lines. The rail lines cross over the Broderick site. All operation and maintenance activities will continue to function as planned.*
- *A Five-Year Review completed in September 2006 indicated that the current remedy protects human health and the environment.*

## About the Site

The contaminants of concern are polynuclear aromatic hydrocarbons (PAHs), PCP byproducts, dioxins and furans in sludge and liquid waste from wood treatment that contaminated soil, surface water and groundwater. Swallowing or inhaling the contaminants can possibly cause damage to organs, irritation of the upper respiratory tract and eyes, and irritation or inflammation of the skin.

Cleanup of the site is complete. A land-treatment unit (LTU) for

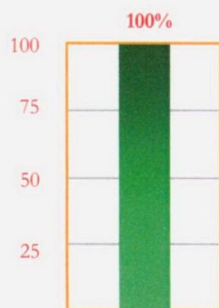
contaminated soils, a water treatment plant for contaminated groundwater and an oil recovery and bioventing system for the subsurface are part of current operation and maintenance activities along with groundwater monitoring. Additionally, since contamination remains on site, five-year reviews are conducted by EPA to ensure that the remedy remains protective of human health and the environment.

## Site Background

The 64-acre Broderick Wood Products site in Adams County, Colorado is a former treatment plant that used creosote and pentachlorophenol (PCP) to treat wood products. In 1983, EPA detected PCP in

soil and groundwater samples taken both on and off the Broderick Wood Products property. The Agency placed the site on its National Priorities List in September 1984.

Percent of Construction Complete



## Cleanup Approach

These cleanup activities have been completed either by EPA or the potentially responsible party, Broderick Investment Company (BIC):

- Removal of sludges from the two former impoundments to a reclamation facility in 1993.
- Construction of a land-treatment unit for contaminated soils in 1994.
- Construction of a treatment plant to treat contaminated groundwater in 1994 (modified later in 1996).
- Construction of a bioventing system to treat the subsurface area in 1996.



## Cleanup Approach Continued

A Five-Year Review completed in January 2001 indicates that the current remedy protects human health and the environment for workers and people near the site. However, more data are needed to fully evaluate the groundwater remedy.

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# CALIFORNIA GULCH

LAKE COUNTY, COLORADO  
CONGRESSIONAL DISTRICT No. 5

## Recent Accomplishments:

*Through facilitated work groups, EPA, CDPHE, Lake County and the city of Leadville are resolving issues that have prevented the deletion of portions of the site from the National Priorities List. In 2009, at the recommendation of a work group, Lake County adopted institutional controls for two operable units designed to prevent damage to capped waste piles and insure that excavation of soils does not spread contamination. Another work group developed a long-term community health program that will serve as the institutional control for residential properties. The education-based program is designed to detect elevated blood lead levels in children and pregnant women.*

*Now that cleanup work on several operable units is complete and institutional controls are in place, EPA plans to delete portions of the site in 2009.*

*In 2009 EPA will issue its proposed approach for managing site-wide groundwater and request public comment.*

*In 2008, EPA and the state of Colorado reached a final settlement with Asarco for past and future costs and for natural resource damages.*

*Because waste is left in place at this site, EPA will review the effectiveness of the cleanup every five years. The next five-year review will take place in 2012.*

## About the Site

Mining, milling and smelting in the Leadville area produced gold, silver, lead and zinc for more than 130 years. Mining in the area began in 1859 when prospectors working in the channels of the Arkansas River tributaries discovered gold at the mouth of California Gulch. Wastes generated during over 100 years of

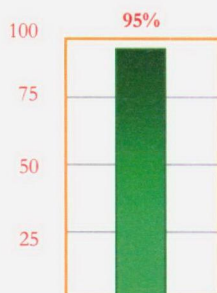
mining and ore processing contain metals such as lead, arsenic, copper, cadmium and zinc that pose a threat to human health and the environment. These mining wastes remain on the land and wash into streams. Acid rock drainage leaches metals from the wastes into streams and groundwater.

## Site Background

The California Gulch Superfund site encompasses about 16.5 square miles in Lake County, Colorado, and includes Leadville, the highest incorporated town in the United States. The site was added to the National Priorities List in 1983. Mining companies, with the oversight of EPA and the Colo-

rado Department of Public Health and Environment (CDPHE), performed cleanup work. EPA also conducted cleanups on portions of the site. The site is divided into 12 geographically based areas called operable units.

Percent of Construction Complete



## Cleanup Approach

The Yak Tunnel, one of two tunnels that drain the historic mining district, was the primary focus of studies and cleanup activities between 1989 and 1994. Prior to construction of the Yak Water Treatment Plant, the tunnel discharged tons of metals into California Gulch which

drains into the Arkansas River.

Since 1995, the EPA and several mining companies have conducted removal and remedial activities to consolidate, contain and control more than 350,000 cubic yards of contaminated soils, sediments and



## Cleanup Approach Continued

mine processing wastes. Cleanups included:

- Drainage controls to prevent acid rock runoff and mine-water discharge;
- Consolidation and capping of mine waste piles;
- Cleanup of residential properties;
- Reuse of slag; and
- Restoration and development of wetlands and streams.

## Points of Interest

While the community recognizes that mine waste impacts the Arkansas River, many residents strongly desire to maintain the historic appearance of the mining district. Consequently, EPA and CDPHE attempt to approach remediation activities so as to maintain the appearance of the historic waste piles to the extent possible.

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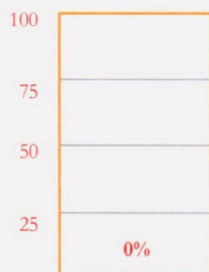
# CAPTAIN JACK MILL SITE

WARD, COLORADO  
CONGRESSIONAL DISTRICT NO. 2

## Recent Accomplishments:

*With the completion of the remedial investigation and feasibility study for the Site in the spring of 2008, CDPHE and EPA presented a proposed plan for alternatives for the design and construction of the site remedy for public review and comment. Following a public comment period, a remedy was selected in the fall of 2008 and a Record of Decision (ROD) was produced. Following the ROD, design and construction of the remedy is scheduled to begin 2009-2010.*

## Percent of Construction Complete



Construction has not begun at Captain Jack Mill Site. Construction is scheduled to begin as early as 2010.

## About the Site

The contaminants of concern at the Captain Jack Mill Site are zinc, cadmium, lead and copper from mining and smelting operations. The affected media are underground mine water, surface water, soils and solid waste. The site is in the upper part of the Left Hand Watershed. The watershed supplies irrigation water to Boulder County agriculture and drinking water to several Boulder County communi-

ties. Left Hand Water District has a water intake 15 miles downstream from the site that provides drinking water to more than 15,000 users in north Boulder.

In June 2008, EPA and the Colorado Department of Public Health and Environment (CDPHE) completed the site's Final Remedial Investigation and Risk Assessment report and Feasibility Study report (RI/FS). The FS report contains a

detailed analysis of remediation alternatives for various site components. The Proposed Plan presented EPA and CDPHE's preferred alternative for the remediation of the site. A public meeting was held July, 2008, giving the community a chance to comment on the preferred remedy. A Record of Decision (ROD) was signed and published by EPA and CDPHE, in the fall of 2008.

## Site Background

The Captain Jack Mill Site is located at the headwaters of upper Left Hand Creek about 1.5 miles south of Ward in Boulder County, Colorado. The site is in a narrow valley known as California Gulch. Mining for gold and silver in the region began in 1860 and ended in 1992.

The site is comprised of the Big 5 Mine (the upper mine), Captain Jack, Ltd. Mill, the White Raven Mine (the lower portal), and other mines and waste features in the immediate surrounding area. The Big 5 Mine lo-

cated about 500 feet upstream from the mill, consists of an adit (tunnel), a large waste rock pile and a settling pond. The mill works area includes several dry lagoons previously used for settling tailings from the mill. The lower portal includes the White Raven adit and a shed.

Other mine wastes include waste material in Left Hand Creek and waste rock from the mine tunnels.

Water and sediment samples from Left Hand Creek show elevated concentrations

of metals, including zinc, cadmium, copper and lead. Mine and mill wastes have been dumped into Left Hand Creek. Blowing dust from tailings, surface flooding, overflow of the tailings pond and subsurface groundwater percolation are threats to the environment. There are elevated levels of heavy metals in the soils. Improperly stored drums and explosives contributed to the hazards.



## Cleanup Approach

The selected remedy for cleaning up the Captain Jack Mill Superfund Site has two components, as it controls both surface and subsurface contamination sources.

To control subsurface contamination associated with the Big Five Tunnel, the remedy consists of an installed bulkhead, mine pool mitigation, and if needed, successive biochemical reactor treatment. The concrete bulkhead will plug the draining mine adit, impounding the mine water. The mine pool environment will have reduced oxygen levels, which, coupled with an injected caustic chemical, will increase the pH of the water to a neutral condition (Phase I). If necessary, after approximately

two years of neutralization, CDPHE may install a series of biochemical reactors outside of the mine (Phase II). The reactors use microorganisms to transform hazardous contaminants into non-hazardous substances. Following bioreactor treatment, the water may flow through wetlands for additional "polishing" treatment before entering Lefthand Creek. Because of uncertainties over the mine workings, there will be extensive groundwater monitoring once the bulkhead is installed.

Under the selected surface remedy, waste will be excavated and placed in several on-site consolidation cells. The selected remedy calls for excavation of site material con-

taining contaminants of concern in concentrations above the remedial action levels.

To contain the waste, consolidation cells will be capped. The caps will likely consist of a layer impervious to water, coarse material to prevent rainwater from seeping down and contacting the waste, and topsoil to support vegetation. Before a liner is placed on the more contaminated waste, alkaline material would be mixed into the top of the waste material to minimize acidic leaching. Officials will fully evaluate potential locations for the consolidation cells, as well as locations from which to borrow dirt for the cap, during the design phase.

## Points of Interest

EPA, CDPHE, and Boulder County Health actively engaged area citizens and stakeholders. The Boulder County Task Force, a group of citizens from the affected communities studied the site and recommended the Superfund listing to the Boulder County Board of Health.

The board then recommended the listing to the Colorado Governor's office, which did not oppose the site being listing on the NPL. As a result, on September 29, 2003, the Federal Register notice announced the listing of the Captain Jack site on the NPL.

The Captain Jack Mill Site is part of the Left Hand Creek Watershed Pilot which will provide a model for a multi-program approach to addressing mining pollution problems on a watershed basis.

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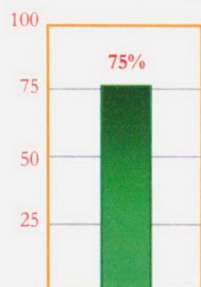
# CENTRAL CITY/CLEAR CREEK

IDAHO SPRINGS (GEORGETOWN, CENTRAL CITY, AND BLACK HAWK), COLORADO  
CONGRESSIONAL DISTRICT NO. 2

## Recent Accomplishments:

- In 2008, the Church Placer property was acquired, and work began constructing the on-site mine waste repository. The consolidation area where sediment will be placed is complete and ready to accept mine waste rock and tailings piles that will be removed in the summer of 2009.
- In the fall of 2008, sediment detention basins, rock check dams, rock drop structures, and run-on control ditches were built to help with sediment control and to slow the flow of water. Some eroded tailings were removed from the channel and placed on a more stable site with existing mine waste piles. Some mine waste piles were re-graded and a rock cover placed over them. This work occurred primarily in Russell and Nevada Gulches and included at least six waste rock and tailings piles.
- Phase I work of Operable Unit 4 began in August 2007. Two sediment detention basins were constructed to help minimize the amount of sediment entering the tributaries of Clear Creek. One was built in Russell Gulch and the other in Nevada Gulch. Erosion control measures were completed at five mine waste rock and/or tailings piles and included run-on, and run-off ditches, re-grading of steep or eroding slopes, and placing rock at the bottom of the pile if necessary.

Percent of Construction Complete



## About the Site

The Central City/Clear Creek Superfund Site consists of a 400-square mile watershed extending from the Continental Divide east to near Golden. The Site is located in Gilpin and Clear Creek Counties.

Popular for activities like fishing, rafting, kayaking, and gold panning, it also serves as a drinking water source for over 500,000 people in the Northwest Denver Metro area.

In September of 1983, the Central City/Clear Creek site was placed on the National Priorities List or Superfund list. Historic gold mining and mine wastes left behind in the Clear Creek basin contaminated the watershed. Elevated levels of metals in Clear Creek were the driving

factors in the listing of the site. Only a small fraction of this watershed is actually impacted by the historical mining operations. However, mine wastes are scattered throughout the watershed.

The contaminants of concern for aquatic life include zinc, copper, cadmium, and manganese. These metals are found in surface water and primarily affect trout, aquatic insects, and adjacent habitat.

Contaminants of concern for humans are arsenic and lead. Health risks to humans could result from long-term drinking of groundwater containing high concentrations of these metals, ingestion of tailings and waste rock, and inhalation of airborne dust.

## Site Background

Gold was discovered near Idaho Springs in January 1859 and in Black Hawk/Central City the following May. For the next 20 years, the Black Hawk/Central City area was the leading mining center in Colorado with the construction of mills for processing the gold and silver found through placer and hard-rock mining.

The decline of mining in the area began with the silver crash of 1893 and the rise of mining in Leadville. However, mining continued to be an important industry in Clear Creek and Gilpin counties

from the turn of the century until approximately 1950. Since 1950, mining in the area has been limited, with only a handful of mines operating.

In 1992, limited stakes gaming began in Central City and Black Hawk. Introduction of gambling has led to some land use changes. While these changes have the potential to increase the direct human exposure to mine wastes, many mine waste cleanup projects were implemented as the casinos developed property in these communities.



## Cleanup Approach

Abandoned mines along Clear Creek produce acidic metal-rich water that drains into the river. Piles of mine tailings located along or near the river's bank erode or leach metals into the water. The state and EPA have assessed potential impacts to human health and the environment from mine waste piles and tunnel discharges.

Because mine wastes are scattered throughout the watershed, cleanup

goals focus on improving water quality rather than individual tasks. This has made it necessary to approach cleanups in stages called Operable Units. Four different Operable Units were designated at this site.

The environmental issues addressed by these projects include metals contamination in the surface waters of Clear Creek, particularly the North Fork, and the management of mine tailings,

waste rock and tunnel drainage to prevent further contamination of the creek.

Work at these operable units has focused on removal or containment of waste piles, slope stabilization, run-on and run-off controls, construction of sediment detention basins, rock check dams, rock drop structures, collection and piping of tunnel discharges, and chemical treatment of the Argo Tunnel discharge.

## Points of Interest

The Central City/Clear Creek site has received up to \$5 million in new funding through the American Recovery and Reinvestment Act of 2009. The new money will accelerate the cleanup of the 400-square-mile Clear Creek watershed that is impacted by wastes from historic mining activities. Improvements will include the consolidation and capping of mine waste piles, sediment control and water treatment to mitigate heavy metals impacts to Clear Creek, a tributary of the South Platte River. Work at the site will also reduce metals entering the watershed which supplies water to Denver-area residents.

The state and EPA have worked jointly with other agencies including the Colorado Department of Transportation (CDOT), Trout Unlimited, and the Clear Creek Watershed Foundation to mitigate mining impacts under Superfund, restore fish and wildlife habitat, and improve transportation safety along the State Highway (SH) 119 corridor between U.S. 6 and Black Hawk. By working together this has improved efficiency, prevented duplication of work, and saved money.

Another collaborative effort

between the state, EPA and CDOT included two projects resulting from a highway widening project on the North Fork of Clear Creek near Black Hawk.

One project involved cleanup of the mine drainage from the National Tunnel near Black Hawk. Another project used the rock generated from widening the highway for the rock cover used at the Church Placer Repository and the Pittsburgh waste pile. Both of these projects led to stream sediment improvements and habitat restoration.

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## CHEMICAL SALES

NORTHEASTERN DENVER, COLORADO  
CONGRESSIONAL DISTRICT NO. 1

### About the Site

The Chemical Sales Company (CSC) Site covers about five square miles in a mainly light-industrial area of northeastern Denver. The company was a wholesale distributor of commercial/industrial chemicals, detergents and water leisure products.

Groundwater studies by EPA led to the discovery of the Site as a source of volatile organic compound (VOCs) contamination in the area. The 1990 Risk Assessment showed that use of the contaminated groundwater for

drinking, cooking or bathing could increase the chance of developing cancer. Breathing indoor air poses a potential risk if residents use the contaminated water for showering, bathing or cooking.

The next Five-Year Review is due by the end of 2012.

EPA proposed the CSC Site for its National Priorities List in June 1988 and finalized the listing in August 1990.

Current Operation & Maintenance activities include operating the system and monitoring groundwater throughout the site.

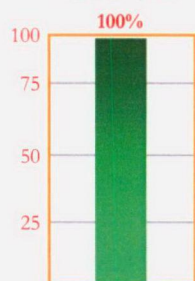
Construction completion was achieved at the site in March 2000.

A Five-Year Review completed in 2007 indicates the remedy protects human health and the environment.

The next Five-Year Review will be in 2012.

### Cleanup Approach

Percent Construction Complete



The following cleanup activities have been completed:

- Connection of over 400 residences to the South Adams County Water and Sanitation District (SACWSD) municipal supply in 1986, 1992 and 1995.
- Construction of the Klein Treatment Plant for SACWSD in 1989.
- Removal of leaking and corroded drums from the CSC property in 1989.
- Construction of an air sparging/soil-vapor extraction system in 2000 to clean up the source area.
- The remedy was modified from air sparging/soil extraction to *in-situ* chemical oxidation in 2007 to optimize the cleanup of sub-surface contamination and groundwater.



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# DENVER RADIUM SITE

DENVER, COLORADO  
CONGRESSIONAL DISTRICT No. 1

## Recent Accomplishments:

- *The most recent Five-Year Review was completed in September 2008 and confirmed that the remedies at the various properties remain protective of human health and the environment. A notice, placed in Denver newspapers, announced that the review was underway. The public review process included contact with each property owner and with neighborhood organizations in affected areas. EPA mailed a description of the site and ongoing actions to interested stakeholders and included self-addressed comment cards to solicit feedback.*
- *All wastes from OU7 in the City and County Right of Way have been removed.*
- *As of January 1, 2008, the state of Colorado concurred with EPA's intent to delete Denver Radium from the NPL.*

## About the Site

Cleanup of the Denver Radium site is now complete.

The site consists of more than 65 properties combined into 11 Operable Units (OUs). Most of the affected properties are used for business or open space. Redevelopment has occurred at several of the cleaned-up properties.

The last step of the remediation process was the removal of all radioactive materials from the former Shattuck Chemical Company site, OU8, in July 2006.

At some properties, waste was left in place. Institutional

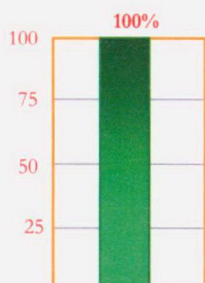
controls have been placed on these properties to ensure long-term protectiveness. The City and County of Denver continues to remove contamination underlying streets as part of routine street maintenance.

Because waste has been left in place, EPA will continue to conduct Five-Year Reviews to ensure that the remedy remains protective.

The next Five-Year Review is scheduled to be completed by September 2013.

## Site Background

**Percent of Construction Complete**



Radium was used for commercial purposes in the early 1900s when Denver ore processing facilities provided a domestic source to meet demand. After the radium industry's collapse, numerous locations were left with radioactive residues.

These residues were often used as fill, for paving materials, or left in place.

Contaminants at the site included radium, thorium, uranium, arsenic, lead and radon gas.

Radium is of most concern. Radon gas emitted from decaying radium causes lung cancer; however, radon is only a health risk if the gas is concentrated in buildings where people may be exposed for long periods of time.

The Colorado Department of Public Health & Environment (CDPHE), EPA and responsible parties worked together on the cleanup.

The site was added to the Superfund National Priorities List in 1983. The Final Close Out Report for the Denver Radium Superfund Site was completed in September 2006.

## Cleanup Approach

Cleanup approaches included: removal of contaminated soil to a permanent disposal site; installation of ventilation systems to vent radon gas; and in place stabilization and capping. Some wastes under structures and streets were left in place.

Remedial action for most of the OUs consisted of excavation of contaminated materials and disposal at a

licensed facility in Western Utah.

Remediation of the final site, OU8, Shattuck Chemical Co., involved excavating and treating contaminated soils with cement and fly ash and placing the solidified and stabilized soils back on site, creating a structure that was then capped.

Further review of this remedy,

however, and concerns raised by the community, caused EPA to reconsider its original decision.

EPA concluded that the long-term protectiveness of the remedy could not be guaranteed, and therefore removed the stabilized waste to a licensed disposal or recycling facility.

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# EAGLE MINE

NEAR MINTURN & REDCLIFF IN EAGLE COUNTY, COLORADO  
CONGRESSIONAL DISTRICT NO. 2



*Monitoring metals in the Eagle River: Fish shocking, counting, and weighing event, 2005*

## Recent Accomplishments:

- In summer 2008, the Colorado Water Quality Control Commission adopted new water quality standards for the Eagle River and Cross Creek near the Eagle Mine Superfund Site. The new standards are based on the river's ability to sustain biologically improved and healthy fish and aquatic life due to Eagle Mine cleanup efforts. As a result, EPA is in negotiations to conduct additional cleanup work at the site to meet the new standards.
- The third Eagle Mine Superfund Site Five-Year Review was conducted in 2008. Overall results show that the remedy, due to the new water quality standards, is no longer protective of human health and the environment because the zinc loading from the site to the river is now considered to be too much. Plans for additional work at the Eagle Mine Site to reduce zinc loading from the site are being developed.

## About the Site

The Eagle Mine Superfund Site is located in Eagle County, Colorado, eight miles southwest of Vail and 110 miles west of Denver. The site is defined as the area impacted by past mining activity along and including the Eagle River between the towns of Red Cliff and Minturn. The site is approximately 235 acres and includes the Eagle Mine workings, the former town of Gilman, various mine waste and waste rock piles and their associated water diversion components, Maloit Park, the water treatment plant, slurry line and trestles, mine seepage and associated

collection systems and the Belden Mill area. The site is bordered on the south and west by the White River National Forest.

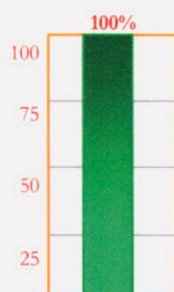
Miners began working the Eagle Mine in the 1880s, searching for gold and silver. The Eagle Mine later became a large zinc mining operation, leaving high levels of arsenic, cadmium, copper, lead and zinc in the soil and in surface water and groundwater. The Eagle Mine closed in 1984. Two years later, EPA placed the Eagle mine on its National Priorities List, a list of the nation's most contaminated places, commonly known as Superfund sites.

The Colorado Department of Public Health and Environment (CDPHE) first worked out a cleanup plan with the site owner, who today is Viacom International, Inc. In 1993, EPA issued a Record of Decision for the site that identified additional investigation and cleanup actions.

EPA, CDPHE, and Viacom implemented the cleanup requirements of the Record of Decision via a three-party Consent Decree. The Consent Decree also calls for a program to sample water quality, aquatic insects, and fish populations in the Eagle River to assess the effects of the remedial actions and to evaluate the possibility of establishing biologically-based standards for the site.

Cleanup activities at Eagle Mine have caused zinc concentrations in the Eagle River to go down, and there has been a corresponding increase in the brown trout population. In October 2001, EPA declared that construction of the required elements of the remedy was complete, marking EPA's 800th completed Superfund Site nationwide. Due to recent water quality standard changes, additional work to reduce metal loads to the Eagle River is being planned.

Percent of Construction Complete





## Cleanup Approach

Cleanup activities included moving a nearly one million ton tailings pile; consolidating seven million tons of tailings from across the site; relocating nearly 140,000 tons of roaster piles; protecting waste rock

piles and removing a large quantity of hazardous materials, including chemicals, PCBs and dynamite caps from the towns of Belden and Gilman; collecting water from the mines; and reclaiming wetlands. After cleanup activities were

successfully completed in 2001, EPA, CDPHE and the community began working to develop long-term water quality standards for the Eagle River.

## Points of Interest

- Ginn Battle North is a development company that has approached EPA and CDPHE with a proposal to develop the North Property of the Eagle Mine Superfund site into a residential golf course community. The North Property historically received the mine waste left over during the mine operations at the Eagle Mine. This proposed new use of the site as residential and recreational requires that additional cleanup

actions be taken to ensure that residents, workers, and visitors are protected. EPA and CDPHE are requiring that Ginn Battle North take the steps required in the Superfund process to allow for recreational and residential use of the site.

- EPA provides Technical Assistance Grants (TAGs) to community groups so that community residents can hire a technical advisor for independent review of the cleanup. The Eagle River Watershed Coun-

cil, Eagle Mine, Ltd., is the current TAG recipient. Their umbrella organization, Eagle River Watershed Council, has been actively interested in the Eagle Mine cleanup for many years. EPA has worked with members of these groups and the broader community, including local elected officials and others, as the cleanup has moved forward.

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## FRENCH GULCH SITE

SUMMIT COUNTY, COLORADO  
CONGRESSIONAL DISTRICT NO. 2

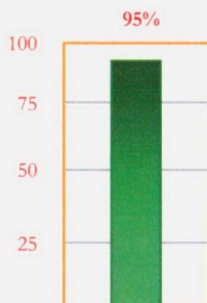


### Recent Accomplishments:

*EPA in partnership with the Town of Breckenridge and Summit County recently held a Dedication Ceremony and Public Open House announcing the operation of a new water treatment plant to treat metals-laden water discharging from the abandoned Wellington Oro silver-zinc mine site near Breckenridge, Colorado.*



### Percent of Construction Complete



### About the Site

The French Gulch Site is located approximately 2.2 miles upstream or east of the confluence of French Creek with the Blue River near Breckenridge, Colorado.

The primary concern is for aquatic life impacted by acid mine drainage discharging from the Wellington Oro Mine. The contaminants of concern are zinc and cad-

mium that pose a risk to trout and other aquatic life in French Creek and the Blue River.

### Site Background

Extensive underground mining occurred in the valley from the late 1850s to the 1960s. Lode mining recovered lead-zinc-silver sulfide and gold ores from an extensive network of tunnels and adits originating on the steep valley sides. Large floating dredge boats were used to placer-mine the valley floor for gold. The placer dredging disrupted French Creek and its associated alluvial valley material. This resulted in large dredge piles covering the French Gulch valley floor and extending upstream approximately one mile east of the former Wellington-Oro Mine.

Sporadic mining and milling operations occurred at the mine from the late 1940's to the early 1970's. The mine workings remain open and are interconnected with a bedrock fault and fracture system. Since this area contains a large quantity of sulfide-bearing minerals, these conditions promote the formation of acid mine drainage. This is caused by the oxidation of sulfur in the presence of water, forming sulfuric acid in the mine pool water. Metals such as cadmium and zinc are soluble in acidic water. As a result, acid mine water flowing through the mine workings

becomes highly contaminated with dissolved metals, exits the mine in the form of seeps, and enters French Creek. The zinc concentration in the seep water is approximately 5,000 times the concentration in French Creek upstream of the mine and is primarily responsible for the absence of fish populations in the downstream portion of French Creek and a segment of the Blue River.

## Cleanup Approach

In 1998, mine wastes including roaster fines, tailings, and waste rock were removed from the mine site to an area with reduced potential for human contact. The materials were capped with impermeable clay and clean gravel. Drainage ditches were installed to reduce infiltration of rain and snow melt into the mining wastes. This material provides little or no contribution to the water contamination of French Creek and the Blue River.

Water discharging from the Wellington Oro Mine is being collected. The collected water is being pumped to

the nearby water treatment facility. The purpose of the plant is to remove cadmium and zinc from mine drainage, resulting in improved water quality in French Creek and the Blue River and to protect the brown trout fishery in the Blue River. EPA will collect water quality data in 2009 to evaluate the impact treatment has on French Creek and the Blue River.

## Points of Interest

The town of Breckenridge and Summit County purchased the site and surrounding land totaling 1800 acres to preserve the area as part of the Golden Horseshoe Open Space. The town of Breckenridge and Summit County reached a settlement as part of the 1800 acre purchase that provided for the construction of the water

treatment plant at the Wellington Oro Mine. The construction of this plant was completed and full operation began in the fall of 2008.

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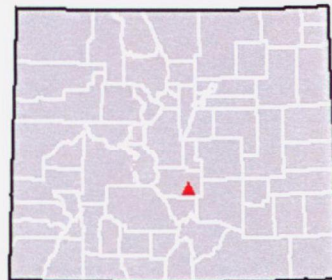
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# LINCOLN PARK STUDY AREA

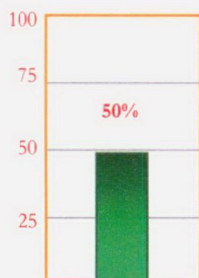
CANON CITY, COLORADO  
CONGRESSIONAL DISTRICT No. 5



## Recent Accomplishments:

- The first Five-Year Review report for Lincoln Park in September, 2007 determined the site was protective.
- EPA, Cotter Mill and the Colorado Department of Public Health & Environment (CDPHE) issued a report on the Lincoln Park Water Use Survey in January 2009 for work performed in the fall of 2008.
- State groundwater standards were established for uranium and molybdenum of 30 ug/l and 35 ug/l respectively, effective May 2008.
- Old Ponds Area reclamation is progressing under state license.
- CDPHE license decision was issued mid-December 2004. Cotter is permitted to continue to process uranium ore, but not allowed to accept waste from a Maywood, N.J. Superfund Site. The decision was upheld in the courts and Cotter chose not to appeal in 2007.

## Percent of Construction Complete



## About the Site

In 1958, the Cotter Corporation began milling uranium ore outside Canon City, Colorado. Mill operations released radionuclides (radioactive particles) and metals into the environment, causing soil contamination

around the mill itself, as well as groundwater contamination in the nearby community of Lincoln Park.

Cotter has been cleaning up the contamination under a radioactive-materials license and a court settlement with

the state of Colorado, as well as with EPA oversight.

The contaminants of concern at the site are molybdenum, uranium, and uranium daughter products.

## Site Background

The site is an operating uranium ore processing mill on 2600 acres with a current license issued by the Colorado Radiation Control Program.

The facility is not currently processing ore.

Releases of contaminants to the environment were found to affect surface soils and groundwater in neighboring Lincoln Park. The Lincoln Park site was added to the Superfund National Priorities List in 1984. The listing includes Cotter Mill and areas where contaminants have come to be located.

Before 1980, Cotter dis-

posed of tailings and other wastes from uranium processing into unlined ponds, following the custom of the times. Contaminants leached into groundwater then migrated to Lincoln Park affecting local wells.

Currently, very few residents use groundwater for domestic purposes since most are connected to the Canon City water supply. Some individuals in Lincoln Park still use groundwater to irrigate lawns and gardens.

Wind deposited contaminants on soils adjacent to the mill. Tailings, the waste from ore processing, were carried in surface water runoff from the mill, contaminating the

stream sediments in Lincoln Park's Sand Creek.

The Lincoln Park site is divided into two major cleanup areas, called Operable Units. OU1 is the Cotter milling facility itself located about three miles from downtown Canon City. OU2 is the neighborhood of Lincoln Park.

In 1988, the state of Colorado settled a lawsuit for natural-resource damages with Cotter Corporation. As part of the settlement, the state and Cotter agreed on how the site would be cleaned up further at Cotter's expense. EPA and the state also signed a Memorandum of Understanding (MOU)



giving the state the lead role in overseeing the cleanup of the site.

Cotter Mill, EPA and CDPHE conducted a Water Use Survey in Lincoln Park in 2008 to determine

the extent of groundwater use among residents.

In March 2009, Cotter Mill announced plans to refurbish the mill, with plans to reopen and process ore

in 2014. Old mill workings will be put on a decommissioning schedule, a step which was not required while the mill was in a stand-down mode.

## Cleanup Approach

Cleanup takes place under the joint authorities of the Radiation Control license, the court ordered settlement of a Natural Resource Damage Suit, and the Superfund National Priority List program.

Cleanup plans for both onsite (OU1) and offsite (OU2) areas are documented in the Remedial Action Plan (RAP). The RAP requires Cotter to perform cleanup actions in OU1 and OU2, monitor groundwater and air, and conduct additional studies.

The RAP is incorporated into the Federal Consent Decree for Civil Action No. 83-C-2389. The RAP was also incorporated into Cotter's Radioactive Materials License in 1987.

Remedial action and monitoring under the RAP began in 1988 and continues today. Cleanup takes

place concurrent with ongoing license activities.

Offsite exposures are managed by the following measures:

- A Water Use Survey to identify existing users of contaminated groundwater;
- Continuing review of new wells of record at the State Engineer's office;
- Notification to new water rights holders through the State Engineer's office and an annual newsletter issued by regulators;
- Provision of alternate water supply as appropriate (ongoing responsibility).

Nine thousand cubic yards of contaminated tailings, soil and sediment were excavated from 1.25 miles of San Creek from 1993 to 1999.

In January 2002, EPA issued a Record of Decision requiring no further action for surface soils within Lincoln Park. The decision was made because previous surface-soil cleanup activities eliminated or reduced risks to acceptable levels.

In 2002, CDPHE determined that wastes from the Li Tungsten Superfund site in Maywood, NJ could not be processed at the site. The decision was upheld in court in late 2007. Cotter determined it would not appeal the decision.

The Five-Year Review of the site in 2007 indicated these measures are currently protective. An updated Water Use Survey was performed in the fall of 2008 with a second round of sampling in January 2009.

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# LOWRY LANDFILL

UNINCORPORATED ARAPAHOE COUNTY, COLORADO  
CONGRESSIONAL DISTRICT NO. 6

## Recent Accomplishments:

- In July 2008, Lowry's "green" gas-to-energy plant was dedicated. The system uses extracted landfill gas to power four engines that generate enough electricity to supply nearly 3,000 homes yearly.
- In April 2008, EPA, in conjunction with the Colorado Department of Public Health & Environment and the Tri-County Health Department, released a Fact Sheet providing information about a plume of 1,4-dioxane, a probable human carcinogen, located in the shallow groundwater north of the site. Due to the limited potential exposure to humans and the low concentration, EPA determined no significant health risk associated with 1,4-dioxane with groundwater or surface water exists.
- In February 2007, EPA released its second Five-Year Review which indicates that the remedies for all six Operable Units are protective of human health and the environment.

## About the Site

The Lowry Landfill Superfund Site occupies approximately 500 acres of land 15 miles southeast of the City of Denver, in Aurora, Colorado. The City and County of Denver operated a municipal, hazardous, and industrial waste landfill at the site from 1966 until

1980, and Waste Management of Colorado continued municipal solid waste disposal at the site until 1990. Contamination of soil, shallow groundwater, and subsurface soil vapors resulted in the addition of the site to the Superfund National Priorities List in 1984.

## Site Background

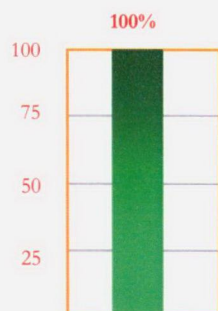
During the 1970s, citizen complaints regarding fires, disposal practices and odors motivated EPA and other agencies to initiate investigations at Lowry. Over the past decades, EPA and other responsible parties conducted investigations, researched solutions, implemented remediation activities and monitoring programs, spending over \$150

million. In response to community concerns over potential radionuclides at the site in 2001, a USGS investigation showed that concentrations of radionuclides were indicative of natural background levels in Colorado.

The site is currently in the Operations and Maintenance phase of the Superfund process.

## Cleanup Approach

Percent of Construction Complete



The overall strategy at the Lowry Landfill site is to contain migration of contaminants in ground and surface water and prevent potential exposure to landfill gas and waste-pit liquids.

The remedy consists of a number of components that operate together to ensure that containment is effective. The components are a Land-

fill Cover, Underground Barrier Walls, the North Toe Extraction System, Groundwater Monitoring Wells and Compliance Programs, and Landfill Gas Collection and Treatment System.

The Landfill Cover is a four-foot thick "cap" of compacted clay and soil designed to reduce infiltration of rain and surface water into the

landfill mass, prevent erosion, further prevent the release of landfill gas and better contain the landfill waste.

The East/West/South Ground Water Slurry Wall, completed in 1998, is designed to stop contaminated groundwater from flowing off site. At the northern site boundary,



## Cleanup Approach Continued

contaminated groundwater is captured by another system called the North Boundary Barrier Wall.

The North Toe Groundwater Extraction System was completed in spring 1998, and began operation in 2000. The system removes contaminated groundwater that is flowing underneath the landfill site. The

groundwater is pumped to an on-site water treatment plant and discharged to the municipal sewage system after treatment in accordance with the Site's wastewater discharge permit.

Ongoing monitoring programs at the Lowry site insure compliance with the performance standards in the Groundwater Monitoring Plan

and the updated Compliance Monitoring Plan – Landfill Gas Remedy.

Additionally, an early warning monitoring system is in place to indicate migration and identify contaminants which could impact water treatment plant operations and potentially violate the wastewater discharge permit.

## Points of Interest

Before converting to the gas-to-energy program, extracted landfill gas at the Lowry Landfill site was burned off in an enclosed flare. The gas-to-energy facility constructed at the site produces energy that is made available to a local utility company. It also removes 5,000 tons of methane from the atmosphere, equivalent to removing 22,000 cars from the road annually.

The beneficial use of landfill gas to produce energy at the Lowry Landfill is consistent with the mis-

sion of EPA's Landfill Methane Outreach Program. The program is intended to reduce methane emissions by promoting the development of cost-effective and environmentally beneficial landfill gas-to-energy projects.

Landfill gas from municipal solid waste landfills consists of approximately 50% methane, 45% carbon dioxide and a balance of other gases, primarily nitrogen. At Lowry, landfill gas may also contain volatile organic compounds, semi-

volatile organic compounds, and other chemicals from the industrial waste that was disposed there from the mid-1960s until 1980.

The project at the Lowry Landfill site provides a number of benefits, — destroying hazardous substances in extracted landfill gas, offsetting the use of non-renewable energy resources for the generation of electricity, and reducing emissions of sulfur dioxide, nitrogen oxides, carbon dioxide and particulate matter from the use of non-renewable resources.

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# MARSHALL LANDFILL

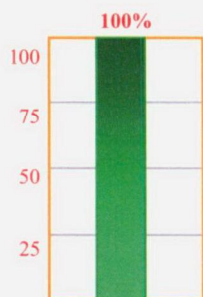
SUPERIOR, COLORADO  
CONGRESSIONAL DISTRICT No. 2

## About the Site

### Recent Accomplishments:

*A Five-Year Review was completed in September 2006. The review found that the remedy, as designed, constructed and operated, is protective of human health and the environment.*

### Percent of Construction Complete at OU1



The 160-acre Marshall Landfill site is located at the foothills of the Rocky Mountains, about three miles southeast of Boulder. The Marshall Reservoir is immediately west of the site.

In 1981, water that collected contaminants as it leached down through the landfill was discovered seeping into the open Community Ditch. The ditch carries drinking water from the reservoir to the city of Louisville and irrigation water to downstream ranchers.

The inactive landfill had high levels of contaminants in both surface water and groundwater. Identified contaminants were benzene, trichloroethylene (TCE), tetrachloroethylene, barium, iron, manganese and zinc. Benzene and TCE are known to cause cancer; the others are toxic to fish and other aquatic life. Because significant levels of contamination from the landfill were found in surface and groundwater on and next to the landfill, EPA added the site to its Superfund National Priorities List in 1983.

Current operation and maintenance activities include operating a groundwater treatment system, maintaining the landfill cover and groundwater monitoring.

EPA issued an Explanation of Significant Differences (ESD) in September 2003 that documents amendments made to the 1986 Record of Decision for Marshall Landfill. The ESD describes new or changed standards for groundwater and surface water at the site. At the time of the Record of Decision, groundwater standards did not exist for several volatile organic compounds. In addition, many of the State of Colorado's surface water quality stan-

dards have been updated.

The ESD determined that the standards be brought up to date in order to be protective of human health and the environment and to assure that the original remedy is protective.

The ESD identified that institutional controls (ICs) were necessary to ensure long-term protection of the engineered remedy and to prevent future release of contamination. The ICs have been implemented and consist of two components, informational and enforcement.

**Informational** -- an electronic map in the Boulder County Planning Department outlines the landfill boundary and identifies the property as a Superfund Site. All applications related to development or changes in land use are submitted to the county.

**Enforcement** -- A rural Preservation Planning Area land use designation prohibits the development of the Superfund Site. The land use restriction is enforceable by Boulder county and all surrounding municipalities through the Intergovernmental Agreement US 36 Interstate Corridor Comprehensive Development Plan effective June 20, 2000. Specifically, the agreement states that the municipalities "shall not grant a permit for development" for all areas within the Rural Preservation Planning Area including the Superfund Site.



## Cleanup Approach

These cleanup activities were completed in 1993 by the potentially responsible parties:

- Constructed a groundwater collection and treatment system.
- Regraded and revegetated the landfill soil cover.
- Drained and treated leachate from lagoons.
- Installed a pipeline to convey water from the Community Ditch through the landfill to prevent further contamination of the groundwater.

Cleanup construction was completed in August 1993.

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# NELSON TUNNEL/COMMODORE WASTE ROCK

CREEDE, COLORADO  
CONGRESSIONAL DISTRICT 3

## Recent Accomplishments:

- *Work on the Remedial Investigation began in the fall of 2008.*
- *During the construction season of 2008:*
  - ◊ *a temporary stream diversion around the construction area in West Willow Creek was completed;*
  - ◊ *debris, old pipes, and a flume were removed from the channel; and*
  - ◊ *in preparation for construction of the new conveyance system, some grading of the lower portion of the waste rock pile was completed.*
- *Final Listing on the National Priorities List was September 3, 2008.*

## About the Site

The Nelson Tunnel/Commodore Waste Rock Superfund Site is located about one mile north of the town of Creede in the Willow Creek watershed in Mineral County. Willow Creek is nestled against the eastern edge of the San Juan Mountains.

Historically, the mining of silver, lead, and zinc provided economic viability to the area in and around the Creede mining district. The activity resulted in contami-

nated water discharging into the Willow Creek drainage and mine waste piles accumulating in the watershed. Willow Creek is a tributary to the Rio Grande River, a gold medal trout fishery.

Characterization of the watershed identified the Nelson Tunnel adit as the largest contributor of cadmium, lead, and zinc in Willow Creek. Immediately upslope and surrounding the Nelson Tunnel is the Commodore Waste Rock pile, which in-

cludes waste rock from hard rock mining that accumulated over the years.

The waste rock contains elevated levels of arsenic, cadmium, lead, and zinc. In 2005, a less-than-20-year flood event caused catastrophic failure of the waste rock pile. This pile is now highly unstable and partially lies in West Willow Creek and the main stem of Willow Creek.

## Site Background

In 1889, a very rich vein of silver was located along the banks of East Willow Creek. The news of this discovery brought prospectors to the area. Soon two claims were staked on West Willow Creek. These mines were located along the Amethyst vein and would become the richest and most profitable in the Creede mining district.

Creede was one of the last silver boom towns in

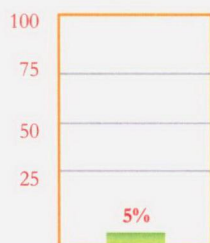
Colorado. Mining would continue off and on for about 100 years. Some 10,000 people resided in Creede at its peak.

Plummeting silver prices in 1893 ended the initial boom. In 1894, mining resumed and the Creede district experienced a slight recovery. From 1896-1910, ore production in the Creede district was steady. Mining continued intermittently until the late 1950's and

early 1960's when a final mini-boom occurred. The last mine in the Creede district closed in 1985.

By the 1970's, people began taking an interest in outdoor recreation and exploring the area's history. Tourism became the new economic factor for Creede and the upper Rio Grande River area.

## Percent of Construction Complete





## Cleanup Approach

To address immediate threats from the Commodore Waste Rock pile, removal work began on designs for stabilizing the pile and re-designing drainage of West Willow Creek around the pile.

Plans included doing some re-grading of the pile to slow the speed of the water; opening up the conveyance system preventing logs, rocks and other debris from plugging up the system; and lining the conveyance system to prevent water from leaching through the pile.

During the 2008 construction season, most of the debris, old

pipes and flume were removed from the Commodore Waste Rock area, and a temporary stream diversion around the construction area was installed. Some re-grading of the pile began in the fall 2008 and will continue in 2009 as the conveyance system is installed.

Water sampling in the Nelson Tunnel was conducted in November 2008. Since water quality issues need to be dealt with, the mine hydrology must be examined. Samples will be used to map, fingerprint and date the water to determine where it is coming from and at what point it becomes con-

taminated.

Sampling will continue in 2009 as part of the Remedial Investigation. Once the data has been gathered as part of the Feasibility Study, alternatives for cleanup or treatment of the water will be evaluated. Several different methods will be reviewed to find an effective way to either cleanup and/or treat the water. Finding a way to reduce the amount of water needing treatment will be examined.

## Points of Interest

About ten years ago, based on a strong desire to find alternative cleanup mechanisms for Creede and the watershed, the residents of the town of Creede and the surrounding portion of Mineral County developed a community-based effort to identify and address the most pressing environmental concerns in the Willow Creek watershed. The Willow Creek Reclamation Committee (WCRC) convened in 1999 and

has partnered with numerous state and Federal agencies including the USEPA, the United States Forest Service, the Colorado Department of Natural Resources, the Division of Reclamation and Mine Safety, the Colorado Department of Public Health and Environment, and the Natural Resource Conservation Service.

These partnerships allowed the WCRC to accomplish many projects in the watershed. The pro-

jects include facilitation of assessments, cleanup, and reclamation of much of the mining district.

The WCRC cannot move forward with other watershed restoration projects below the Nelson Tunnel/Commodore Waste Rock pile and below town until the Commodore Waste Rock pile is restored and water draining from the Nelson Tunnel has been cleaned up.

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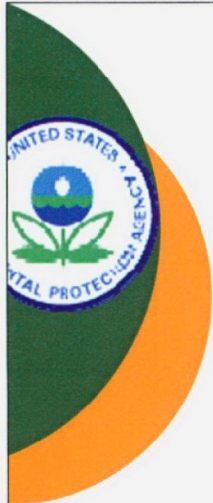
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# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

GOLDEN, COLORADO  
CONGRESSIONAL DISTRICT NO. 2

**SUPERFUND REMEDIAL**

## About the Site

The Rocky Flats Environmental Technology Site, previously known as the Rocky Flats Plant, declared physical construction complete in October 2005.

The site was cleaned up as an accelerated action through federal and state oversight, with the Department of Energy (DOE) as the lead agency. Most of the activities at the site were completed under the terms of the Rocky Flats Cleanup Agreement (RFCA) signed by DOE, EPA and the Colorado Department of Public Health & Environment (CDPHE) in July 1996.

In September 2006, a Record of Decision was signed that deleted the Peripheral Operable Unit (OU) and the OUT 3 (Offsite Areas) from the National Priorities List (NPL).

Following deletion, DOE transferred the Peripheral OU to the Department of the Interior for management by the U.S. Fish and Wildlife Service as the Rocky Flats National Wildlife Refuge.

The site provides habitat for many wildlife species, including the federally protected Preble's Meadow Jumping Mouse.

## Recent Accomplishments:

- In March 2007, DOE, EPA and CDPHE entered into the Rocky Flats Legacy Management Agreement (RFLMA). RFLMA established the regulatory framework for implementing the final remedy for Rocky Flats and ensured that it remains protective of human health and the environment.
- The majority of property at the site (the Peripheral OU), which served as a security buffer zone during production, was transferred to the U.S. Department of Interior for management by the U.S. Fish and Wildlife Service as the Rocky Flats National Wildlife Refuge in July 2007.
- The final remedy for Rocky Flats was selected in the September 2006 Corrective Action Decision/Record of Decision (CAD/ROD) after completion of cleanup and closure by DOE under RFCA. The CAD/ROD was based on the results of the July 2006 Remedial Investigation /Feasibility Study (RI/FS), Comprehensive (Human Health and Ecological) Risk Assessment (CRA) and Proposed Plan.
- The response action in the final CAD/ROD is no action for the Peripheral OU and institutional controls and physical controls with continued monitoring for the Central OU.

## Site Background

Beginning in 1952 and continuing for nearly 40 years, the U.S. government manufactured nuclear weapons components from plutonium, uranium, beryllium and stainless steel at Rocky Flats in Colorado. Rocky Flats shut its operations in 1989.

In 1992, with the end of the "Cold War," the U.S. did not resume production of nuclear weapons parts at Rocky Flats.

The Rocky Flats site, which DOE renamed the Rocky Flats Environmental Technology Site, is located on 6,500 acres in Jefferson County, 16 miles northwest of downtown Denver. Approximately 300,000 people live within 10 miles of Rocky Flats.

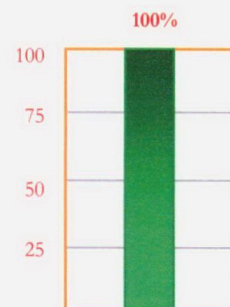
Operators conducted all manufacturing activities in a 300-acre area at the center of the site, known as the Industrial Area. The surrounding property is referred to as the Buffer Zone.

At one time the site stored more than 14 tons of plutonium making the site the second-largest repository of the element in the United States.

Leaking storage drums, unlined disposal trenches, surface-water impoundments, leaky pipelines, leaky underground tanks, two on-site landfills, and contaminated buildings all contributed to the contamination of soils and groundwater at the site.



**Percent of  
Construction  
Complete**





## Cleanup Approach

Key elements of the 1996 Rocky Flats Cleanup Agreement and the site remedy included a framework of action levels and cleanup standards for surface water, groundwater, soils and buildings. Surface water leaving the site was subject to enforceable standards for plutonium and americium. Activities included environmental restoration, building decontamination and decommissioning, waste management, buffer zone management, and surface water management.

Volatile organic compounds (VOCs) contaminated shallow groundwater in the central section of the site. The radioactive elements plutonium, uranium and americium contaminated soil in the central and eastern portions of the site; the most contaminated soils were located on the eastern edge of the industrial area.

The potential for radionuclides (radioactive particles) to become airborne during strong winds was a

concern, as was the potential for plutonium in soils to be washed into the two streams that flowed on either side of the Industrial Area.

All wastes from the cleanup and closure activities, including previously generated process wastes and contaminated excavated soils, were managed and processed as required by receiver facilities, packaged to meet strict transportation requirements, and shipped off site.

## Points of Interest

EPA, CDPHE and DOE held stakeholder meetings and invited stakeholders to many site technical meetings to present cleanup plans and receive input on major remedial activities. DOE funded two stake-

holder groups: the Citizens Advisory Board, a DOE Site Specific Advisory Board; and the Rocky Flats Coalition of Local Governments, a DOE reuse and local government organization. DOE now funds the Rocky Flats

Stewardship Council, a local stakeholder organization that meets quarterly and is involved in post-closure oversight.

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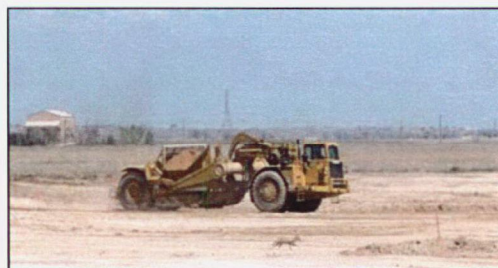
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# ROCKY MOUNTAIN ARSENAL

COMMERCE CITY, COLORADO  
CONGRESSIONAL DISTRICT NO. 7



## Recent Accomplishments:

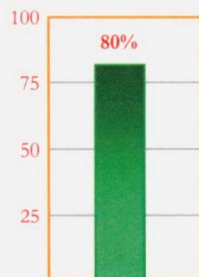
- Crews completed removing contaminated soils and sludge at the Basin F wastepile in 2007. Basin F once contained 243 million gallons of liquid waste from site manufacturing operations. The solid wastes from Basin F were dried, consolidated, and transferred to the Basin F wastepile in the 1980s. The wastepile cleanup involved excavating the contaminated soil both in the wastepile and underneath it and disposing of it in a landfill on the RMA property.
- In 2008, crews completed the Lime Basins remediation project. The Lime Basins were used to neutralize wastes from chemical agent production. Crews trenched around the Lime Basins to install a slurry wall which isolates the underground contaminated waste from the surrounding groundwater and prevents future migration of contaminants.
- EPA completed the third Five-Year Review Report at RMA in 2008. While the review identified some outstanding issues, overall EPA concluded that the remedy in place for RMA is protective for human health and the environment.

## About the Site

The Rocky Mountain Arsenal (RMA) was initially approximately 17,000 acres or 26.6 square miles, which is approximately the size of Manhattan Island in New York. The site is located 10 miles northeast of downtown Denver, Colorado, adjacent to Commerce City and Brighton to the north, Montbello to the south, Denver International Airport to the east, and Commerce City to the west. Residential homes border the site to the north, south and west and residential and business development is rapidly growing in these areas.

The Army established RMA in 1942 to manufac-

Percent of Construction Complete



ture chemical weapons. After World War II, the Army leased parts of RMA to private industry. The Army and private chemical manufacturers disposed of liquid wastes in basins and trenches, which leaked and contaminated groundwater. Since 1982, the Army and Shell Chemical Company, with oversight from the Colorado Department of Public Health and the Environment (CDPHE) and the Environmental Protection Agency (EPA), have been working to ensure the cleanup of the RMA.

Most contaminated soils are located in the central six square miles of RMA. Most of the health risks posed by

the site are from aldrin, dieldrin, dibromochloropropane (DBCP), and arsenic. Aldrin is a pesticide that breaks down to dieldrin. Both chemicals are stored in the body and affect the central nervous system and liver. DBCP is also a pesticide, but it is not stored in the body. DBCP can affect the testes, kidneys, liver, respiratory system, central nervous system and blood cells. Arsenic is a naturally occurring element. It can cause cancer in humans. Impacts to wildlife in the area have been documented.



## Cleanup Approach

The Army, EPA, and Shell signed two documents in the late 1980s. The first was the Federal Facility Agreement (FFA) that specified the process by which decisions will be made for the cleanup of RMA and established certain cleanup goals. The second was a settlement agreement that outlined the procedures for allocation and reimbursement of cleanup costs between the Army and Shell. The FFA ultimately led to the signing of two Records of Decisions in 1995 and 1996.

The Records of Decision provide the framework, purpose, and overall rationale for the remediation actions that must be accomplished at the site. The Army, EPA and CDPHE signed both documents. The U.S. Fish and

Wildlife Service and Shell Chemical Company concurred with one of them.

The Army, serving as the lead agency, and Shell are implementing the selected remedy that includes 31 projects for soils, structures, and the treatment of groundwater contaminants. EPA, CDPHE, and Tri-County Health Department are conducting regulatory oversight. The majority of the cleanup projects required in the Records of Decision are complete.

Currently, an integrated cover system is being installed over areas at RMA where waste has been consolidated and left in place, such as at the landfills, Lime Basins, and South Plants Central Processing area.

These covers are specially designed to ensure that no precipitation migrates through the contaminated waste consolidated below. Construction began in June 2007 and is expected to be finished in fall 2010.

In addition, the groundwater remedy at RMA is ongoing. The groundwater remedy consists primarily of removal and treatment of contaminated groundwater through the operation of existing boundary and on-site treatment systems. There are additional areas of extraction and treatment of contaminated groundwater at contaminant source areas.

All remediation activities are expected to be completed by 2011, depending upon funding from Congress.

## Points of Interest

In October, 1992, Congress enacted a bill designating approximately 16,000 acres of RMA as one of the nation's largest urban wildlife refuges. To date, EPA has deleted from the NPL over 13,000 acres of land at RMA because all required cleanup activities have been completed. Of that, more than 12,000 acres have been transferred from the

Department of Defense to the U.S. Fish and Wildlife Service to become part of the National Wildlife Refuge System.

Community interest and concern in RMA has always been strong. There are three forums where EPA, CDPHE, and the Army have regularly interacted with community representatives over the many years

of the cleanup process: the Restoration Advisory Board, the Site Specific Advisory Board, and the Medical Monitoring Advisory Group. In addition, around any significant cleanup activity, RMA, EPA and CDPHE have worked with the Army to provide the necessary community involvement and outreach, including public meetings, flyers, tours, etc.

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# SAND CREEK

COMMERCE CITY, COLORADO  
CONGRESSIONAL DISTRICT NO. 1

## Recent Accomplishments:

*A Five-Year Review completed in September 2005 indicates that the current remedy protects human health and the environment for workers and people near the site.*

## About the Site

Volatile organic compounds (VOCs), pesticides, herbicides and arsenic are the site's contaminants of concern.

The cleanup is complete with ongoing Operation and Maintenance (O&M) activities, that include:

- Operating the landfill system,
- Maintaining the fence around the landfill,

- Maintaining the vegetative cover over the landfill, and
- Monitoring groundwater throughout the site.

Since contamination remains on site, Five-Year Reviews are conducted to ensure that the remedy is protective of human health and the environment.

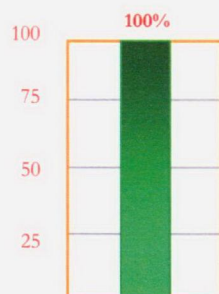
## Site Background

The Sand Creek Industrial site occupies about 550 acres in Denver and Commerce City, Colorado. Four sources of contamination, all now inactive, were known to exist: an oil refinery, a pesticide manufacturing facility, acid pits, and a landfill.

EPA conducted sampling at the site and found the soil and groundwater contaminated with VOCs, pesticides, herbicides and arsenic. Exposure to such contami-

nated groundwater or soil could cause serious health problems, such as cancer and damage to the liver, central nervous and respiratory systems. People also could be exposed by inhaling contaminated dust and vapors. EPA proposed the site for the Superfund National Priorities List (NPL) in December 1982 and added the site in September 1983. It was deleted from the NPL in December 1996.

Percent of Construction Complete





## Cleanup Approach

These cleanup activities have been completed:

- Installation of a methane gas collection/treatment system at the landfill in 1991.
- Removal of four buildings, four rail cars, two concrete tanks and thirteen steel tanks in 1992.
- Treatment of subsurface soils, using Soil Vapor Extraction in 1994.
- Removal of oily liquids floating on groundwater in two localized areas, using Dual Vapor Extraction in 1995.
- Treatment of surface soils, using Low Temperature Thermal Treatment in 1994.

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# SHATTUCK CHEMICAL COMPANY

DENVER, COLORADO  
CONGRESSIONAL DISTRICT NO. 1

## About the Site

Remediation of the Shattuck Chemical Superfund Site was completed in November 2006. Shattuck Chemical was designated Operable Unit 8 (OU8) of the larger Denver Radium Superfund Site, consisting of 65 properties abandoned after the city's radium industry collapsed in the 1920's.

Activities began at the site in 1992 following the Superfund Record of Decision (ROD), Denver Radium Site, OU8. In 1997, work was completed on the solidification of site soil and rub-

ble with a mixture of concrete and fly ash, covered with a cap composed of clay material, a geosynthetic liner, sand and gravel, and riprap to create a "monolith" at the site.

Subsequent to the action, an amendment to the ROD for the site in June 2000 called for the removal and off-site disposal of the existing monolith. Contaminated soils beneath the monolith and along the perimeter of the site were also required to be removed.

The United States Army Corps of Engineers (USACE) was selected by EPA to manage the remediation effort.

A total of 2,244 railcars containing approximately 243,101 tons of soil and monolith materials were delivered to the approved offsite disposal facility in Grandview, Idaho.

### Recent Accomplishments:

- EPA and the state expect to delete the site from the National Priorities List (NPL) in 2009.
- The state of Colorado on January 2008 concurred with EPA's intent to delete Shattuck and all other Denver Radium sites from the NPL.
- The last of 2,244 railcars of contaminated soil left the site in July 2006. Site remediation was complete as of November 2006 and the site is ready for re-use.
- The site is free of contamination and under no restrictions other than groundwater use.

## Site Background

The site is located approximately six miles southwest of downtown Denver. The S.W. Shattuck Chemical Co. processed a variety of radioactive materials at the site from 1917 to 1984.

Radionuclides of concern were radium-226 (Ra-226), thorium-230 (Th-230) and natural uranium (U-nat). Processed ore wastes (soil and rubble) remained at the site at the time of its closure.

Initial remediation at the site involved stabilizing and treating contaminated soils on-site. However, further review of the remedy, and concerns raised by the com-

munity, caused EPA to reconsider the original decision.

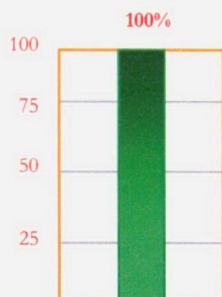
EPA concluded that the long-term protectiveness of the remedy could not be guaranteed and therefore decided to remove the stabilized waste to a licensed disposal or recycling facility.

Work to remediate the five-acre site began in March 2003. It consisted of removal of the riprap and the monolith in sections below a building used to enclose the site. The building started at the southern section of the site and

moved forward as sections of the monolith were mined, placed in a railroad gondola cars and shipped to the licensed disposal facility in Idaho.

When the excavation of the monolith and affected underlying soil was completed in each building setup, survey units were established on the newly-excavated surface. The units were used to establish a sampling and analysis program to confirm that all radiologically affected materials had been removed from the site.

### Percent of Construction Complete





## Cleanup Approach

Demolition of the monolith occurred inside a moveable "mining" structure made of sheet metal and tensioned fabric to allow the structure to conform to the narrowing width of the monolith. The mining structure used air filters to control dust and other emissions.

A metal conveyor structure moved the mined monolith materials to a metal load-out structure where rail cars were filled. The load-out structure also had air filters to control dust and other emissions. The rail cars used the Shattuck site rail spur to connect the site with the main line.

The site and community health and safety plans required eight on-site and one off-site background high volume air samplers running 24 hours a day, seven days a week. A background PM-10 dust monitor recorded particulate levels 24 hours a day, seven days a week, and a working area PM-10 dust monitor operated during intrusive activities on-site.

Alarms on the monitors alerted site personnel of high particulate levels for corrective action. Security was maintained 24 hours-a-day, seven days-a-week by an on-site security officer.

Contaminated soils and monolith materials were transported by gondola rail car. The waste was placed in a polyvinyl chloride, "burrito-like" load wrapper in the rail car to prevent contamination releases during transport.

In addition to Final Status Survey sampling, independent verification sampling was conducted by the Colorado Department of Public Health and Environment.

Shattuck waste is permanently disposed at the U.S. Ecology facility in Grandview, Idaho. The facility operates under a state of Idaho permit.

## Points of Interest

In December 2001, Shattuck Chemical Co. agreed to pay more than \$7.2 million to offset the cost of cleaning up the Shattuck Superfund Site in Denver.

The settlement provided funds to reduce EPA and state costs. It covered the removal of radionuclide

contaminated materials and groundwater monitoring.

Under the agreement, Shattuck paid EPA \$5,450,000 in cash. The settlement also required Shattuck to pay \$2.5 million to the state of Colorado for environmental damage the site may have caused and for reim-

bursement of state response costs.

The funds are in addition to the \$26 million that Shattuck spent to implement the 1992 remedy.

At the conclusion of the project, approximately \$65 million had been spent on the cleanup.

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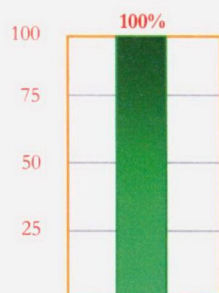
# SMELTERTOWN

SALIDA, COLORADO  
CONGRESSIONAL DISTRICT NO. 3

## Recent Accomplishments:

*A Five-Year Review of the site will be conducted in 2009.*

## Percent of Construction Complete



## About the Site

The contaminants of concern are arsenic, cadmium, copper, lead, manganese, zinc, pentachlorophenol and creosote. Groundwater, soil, surface water and solid waste were contaminated during smelting, wood treating, and zinc sulfate manufacturing.

Cleanup activities at the Smelertown site are complete.

Groundwater monitoring continues. Since contamination remains on site, Five-Year Reviews will be conducted to ensure that the site remedies continue to be protective of human health and the environment.

## Site Background

A lead/zinc smelter operated on the Smelertown site from the turn of the century until about 1920 and dumped wastes along the banks of the Arkansas River, near the town of Salida, Colorado. Contaminants included arsenic, cadmium, copper, lead, manganese and zinc.

Beginning in 1924, wood treatment occurred at the site. Creosote and pentachlorophenol were allowed to drip onto the ground after the lumber was treated. Creosote contaminated soils were removed from the site in 1986 and 1992.

CoZinCo manufactured zinc sulfate soil amendment/animal feed by treating metallic galvanizing wastes called "skimmings" with 94 percent sulfuric acid. Areas of contamination include several drum piles, sludge disposal

and storage areas, and two wastewater lagoons. These sources of contamination were addressed under a Corrective Action Order issued by the state of Colorado.

A majority of the western and central portion of the site is currently owned by the Butala Construction Co., a gravel-mining and processing business. E&R Trucking, Inc., a now-defunct tractor-trailer freight company, bought the remainder of the property. The smokestack, located on E&R Trucking's property, was listed on the National Register of Historic Places in 1976 and is currently an attraction for tourists.



## Cleanup Approach

The site was divided into three Operable Units (OUs) that are directly associated with the source activities and contaminants from each of the three industrial practices. The OUs allowed the investigation to be focused on distinct contaminants and feasible cleanup technologies related to particular contaminants.

The central portion of the site was identified as OU1. It included contamination from a former lead, copper, silver and gold smelter operated by the Ohio and Colorado Smelting and Refining Company from 1902 to 1919.

OU1 investigations have been completed, and a cleanup decision was documented in an Action Memorandum dated September 27, 1996. Cleanup work began on June 9, 2003 and was completed on September 18, 2003. Existing concrete foundations and structural debris were demolished and buried at the

bottom of a waste pile consolidation area (created by an EPA removal in the early 1990s). The waste pile consolidation area, about six acres, was regraded to promote drainage. Contaminated materials outside the consolidation area were placed inside. A two-foot clean soil cover was placed over the waste pile consolidation area and revegetated with native perennial grass and plant species suitable for the project site. A new well was installed for post-construction monitoring. A final Walk Through and Certified Inspection was completed on November 21, 2003.

The western portion of the site, identified as OU2, included contamination from a series of railroad tie-treating companies from 1924 to 1953. The most recent wood-treating company to operate at the site is Koppers, Inc., which is now Beazer East, Inc.

Investigations were conducted by Beazer East, Inc. on OU2. The investigation included analyzing several viable cleanup alternatives. Under current land-use (industrial), EPA and the Colorado Department of Public Health and Environment (CDPHE) concluded that human health was not at risk. However, an unacceptable risk would be posed by OU2 under a future residential scenario or under a future mining scenario. Therefore, the selected remedy requires that land use for OU2 be restricted to non-residential, prohibits mining, and requires groundwater monitoring.

The eastern portion of the site has been identified as OU3 and contained contamination from the operating CoZinCo manufacturing facility. This Operable Unit was cleaned up under the state Resource Conservation and Recovery Act (RCRA) program.

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# SMUGGLER MOUNTAIN SITE

ASPEN, COLORADO  
CONGRESSIONAL DISTRICT NO. 3

## About the Site

The Smuggler Mountain Site is located in northeastern Aspen on the flank of Smuggler Mountain. Silver and lead mines were active on the site between 1879 and 1920. Mine waste included toxic metals, mill tailings and smelter by-products.

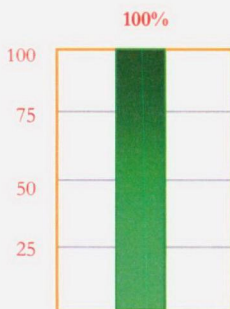
The site covers 135 acres, 116 of which are currently residential. The site has condominium units, mobile home parks, a tennis club and single-family homes.

Site soil analyses have shown high levels of lead and cadmium.

The Environmental Protection Agency placed the site on its Superfund National Priorities List (the "NPL") in 1986.

Cleanup construction was completed in September 1996. The site was deleted from the NPL on September 23, 1999.

Percent of  
Construction  
Complete



## Site Background

Lead contaminated surface soil posed a potential health risk to residents. Contaminated dust could be breathed in or consumed in garden vegetables. Potential lead exposure may cause long-term or permanent nervous-system damage, resulting in learning disabilities and behavioral problems.

Exposure to low lead levels may

harm the nervous system of young children. Lead exposure may also cause long-term damage to the cardiovascular system, the reproductive system, kidneys and the liver.

## Cleanup Approach

These cleanup activities have been completed:

- Completing reports on lead impacts, bio-availability, and blood-lead monitoring studies concluding that children living on the site are not at unacceptable risk due to exposure to lead in soil.
- Capping a contaminated berm with clean soil and vegetation; covering and replanting common-use areas of exposed mine waste, including the Mollie Gibson Park.
- Re-grading a parking area and part of the mine to drain back into the mountain.
- Controlling dust emissions from the mine from dirt roads and the parking area by periodic spraying of a dust-suppressant solution.
- Extending the existing fence to restrict entry to the lower portion of the mine.



## Cleanup Approach Continued

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In relation to the mine, Operation and Maintenance activities include maintenance of runoff and dust control, and restriction of site access. For the residential area, institutional

controls restrict the movement of contaminated soils in and from the site and help preserve the integrity of the remedy.

The last Five-Year Review indi-

cated that the remedy is protective of human health and the environment. The next Five Year Review is due in June of 2012.

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## STANDARD MINE

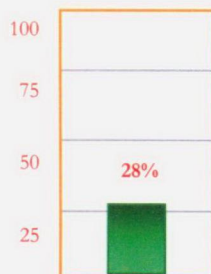
CRESTED BUTTE, COLORADO  
CONGRESSIONAL DISTRICT No. 3



### Recent Accomplishments:

- Groundwater wells were drilled in the vicinity of the Standard Mine fault in September 2009 and samples were collected in October.
- Operation and monitoring of the bioreactor continued over the winter. No major problems were encountered. Results show 96-99% removal efficiency of zinc, copper, and lead.
- EPA briefed the Gunnison County Commissioners and Crested Butte Town Council in April 2009 as to the status of the cleanup. Both County Commissioners and Council members expressed their satisfaction with the progress EPA has made.

### Percent of Construction Complete



### About the Site

The Standard Mine site was added to the National Priorities List (NPL) in September 2005. A Remedial Investigation (RI) and Feasibility Study (FS) began after the conclusion of the public comment period for the NPL listing process. A Remedial Investigation is the first step taken to characterize the site. This consists of collecting

information on the physical aspects of the site such as types and location of contamination. The information is analyzed and presented in a RI Report that is used for addressing potential cleanup actions.

The next step is to prepare a Feasibility Study which is an evaluation of several alternatives for cleanup of the

site contamination. The FS uses information collected by the RI as well as a risk assessment to determine the cleanup goals for the site.

In the meantime, a non-time critical removal was initiated to address more immediate contamination concerns at the site.

### Site Background

The Standard Mine is located on 10 acres in the Ruby Mining District of the Gunnison National Forest approximately 30 miles north of Gunnison and 10 miles west of the Town of Crested Butte, Gunnison County, Colorado. The contaminants of concern are primarily heavy metals with samples showing elevated levels of manganese, lead, zinc, cadmium, and copper. The Standard Mine releases 70 gallons per minute (gpm) (high flow) and 5-20 gpm (low flow) of groundwater from the abandoned mine

workings to Elk Creek depending on the season.

Elk Creek flows through the mine site, and during high flow periods, flows into the impoundment depositing heavy metals into Coal Creek which runs through Crested Butte until it meets the Slate River. The Crested Butte municipal drinking water intake is on Coal Creek. As a result, there is a potential threat to downstream water users from the Standard Mine.

Silver mining activity began in the southern Ruby

Mining District in 1874 and continued up to 1974 at several mine sites. Standard mine was one of the three largest producing silver mines in the area. The other two are the Keystone mine owned by U.S. Energy and the Forest Queen mine. None of these mines are currently active except for mine water treatment at the Keystone mine. The Standard Mine was called the most environmentally degraded mine site in the entire Ruby Mining District by a report from the Colorado Geological Survey.



## Cleanup Approach

Due to concerns over instability of the tailings impoundment dam located on-site, the Emergency Response Unit was tasked with initiating actions to accelerate the removal of this structure and the threat it presented. The Removal Program conducted a Non-Time-Critical Response (NTRC) action to address these threats; the Engineering Evaluation and Cost Analysis (EE/CA) developed for the NTRC provided additional, structured opportunities to coordinate with the Remedial Program, the United States Forest Service (USFS) and the citizens of the town of Crested Butte and surrounding areas.

Investigations showed the tailings impoundment dam was highly unstable. EPA determined that this structure should be removed along with other adjacent waste rock piles all of which were physically eroding and/or leaching contaminants into Elk Creek, which passed through the site, and subsequently, to the water supply for the town of Crested Butte. EPA,

in partnership with the USFS, identified numerous site locations for the final waste disposal repository and evaluated those against various criteria to determine the most suitable location. Once the most desirable location was determined, various design options were evaluated and shared with other federal, state and local agencies/groups. EPA removed approximately 50,000 cubic yards of waste, placed it in a stable, engineered repository and capped it.

Under the Remedial Program, the site is currently being characterized and long-term, site-wide cleanup options identified as part of the Remedial Investigation and Feasibility Study. Since the site was listed in 2005, EPA has been characterizing the surface water, sediment, macroinvertebrate populations' in-stream, fish populations, sediment pore water, surface soil, and subsurface soil for the purposes of identifying risks posed by site contaminants. This characterization has also been important as part of the continued biomonitoring of the nearby streams to determine how the previous Removal

Actions have affected the health of the streams in the watershed. The Remedial Program is also conducting investigations of the mine workings and the local groundwater flow regime to develop options for minimizing the generation of acid mine drainage within the mine. Investigations into potential water treatment options are also being conducted. The Remedial Program installed a passive treatment pilot scale bioreactor to evaluate its effectiveness for treating acid mine drainage coming from the Standard Mine adit and to determine if this type of passive water treatment is effective at the mine's high elevation and cold winter climate. This bioreactor has been operational for the last two years. Data collected from the pilot study will be incorporated into the Feasibility Study for the site. The Final Remedial Investigation and Feasibility Study will be completed in 2010.

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# SUMMITVILLE MINE

DEL NORTE, RIO GRANDE COUNTY COLORADO  
CONGRESSIONAL DISTRICT NO. 3

## About the Site

### Recent Accomplishments:

- The design for a new single-stage Water Treatment Plant will be completed in 2009. American Recovery and Reinvestment Act (ARRA) funds will enable a 2009/2010 construction start.
- The Colorado Department of Public Health and Environment (CDPHE) received financial assistance to become the technical lead agency for all site operations in January 2005.
- The state of Colorado and Federal Trustees, along with the community-based Alamosa River Foundation, developed the Alamosa River Watershed Restoration Master Plan in July 2005. The plan assessed the environmental impacts and potential restoration of the entire watershed. Natural Resource Damage settlement funds are paying for a portion of approved projects. Three community projects have been selected for restoration of designated segments of the Alamosa River.

The Summitville Mine Superfund Site covers about 1,231 acres of Rio Grande County and is located approximately 20 miles southwest of Del Norte in the San Juan Mountains of southern Colorado. The latest mining operator, Summitville Consolidated Mining Corp. Inc. (SCMCI), mined the site from 1986 until abandoning the site in December 1992.

Surface water, groundwater and soil were impacted by both acid rock and acid mine

drainage originating from the mineralized terrain and mine site. The acid drainage is characterized by low pH and high metals concentrations, affecting the downstream Alamosa River system, which cannot support a diverse and reproducing aquatic life community. In addition to low pH, contaminants of concern include aluminum, cadmium, copper, iron, manganese, nickel and zinc.

Heap leach operations

used sodium cyanide to extract precious metals from crushed ore. Following implementation of the Heap Leach Pad remedy, minor amounts of residual cyanide and cyanide degradation products remain within the Heap Leach Pad waste materials. However, cyanide has not been detected in any media off-site.

To date, about \$210 million has been spent on the Summitville project.

## Cleanup Approach

After SCMCI declared bankruptcy, EPA emergency response actions and interim remedial actions included plugging the Reynolds and Chandler Adit tunnels to reduce a major source of acid mine drainage.

Actions addressed through Interim Records of Decision included:

- 1) Water Treatment Plant consolidation and operation at a rate of 1000 gallons per minute

(gpm) to remove heavy metals;

- 2) Heap Leach Pad Detoxification/Closure;
- 3) Mine waste excavation from the Cropsy Waste Pile, Beaver Mud Dump and Cleveland Cliffs Impoundment and placement of waste material in site mine pits; and
- 4) Site-Wide reclamation of approximately 585 acres to reshape and restore vegetation to

disturbed lands, as well construction of a surface water/storm water management system.

Ongoing remedial activities include: Seasonal operation of the existing interim Water Treatment Plant, construction of additional water management structures, and monitoring surface water and seepage to evaluate the effectiveness of the water-control strategy.



## Points of Interest

### Water Treatment Plant

The Summitville site has received \$10 to \$25 million in new funding through the American Recovery and Reinvestment Act of 2009. These Recovery Act funds will be used to construct the 1600 gallons per minute (gpm) water treatment plant at the site. The plant will remove contaminants from acidic metals-contaminated mine drainage before the water leaves the site and enters the headwaters of the Alamosa

River, which flows into the Rio Grande. When the plant is operational, all cleanup work at the Summitville Mine site will be complete.

The interim 1000 gpm Water Treatment Plant (WTP), in addition to being old and inefficient, does not have adequate capacity to treat the volume of contaminated water generated at the site.

In accordance with the 2001 Site-Wide Record of Decision, a new

water treatment plant was recommended to replace the interim and inadequate WTP. A two-stage design was complete in September 2004; however, construction funding was not available in part because of the aluminum standard at the time. In 2007, changes to the Alamosa River aluminum standards allowed changes in the new WTP's effluent goals. As a result, in 2009 the WTP will be redesigned as a single-stage 1600 gpm plant.

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# URAVAN URANIUM PROJECT

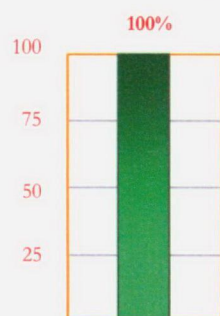
URAVAN, COLORADO  
CONGRESSIONAL DISTRICT NO. 3

## Recent Accomplishments:

*All cleanup work at the site is complete. Over 13,500,000 cubic yards of mill tailings, evaporation pond precipitates, water treatment sludge, and contaminated soil and debris were collected and disposed in four on-site disposal cells that will be transferred to the Department of Energy for long-term management. The remainder of the site and surrounding area will be used in the future for recreation and wildlife habitat. The local community will use 140 acres of the area as a campground and visitor center that will include a museum dedicated to the history of uranium mining and milling in western Colorado.*



## Percent of Construction Complete



## About the Site

On September 29, 2008, a chapter in the history of the uranium industry in western Colorado closed when EPA announced the completion of site cleanup and restoration of the Uravan Uranium Mill Site. Wastes from processing radium, vanadium and uranium ores left contaminated liquids, dried waste pond precipitates, mill tailings, soil and structures at

the site. Contaminants of concern included radium, uranium, lead, arsenic, cadmium and vanadium. Today there no longer are threats to people who might live near or recreate on the site or to the San Miguel River that borders the property. Radon levels meet both federal and state regulations. The cleanup cost was over \$120 million and is designed to last at least 1,000 years.

## Site Background

The Uravan Uranium Mill, located in west-central Montrose County, processed radium, vanadium and uranium ores from 1914-1984. An early mill on the site provided radium for Madame Curie's study of that substance. During the 1940s and 50s the mill processed uranium for the Manhattan Project. Operations at the 680-acre site left a large volume of wastes that contaminated air, soil, groundwater and the San Miguel River. EPA added the site to its National Priorities List in 1986. Umetco performed cleanup work under

the oversight of the Colorado Department of Public Health and Environment and EPA.

Two portions of the site have been deleted from the National Priorities List. The first partial deletion in December 2004 removed 9.84 acres including two historic structures. The second partial deletion in July 2007 removed approximately seven acres, including a one-mile section along Highway 141 between mile posts 75 and 76.



## Cleanup Approach

The cleanup included:

- Consolidating, capping and revegetating millions of cubic yards of radioactive tailings and soil;
- Excavating radioactive raffinate crystals;
- Eliminating process ponds;
- Pumping and treating contaminated groundwater;
- Removing tailings along the river;

- Dismantling more than 50 contaminated mill site structures and the town of Uravan;

- Placing all contaminated tailings, soil, pond precipitates, water treatment plant sludge and debris in four on-site disposal cells.

Because waste is left in place at the site, the remedy will be reviewed every five years. The next Five-Year Review will be in 2010.

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# VASQUEZ BLVD. & I-70

DENVER, COLORADO  
CONGRESSIONAL DISTRICT NO. 1



## Recent Accomplishments:

- EPA completed the investigation and cleanup of lead and arsenic from residential yards at VB/I-70 OU1 in August 2006. This was a vast residential soils cleanup project encompassing more than four square miles and approximately 4,500 properties.
- The Community Health Program, designed to raise awareness in the community about lead and arsenic hazards, concluded in 2008. EPA provided a grant to the city of Denver to lead this effort. The city is now looking to the program as a model for future efforts elsewhere in Denver.

## About the Site

The Vasquez Boulevard/Interstate 70 (VB/I-70) Superfund Site is comprised of three operable units. Operable Unit 1 (OU1) includes residential properties within all or part of the following northeast Denver neighborhoods: Cole, Swansea, Clayton, Elyria, Globeville and small sections of Curtis Park and Upper Larimer neighborhoods. The site is considered by EPA to be an Environmental Justice site, meaning it suffers a disproportionate share of environmental risk due to its industrialized setting.

In 1998, EPA and the Colorado Department of Public Health and Environment (CDPHE) began sampling soil from residential yards to determine if heavy

metals from past smelting operations posed a health threat to the community. Sampling results showed elevated lead and arsenic concentrations in some yards.

EPA conducted a widespread cleanup of lead and arsenic in residential soils at VB/I-70 OU1, complemented by a unique Community Health Program. The latter hired and trained local community members to provide information to their neighbors about how to avoid becoming exposed to lead and arsenic.

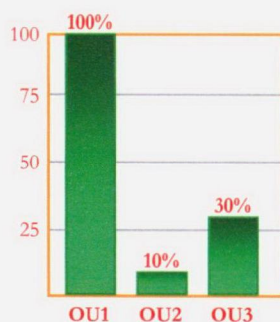
EPA completed the residential soils cleanup at OU1 in August 2006. EPA sampled approximately 4,500 properties and cleaned up close to 750 yards. The

Community Health Program and limited yard sampling continued through 2008.

Operable Unit 2 (OU2), located at Interstate 70 and Brighton Blvd., was previously the Omaha & Grant Smelter site. EPA is concerned that wastes from the historic smelter operation may still exist in soils and may be impacting the groundwater. EPA and the city of Denver are currently investigating the site.

Operable Unit 3 (OU3) was previously the Argo smelter site, located at Interstate 70 and Fox Street. EPA has concluded its investigation of heavy metal contamination in soils and groundwater at OU3 and is currently evaluating cleanup alternatives.

Percent of Construction Complete



## Background

Historically, three smelters, the Omaha-Grant, Argo and Globe, operated in the vicinity of the VB/I-70 site, where Interstate 70 and Interstate 25 cross near the South Platte River. Beginning in the 1870s, these smelters proc-

essed the gold, silver, copper, lead and zinc that was being mined out of the nearby mountains. These smelter activities are thought to be a source of the heavy metal contamination in area soils and groundwater.

Lawn care products used through the mid 1970s, lead-based paint, leaded gasoline, and other industrial sources are also thought to contribute to the contamination.



## Cleanup Approach

For the OU1 residential soils investigation, EPA took 30 samples at each individual yard and combined them into three samples, where the average lead level and the

highest arsenic level of the three composite samples represented the sampling results for each yard. The sampling and cleanup approach was uniform and voluntary. During the investigation, EPA

was able to sample 97 percent of the 4,470 properties affected. EPA removed and replaced soil and re-landscaped a total of 742 yards.

## Points of Interest

- In addition to the residential soils cleanup at OU1, EPA funded a Community Health Program. Administered by the city of Denver, the program helped raise awareness in the community about how to protect children from lead and arsenic hazards. The program was a unique and collaborative effort, designed by local, federal and state government representatives and committed community leaders. The program trained local residents to go door-to-door and talk to their neighbors about the hazards of lead and arsenic. These Community Health Workers conducted home visits and encouraged parents to bring their children to bio-monitoring clinics where they could be tested for lead or arsenic exposure.
- EPA also included an innovative lead paint assessment and abatement program at OU1. EPA removed exterior lead-based paint from portions of houses in cases where peeling paint threatened to re-contaminate recently remediated soil. This program was the first of its kind at any Superfund Site in the nation.
- EPA led an extensive community involvement and outreach effort for the VB/I-70 OU1 residential soils cleanup. The final cleanup plan was developed in collaboration with a group of committed community and agency stakeholders, who met regularly for the duration of the project. EPA twice awarded a technical assistance grant to an area community group called CEASE, which was formed specifically around the Superfund cleanup issue. EPA produced and distributed numerous fact sheets and flyers, participated and presented at numerous neighborhood meetings, and hosted many public meetings and availability sessions throughout the cleanup process.

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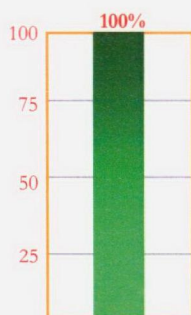


# WOODBURY CHEMICAL

COMMERCE CITY, COLORADO  
CONGRESSIONAL DISTRICT NO. 1

## About the Site

### Percent of Construction Complete



The 15-acre Woodbury Site (the "site") is in Commerce City, Colorado, on the north Denver County line. A mobile home park is located one-third of a mile from the property, and about 3,000 people work or live within a one-mile radius.

Woodbury operated a pesticide production facility at the site from the late 1950s until 1971. Five years after Woodbury closed its doors, the local health department was alerted to contaminated storm runoff from

the vacant lot. Soil samples revealed mainly chlorinated pesticides and some heavy metals and volatile organic compounds. Samples of six wells in the vicinity found no evidence of groundwater contamination.

The property is available for unrestricted use. EPA removed the site from the National Priorities List in March 1993 and will not require periodic reviews as with sites where contaminants are left in place.

## Cleanup Approach

Cleanup was completed in 1992 by the potentially responsible parties and consisted of the following activities:

- 1) Excavating and off-site burning of the more heavily contaminated soil;
- 2) Excavating and transferring less contaminated soils

and rubble to a permitted facility;

- 3) Destroying and transferring site structures to a permitted facility;

- 4) Backfilling site with clean soil and reseeding with native grasses.

## Contact

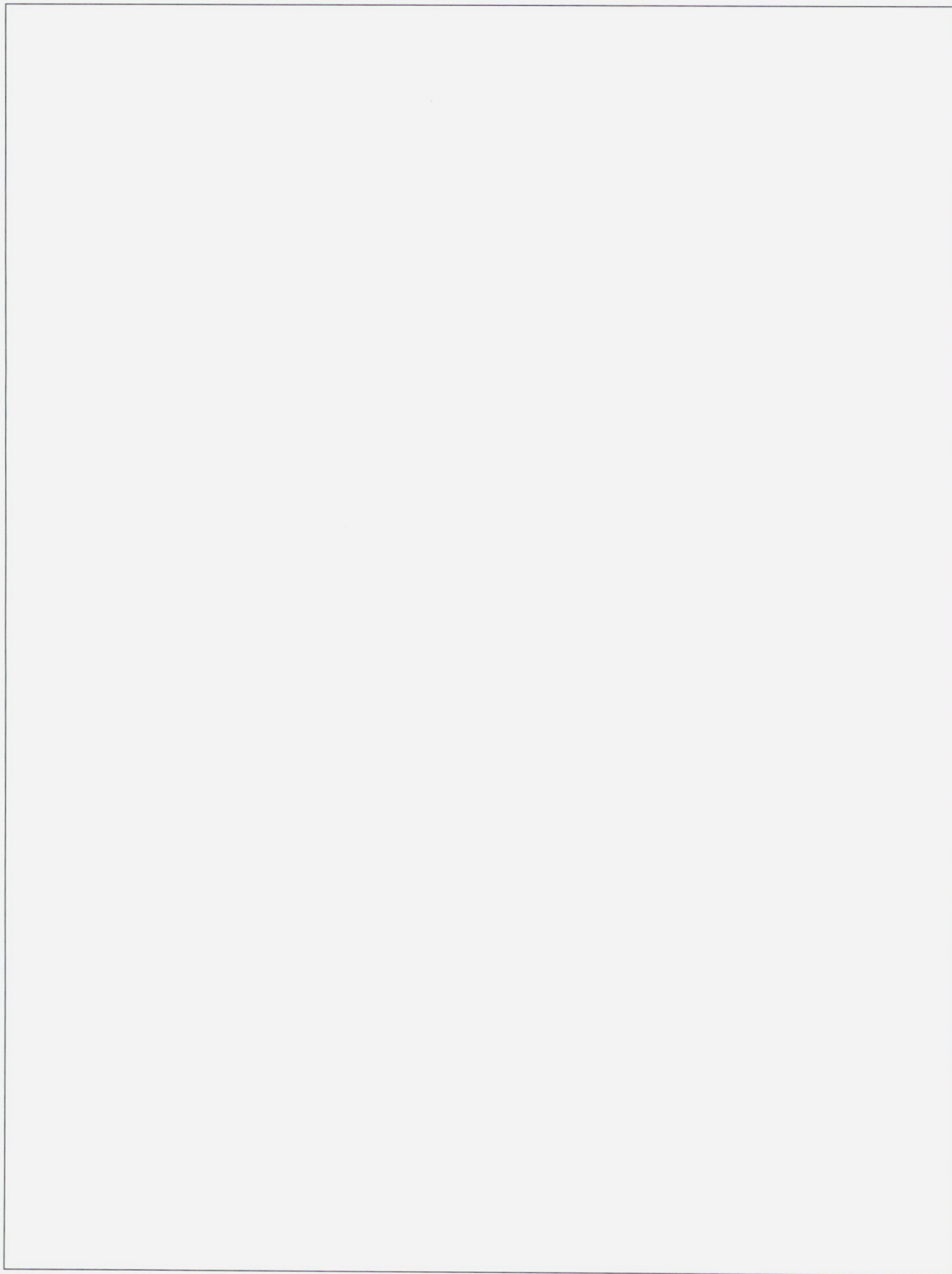


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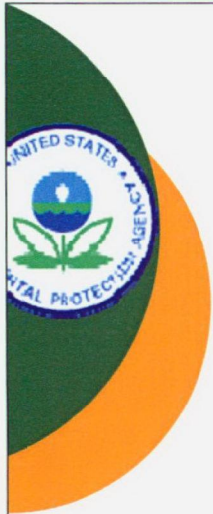
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# LEADVILLE MINE DRAINAGE TUNNEL

SUPERFUND REMOVAL

LEADVILLE, COLORADO  
CONGRESSIONAL DISTRICT No. 5



## About the Site

### Recent Accomplishments:

*All electronic controls for the remote operations system of the pump have been connected and are effectively allowing remote control of the pumping and water treatment operations at the Bureau of Reclamation's water treatment plant.*

The two-mile long Leadville Mine Drainage Tunnel (LMDT) was built in the 1940s to drain hundreds of interconnected mines in the Leadville Mining District. The Bureau of Reclamation

now owns the tunnel. Several collapses blocked the tunnel causing water to back up in the main tunnel. Increasing water pressure behind the blockages threatened a serious release from the tunnel

that could threaten the safety of residents living near the mouth of the tunnel and pour contaminated water and sediment into the headwaters of the Arkansas River.

## Site Background

In February 2008, fearing a catastrophic failure of the tunnel, the Lake County Commission declared a State of Emergency. In response

to community and Congressional concern, EPA deployed a team to prevent a major release from the tunnel. During the four-month

emergency response, EPA worked with local, state and national elected officials.

## Cleanup Approach

The emergency response entailed parallel activities to address the threat. EPA:

- Installed a pump into a nearby mine shaft to reduce the water level in the mine workings on an interim basis;
- Drilled a relief well in the LMDT,

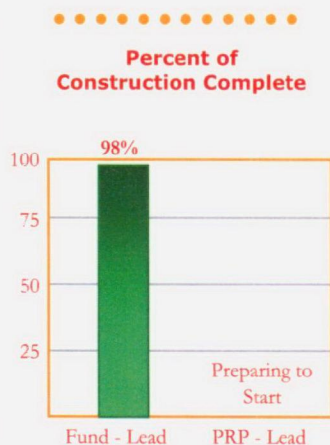
installed a pump to remove water from behind the blockages, and

- Constructed a pipeline to carry the water to the Bureau's water treatment plant at the mouth of the tunnel where it could be treated before being released into the river.

## Points of Interest

The work took place in the dead of winter at an elevation of 10,000 feet. In four months, EPA drilled a new relief well in the tunnel, installed a pump and constructed a nearly one-mile long pipe-

line to transport water pumped from behind the blockages to the treatment plant at the mouth of the tunnel. Approximately \$6 million has been spent to date.



## Contacts



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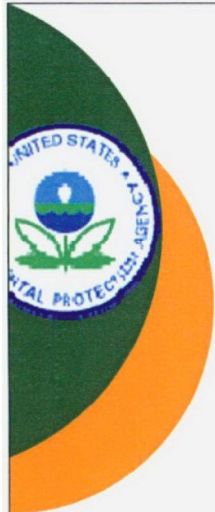
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# ARGO MINE

## BROWNFIELDS

BOULDER COUNTY, COLORADO  
CONGRESSIONAL DISTRICT NO. 2

AWARD DATE: 2006  
AWARD AMOUNT: \$200,000



## Background

In 2006, Boulder County, Colorado, was selected to receive an EPA Brownfields Grant to cleanup contamination at the former Argo Mine, located just west of the town of Jamestown. Starting in the mid-1800s and through the 1990s, mining of precious metals was common along streams in the area including James Creek, Left Hand Creek, Little James Creek, and others. The historical mining and milling usage in the area has left behind mine-

scarred lands and a legacy of heavy metal and acid contamination in surface water and groundwater. The watershed serves as the primary drinking water supply for the 18,000 residential customers of the Left Hand Water District. The contamination from the Argo mine and other historical mining operations poses a potential risk to this local water supply, as well as to the natural environment.

### Project Accomplishments:

- *Boulder County prepared an Analysis of Brownfields Alternatives report and selected a preferred alternative.*
- *Cleanup activities are scheduled to begin in summer 2009.*

## Project Highlights

To address the contamination concerns from the mines, Boulder County and its partners will use the EPA Brownfields Grant to conduct an environmental cleanup at the Argo Mine site. The cleanup will reduce potential exposure to contaminants and prevent further degradation of Little James Creek. Once cleanup is complete, Boulder County in-

tends to use the site for open space, further preventing any future contaminants from entering the stream. The cleanup work will also mitigate hazards related to open mine works. Cleanup is expected to remove the contamination stigma of the area, thereby improving real estate values and the economic growth potential of the area. This innovative

project will serve as a model for other communities that are transitioning from a mining-based economy to an economy increasingly dependent on natural assets: clean land, clean water, and healthy ecosystems.



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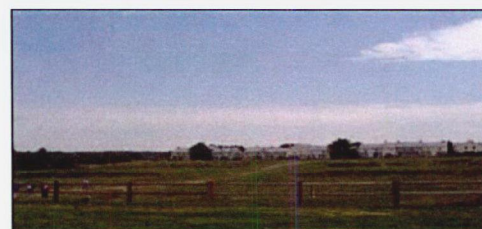
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# THE CITY OF AURORA

AURORA, COLORADO  
CONGRESSIONAL DISTRICT 7

AWARD DATES: 2000, 2008  
AWARD AMOUNT: \$850,000



## Background

The city of Aurora was awarded a Brownfields Revolving Loan Fund (RLF) grant in 2000, and received additional supplemental funds in 2008. During this time, the city has developed

a successful RLF program, designed to assist in the revitalization of the city's tax base and increase the availability of sustainable wage employment in the project area. The city has used its

Revolving Loan Fund to make low interest loans for cleanup activities at brownfields properties, and plans to continue funding projects into the future.

### Project Accomplishments:

*The city of Aurora used its Brownfields RLF to make a loan for cleanup of an old landfill and converted it into a park and recreation area.*

## Project Highlights

On March 9, 2009 the city of Aurora, CO used its EPA Brownfields Revolving Loan Fund grant to capitalize a \$415,000 loan to the Aurora Urban Redevelopment Authority. The loan will be used to finance the remediation of soil and groundwater contamination at a former dry cleaner site at Peoria and Colfax in Aurora. Once complete, the cleanup will enable Bush Development to transform an underutilized mall into the Fitzsimmons Promenade mixed-used redevelopment, providing commercial and residential space and connecting the Fitzsimmons Medical Complex to the community. The project is part of Aurora's overall renewal plan to minimize the presence of derelict and potentially hazardous properties along East Colfax.

On June 7, 2004, the city of Aurora loaned \$471,495 to Community Builders,

Inc. to assist with cleanup costs associated with a five-acre section of the Idalia Court property. This loan was made possible through a \$500,000 EPA Brownfields Revolving Loan Fund grant awarded to the city of Aurora in September 2000. The six-acre Idalia Court property operated as a landfill until the late 1960s. Cleanup included the removal of 45,000 cubic yards of contaminated soil and solid waste. The property was developed into 54 affordable townhouse units enhancing local economic benefits for the community. In addition to EPA funding, Community Builders, Inc. partnered with the Colorado Brownfields Foundation (CBF) to help fund cleanup costs and development of a half-acre section of the Idalia Court property. CBF redeveloped the half-acre section of Idalia Court into Kingsborough Community Park, which upon completion was dedicated to the city of Aurora.

## Contacts



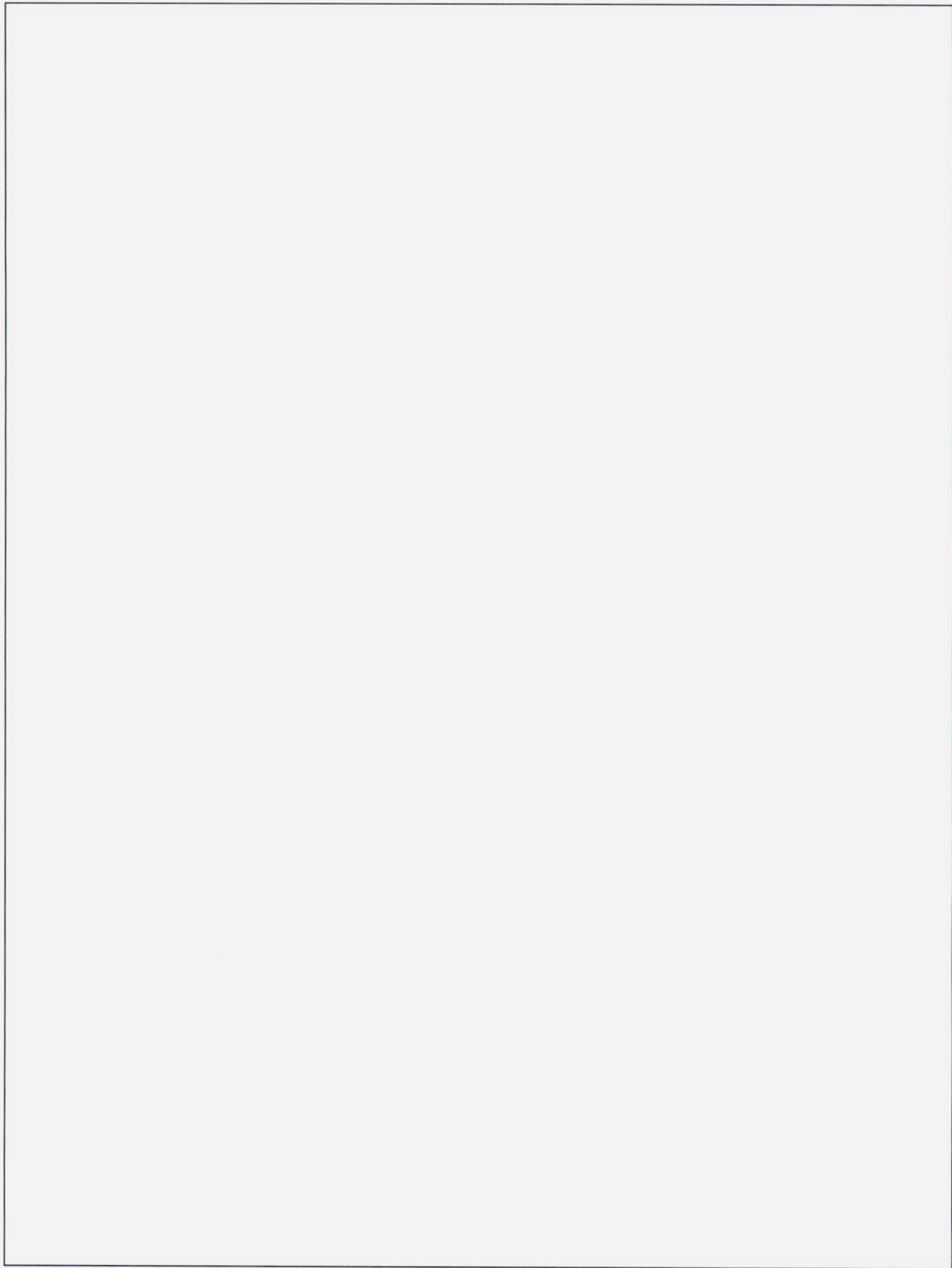
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# CITY AND COUNTY OF DENVER, COLORADO

BROWNFIELDS

CITY AND COUNTY OF DENVER, CO  
CONGRESSIONAL DISTRICT NO. 1

AWARD DATE: 2006 AND 2007  
AWARD AMOUNT: \$400,000 (ASSESSMENT AND CLEANUP FUNDS)

## Project Accomplishments:

- Summer 2009 - Cleanup complete at 10th and Osage
- 3 acres cleaned and made ready for reuse



10<sup>th</sup> & Osage light rail station

## Background

Located in central Colorado, Denver (population of 544,116) is targeting seven areas impacted by brownfields in order to move forward with plans to create Transit-Oriented Development (TOD) Centers. Some of these areas are in federally designated Enterprise Communities. TOD Centers are part of a city initiative to build 119 new miles of commuter and light rail systems within the metropolitan region by 2016. Creation of TOD centers is expected to lead to further mixed-use redevelopment in sur-

rounding areas, thereby bringing new investment to economically distressed areas and improving linkages between the TOD centers, the surrounding neighborhoods, and the city's economic core. Brownfields redevelopment will help develop affordable housing, prevent human health problems, create new job opportunities, and improve transportation.

In 2007 Denver was selected to receive a Brownfields Cleanup Grant to remediate a property adjacent to the 10th and Osage light rail

station. The site is located in the La Alma/Lincoln Park neighborhood. More than 80 percent of residents in three of the four census tracts in this neighborhood are minorities. Neighborhood poverty rates range from 23.5 to 51.8 percent, compared to the citywide rate of 14.3 percent. The 10th and Osage Street site is adjacent to 270 affordable housing units owned by the Denver Housing Authority.



## Project Highlights

The 10th and Osage property was viewed as an under-used eyesore that poses a potential health threat to area residents. In 2008 the site was excavated to remove contaminants including arsenic and polycyclic aromatic hydrocarbons from former railroad operations. Cleanup of the site will allow Denver to move forward with plans to

create a transit-oriented development center in this low-income neighborhood. Brownfields redevelopment is expected to increase economic activity in the La Alma/Lincoln Park neighborhood, bringing new jobs to the community and increasing the tax base.



*10th and Osage cleanup – Summer 2008*

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# THE COLORADO COALITION

COLORADO DEPARTMENT OF PUBLIC  
HEALTH AND THE ENVIRONMENT

AWARD DATES: 1999, 2003, 2006, 2008  
AWARD AMOUNT: \$8.2 MILLION



*A CDPHE Revolving Loan Fund financed the cleanup at an underutilized mall in Lakewood, CO, enabling developers to proceed with the Belmar mixed-use redevelopment.*

## Project Accomplishments:

- Closed on 9 loans and 2 subgrants.
- Completed 10 cleanups and one is underway.
- Loaned \$6,658,644 and subgranted \$180,519 to public, private, and non-profit entities.
- Leveraged 2,779 jobs.
- Leveraged \$628,390,950 through its loans and subgrants.
- Cleaned 179 acres of contaminated properties.

## Background

A major component of EPA's Brownfields Program is the award of cooperative agreements to states, political subdivisions, and tribes to capitalize Brownfields Revolving Loan Funds (RLFs). These entities use RLF funds to make low interest loans for cleanup activities at brownfields properties. Seven Colorado local governments have joined the state to form a coalition to create the first RLF collaborative effort in EPA's Brownfields Program. The Coalition is comprised of Commerce City, Denver, El Paso County, Engle-

wood, Lakewood, Loveland, Westminster, and the Colorado Department of Public Health and Environment (CDPHE), and includes a partnership with the Colorado Housing and Finance Authority (CHFA). CDPHE is the grant recipient and lead agency responsible for assisting coalition communities in carrying out site management responsibilities and CHFA serves as the fund manager responsible for allocating the \$8.2 million in cumulative RLF funds.

## Project Highlights

**Colorado Department of Public Health and the Environment makes \$413,000 loan to clean up land for park use.**

On January 19, 2006, the Colorado Department of Public Health and the Environment loaned \$413,000 to the Westminster Housing Authority to assist with cleanup costs at the Heffly

and Guildner Parcels. This loan was made possible through an EPA Brownfields Revolving Loan Fund (RLF) grant awarded to CDPHE in 1999. The cleanup, which was completed in February of 2006, involved the remediation of dilapidated structures and the cleanup of petroleum, volatile organic compounds and

asbestos from the 4.9-acre lot. In addition to EPA funding, the Westminster Housing Authority leveraged additional redevelopment funding through federal, local and private partnerships. The city transformed the formerly contaminated parcels of land into a city park along the Little Dry Creek.



## Project Highlights Continued

### Colorado Department of Public Health and the Environment makes \$415,023 loan to clean up gates rubber creamery parcel.

On August 30, 2005, CDPHE loaned \$415,023 to Cherokee Denver, LLC to assist with cleanup costs associated with the Gates Rubber Creamery parcel. This loan was made possible through EPA Brownfields Cleanup Revolving Loan Fund (BCRLF) grants awarded to CDPHE and its coalition of Front Range local governments. The cleanup, which was complete in August 2005, entailed excavation and removal of contaminated soil associated with a former truck wash sump, residual contaminated soil from formerly removed underground storage tanks, and chlorin-

ated soil contamination from an up-gradient source. Demolition of the existing buildings began in August 2007 and a mixed-use, transit-oriented development will be phased in over a period of 10-15 years and will include commercial, residential, retail and entertainment uses for the Denver community.

### State of Colorado EPA Revolving Loan Fund assists local community in cleanup of former mine-scarred lands.

On February 6, 2006, CDPHE made a RLF loan to the Gold Hill Mesa Township LLC for \$1,200,000 for cleanup activities on the Gold Mesa property. The 50-acre parcel is part of a larger 210-acre former gold mill site located in Colorado Springs, Colorado. The property has remained

unused because of environmental concerns since operations ended in 1949. The property includes 11 million tons of mill tailings, with cleanup activities focused on proper capping of environmental contaminants in order to facilitate redevelopment options. In addition to traditional financing, Gold Hill Mesa has received additional tax credits and tax increment financing, as well as technical assistance through entry into the state Voluntary Clean Up Program. The Gold Hill Mesa property is being redeveloped into a mixed-use, high density development. Redevelopment is underway, with 14 townhouses and 36 single family homes already completed and occupied at the site, and construction underway for additional housing.

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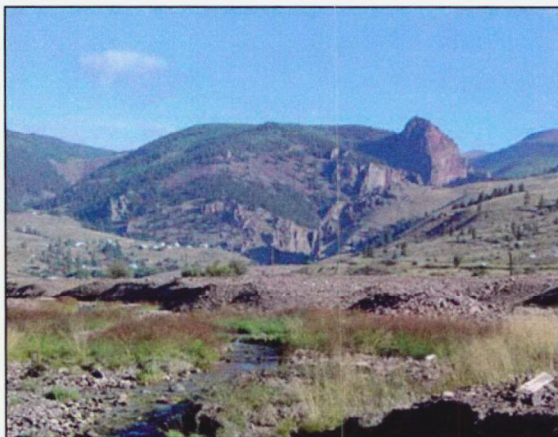
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# CREEDE, COLORADO

MINERAL COUNTY FAIRGROUNDS  
ASSOCIATION  
CONGRESSIONAL DISTRICT NO. 3

AWARD DATE: 2004  
AWARD AMOUNT: \$200,000



*The Willow Creek adjacent to mine tailings and contaminated soil.*

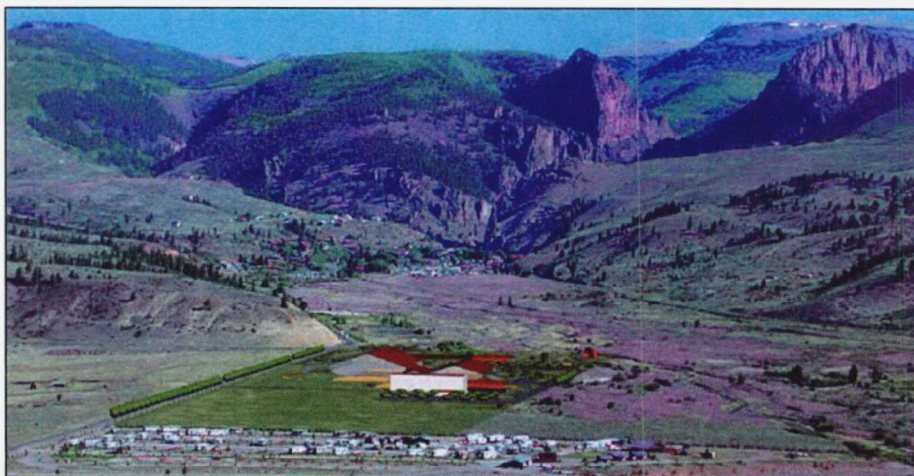
*Photo: Daniel Heffernan*

## Project Accomplishments:

- Cleanup of mine tails across 46-acres of the fairgrounds property was completed in September 2008.
- The fairgrounds will be built out using a phased approach with the initial corrals already installed and being used.

## Background

Nestled in the heart of the San Juan Mountains in southwestern Colorado, the town of Creede (with a population of around 400) has a rich mining history. Unfortunately, the legacy of mining activity has also left behind a host of environmental problems caused by acid runoff and heavy metals from mining waste. The Mineral County Fairgrounds Association (MCFA) is using a \$200,000 EPA Brownfields grant to cleanup mine scarred lands along Willow Creek in Creede. Last fall, construction equipment broke ground and crews began removing mine tailings and contaminated soil to make way for the construction of the new Mineral County Fairgrounds, a much needed community asset.



*A mockup of the future Mineral County Fairgrounds.*

*Photo: Mineral County Fairgrounds Association*



## Project Highlights

For Creede and the rest of Mineral County, the cleanup and redevelopment of the Fairground site is big news. Zeke Ward of the Willow Creek Reclamation Committee elaborates on the cleanup, "Some of the contamination can simply be isolated by putting clean material over the top of it. But the ultimate goal is to eliminate any possibility that any metals can get into the ground water or have a pathway to affect humans."

Project leaders have put together ambitious plans for an indoor arena, recreation center,

classrooms, and exhibition and office space. Plans for the exterior portions of the project are just as bold: rotational livestock grazing, experimental crop cultivation, athletic fields, interpretive trails, and a sculpture art park are all being considered.

Jenny Inge of the MCFA explains, "We believe that having an indoor and outdoor recreation facility this close to the majority of our county population could be a big draw in attracting people to move here. And while Creede has never been anxious to overdevelop, we're aware that development is inevitable

so if we were going to grow we'd like to have something to say about how we grow."

Creede's innovative project serves as a model for other communities that are transitioning from a mining-based economy to an economy increasingly dependent on natural assets: clean land, clean water, and healthy ecosystems.

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FOR MORE INFORMATION: [WWW.WILLOWCREEDE.ORG](http://WWW.WILLOWCREEDE.ORG)



# FORT COLLINS, COLORADO

FORT COLLINS, CO  
CONGRESSIONAL DISTRICT No. 4

AWARD DATES: 2000, 2004  
AWARD AMOUNT: \$385,000 IN EPA BROWNFIELDS  
ASSESSMENT FUNDING



*The new Leed Gold certified Northside Aztlán Community Center opened its doors in November 2007.*

## Project Accomplishments:

- Decreased characterization costs and time by using the Triad approach.
- Coordinated with the Potentially Responsible Party (PRP) and completed an \$8.8 million Removal Action.
- Enabled expansion of the Northside Aztlán Community Center, to LEED Gold certification standards.
- Improved water quality and habitat within and adjacent to the Poudre River.

## Background

As part of its Downtown River Corridor Implementation Program, which focuses on environmental restoration and economic revitalization of a 352-acre area along the Cache La Poudre River, the city of Fort Collins, Colorado used a \$250,000 EPA Brownfields Assessment Pilot Grant awarded in 2000 to identify properties with significant environmental concerns. Of the approximately 120 separate parcels and 65 landowners within the study site, the city owns nearly a third of the land area (107 acres). One of the city's key goals as part of the Corridor Program was to relocate and expand the Northside Aztlán Community Center, which had been sited on a portion of a former municipal landfill and was

continuing to settle, damaging the structure's foundation and rendering the center unusable.

In 2001, an environmental site assessment funded through the EPA grant indicated that the 12-acre former landfill, and an adjacent site once home to a gas plant and a gasoline supply station would need to be addressed due to fuel-related groundwater contamination and the presence of coal tar. Coal tar is a viscous, oily, odorous liquid that is a by-product from the former gas plant's conversion of coal into fuel for home heating and city lights. The gas plant operated from 1904 to 1927, and a gasoline distribution company used a portion of the property in later years.

## Project Highlights

EPA Region 8's Brownfields Program provided Targeted Brownfields Assessment (TBA) funding to conduct further environmental characterizations of the site and engaged EPA's Brownfields and Land Revitalization Technology Support Center (BTSC) to help develop field work plans using the Agency's Triad approach. Designed to produce decision quality data as efficiently and cost-effectively as possible, the Triad approach augments traditional methods of site characterization by using real time measurement technologies and

dynamic strategies that can be quickly modified based on site conditions. BTSC coordinated with stakeholders to continually refine a conceptual site model, select appropriate investigative technologies, and sequence data collection efforts to improve project efficiency. The entire site characterization took approximately one year to complete. It is estimated that use of the Triad approach resulted in 30 percent cost savings when compared with traditional characterization methods, while increasing the amount and

quality of the resulting data.

Environmental characterizations indicated that an approximately 700-foot stretch along the southwest bank of the river was being adversely impacted by coal tar. Chemicals from other sources, such as gasoline and other petroleum-related by-products from leaking underground storage tanks, were also detected in water and soil samples in the area.

The site was referred to EPA's Emergency Response Program in October 2003 and the Triad process



## Project Highlights Continued

continued to facilitate the design and application of measures to capture the coal tar and eliminate its flow to the river. The remedy was implemented by the PRP under a CERCLA consent order less than two years after the start of the TBA. Throughout the cleanup process, the Colorado Department of Public Health and Environment was involved. The city entered into the state's Voluntary Cleanup Program, which provides technical support to facilitate cleanups and provide assurances against regulatory enforcement.

In all, the cleanup cost the PRP \$8.8 million. It involved removing and disposing of approximately 30,000 cubic yards of contaminated sediment and bedrock over a 400 to 600-foot area of the Poudre River, to a depth of about 14 feet. A permanent vertical barrier wall was then installed that measures 700 feet in length along the river bank and extends to 30 feet below the original ground surface. The top of this wall has been covered with soil and is not visible. Groundwater control wells

and sump pumps were constructed to keep contaminants from migrating around the wall. An on-site water treatment system was also put in place to remove coal tar and other dissolved contaminants from the groundwater along the barrier wall, before discharging it into the river. Operation of this system will continue for many years to stop coal tar from migrating to the Poudre River.

Over time, the river is being restored to its natural condition as trees and grasses planted in the spring of 2005 continue to grow. The Fort Collins community was, and continues to be, involved in the restoration planning for the riverbank.

The city's goal of expanding the Northside Aztlan Center has also been realized by developing a new community center on the parking lot of the original building (which was demolished). In order to prevent future damage to the foundation, the new building was constructed onto 300 supports placed into the site's bedrock. An active venting system

was also designed. On November 30, 2007, the new \$7.72 million, 48,739 square foot multipurpose recreation facility (more than three times its original size) opened its doors to the public.

Beyond its value as a community asset, the new Northside Aztlan Community Center has the distinct honor of being recognized as the first Leadership in Energy and Environmental Design (LEED) Gold certified community center in the United States. It is estimated that the facility's green components will save the city of Fort Collins over \$20,000 per year. These green components include: an energy-efficient building shell, HVAC and lighting systems that will contribute to annual energy savings of more than 30 percent, efficient plumbing fixtures that contribute to indoor water savings of 44 percent (720,700 gallons per year), native and adapted plant species and high-efficiency irrigation systems that contribute to outdoor water savings of 52 percent, and heat-reflective roofing to reduce cooling costs.

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# REVITALIZING JAMESTOWN'S ELYSIAN PARK

TOWN OF JAMESTOWN, CO  
CONGRESSIONAL DISTRICT NO. 2

AWARD DATE: 2008  
AWARD AMOUNT: \$200,000



*Elysian Park, pre-cleanup*

## Project Accomplishments:

- The Colorado Department of Public Health and the Environment and faculty of CU Boulder are key partners in the remedy design and execution of this mine-scarred land cleanup project.
- The cleanup plan was developed in 2008.
- Five acres of the park will be remediated in 2009.

## Background

The Town of Jamestown was selected to receive a Brownfields Cleanup Grant. Located about 12 miles northwest of the city of Boulder, Jamestown (population 283) is a small, primarily residential community that was settled in the 1870s as a mining camp. Gold, silver, and fluorospar were mined from the area, but most mines and mills were abandoned after the 1960s. Today, the town's unemployment rate is 16

percent, and its residents are largely sustained by employment in Boulder. The Elysian Park site is next to James Creek, which flows into Lefthand Creek, the source of drinking water for about 20,000 residents in areas northeast of Boulder. Contamination from the target site poses a threat to the creek and those who use the park. A 2002 EPA investigation at Elysian Park revealed high lead concentrations in some surface soil samples.

Recent community interest in improving park facilities has led to a renewed interest in cleaning up contaminated soils. Following the site's cleanup, the town plans to improve the recreational and entertainment facilities in the park, including a pavilion for musical events and a playground. Cleanup of the site is expected to reduce risks to human health and the environment, including the potential contamination of James Creek.

## Project Highlights

The \$200,000 EPA brownfields cleanup grant will be supplemented by funding from the Colorado Department of Public Health and Environment and the Town of Jamestown. While detailed plans for Elysian Park are still to be deter-

mined, the expected remediation plan will involve capping of the site with layers of fill material and top soil that will support native grasses. The result will eliminate any human health risk associated with exposure to contaminated surface soils as well as

any potential for these contaminated soils to degrade water quality in James Creek. Plans for follow-up monitoring include sampling of soils at the park site and the waters adjacent to, upstream and downstream of the site.



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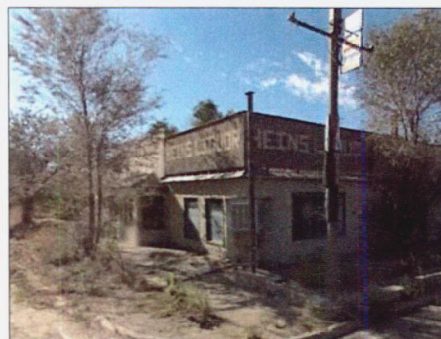
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# KIT CARSON, COLORADO

Kit Carson Rural Development  
Congressional District No. 4

AWARD DATE: 2009  
AWARD AMOUNT: \$200,000



*Paxson Building—pre-environmental remediation and demolition*

## Background

Kit Carson Rural Development - a non-profit 501(c)3 - was selected to receive a Brownfields Cleanup Grant in the spring of 2009. Located in Colorado's Cheyenne County, Kit Carson (population 253) has at least four known brown-field sites along the main highway that runs through town. The 0.4-acre Paxson Building site is the largest, most visible brownfield in town. The only health clinic in town is next door to the site, and four churches, a bank, and a grocery store are within 100 feet of the building. The

Paxson property and the other three sites along the same highway pose potential threats to human health, impair the quality of the town's commercial area, and reduce the number of available sites for redevelopment. Cleanup of the Paxson site is expected to serve as a catalyst that will enable the town to redevelop this and other properties in town.

## Project Highlights

Located on the southwest corner of Highway 40/287 and Church Street in Kit Carson is the dilapidated Paxson Building site. The currently vacant site was home to a variety of operations, including an automobile dealership and repair shop, fuel station, and café. Grant funds will be used to remove and dispose of inorganic contaminants

and friable asbestos, as well as to oversee the cleanup process. Once all contamination has been mitigated, Kit Carson Rural Development plans to demolish the current structure on the site to make way for future commercial development. Potential future commercial uses include a grocery store, feed dealership or laundromat.

Key partners in this project include the non-profit Colorado Brownfields Foundation, Colorado Department of Public Health and Environment, and Colorado Division of Oil and Public Safety.

## Contacts



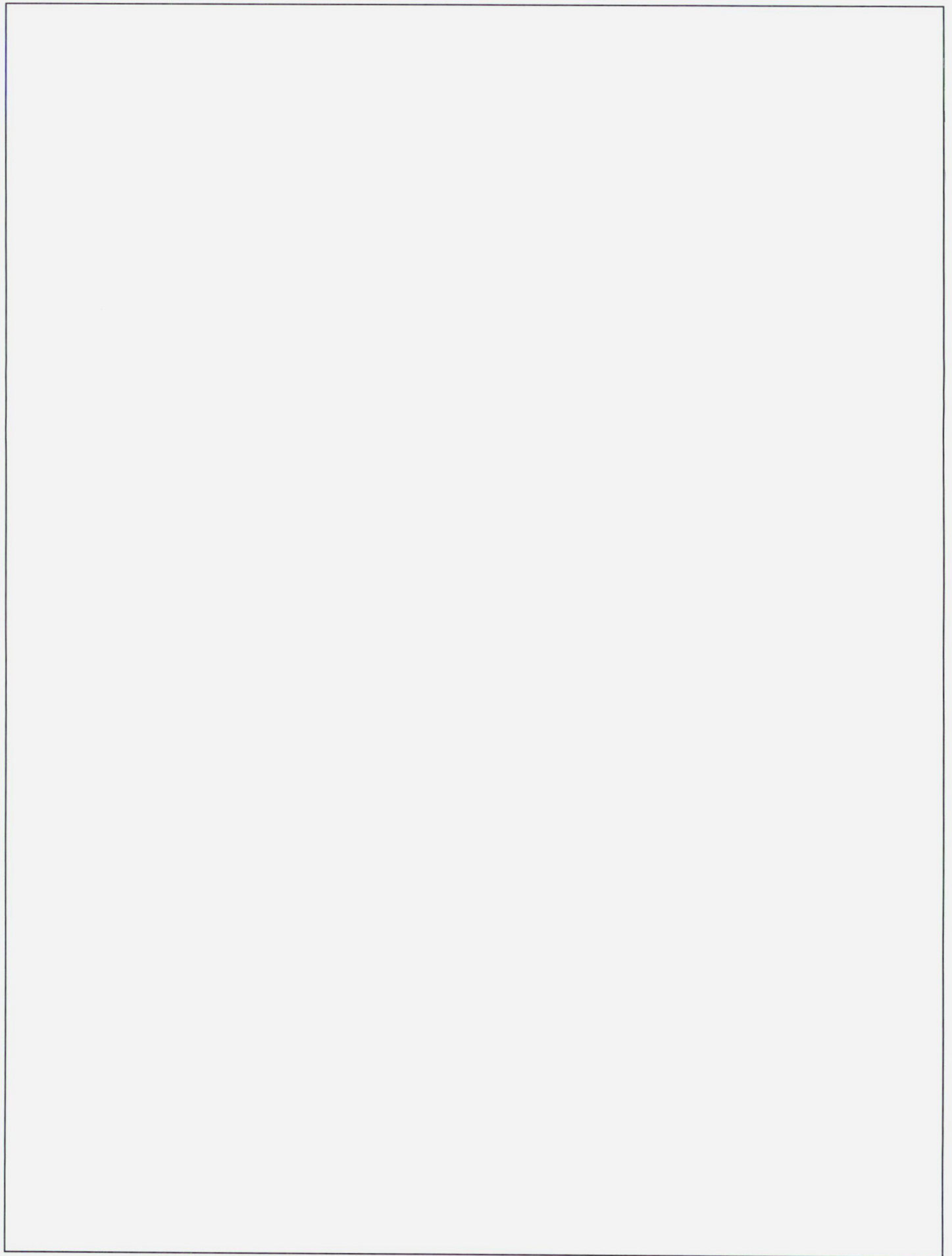
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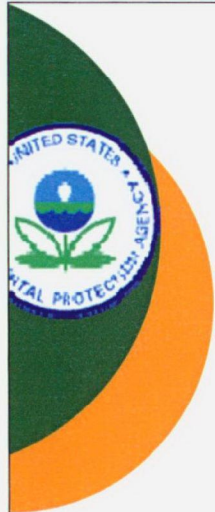


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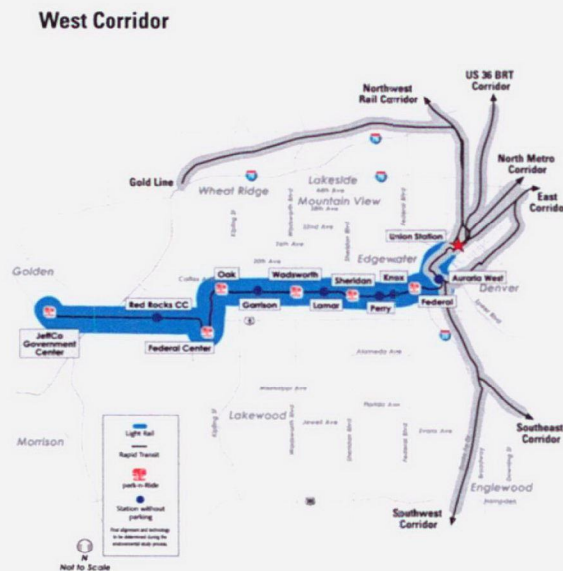
# TRANSIT ORIENTED DEVELOPMENT IN LAKEWOOD, COLORADO

BROWNFIELDS

LAKEWOOD, COLORADO  
CONGRESSIONAL DISTRICT NO. 7

AWARD DATE: 1998, 2005  
AWARD AMOUNT: \$600,000

*West Corridor RTD Light Rail  
Expansion Area*



## Background

### Project Accomplishments:

*Conducted various environmental assessments and transaction screens, paving the way for transit oriented redevelopments.*

In 2005, the city of Lakewood was selected to receive two EPA grants to assess brownfields properties along key transportation corridors. Lakewood's early development was spurred by West Colfax Avenue and the Denver, Lakewood and Golden (DL&G) rail line. Interstate construction in the 1960s eliminated the DL&G line as a significant transportation route. The decline of these transportation links has left a legacy of deteriorating industrial and commercial districts on the once prominent mile-wide transit corridor. The corridor, which accounts for 45 percent of the city, encompasses four residential neighborhoods. The city plans to update the aging freight rail corridor with light rail transit, which would enable redevelopment to occur at the same time the metro Denver region undertakes a major transportation upgrade. In 1998, the city of Lakewood received its first \$200,000 Brownfields Assessment Grant to develop a commercially vital area surrounded by safe and attractive neighborhoods.

## Project Highlights

To assist with the transportation developments in the priority corridor, the city of Lakewood has conducted environmental assessments and transaction screens to evaluate the condition and cleanup options of priority brownfields properties. Conducting an environmental assessment is a critical first step in the redevelopment

process to determine what, if any, contamination exists. Specifically, the city has conducted assessments at 13<sup>th</sup> Ave. and Wadsworth Blvd; the Gambro BCT undeveloped property (10098 West 12<sup>th</sup> Avenue); Harrison Western (1280 Quail Street); the Lakewood Housing Authority (1209 Quail Street); Lakewood Industrial Park;

and, at the Police Property Storage (1290 Harlan Street). Brownfields assessment are key to removing barriers to support the new light rail transit corridor. Redevelopment is expected to revitalize the Lakewood community by expanding its retail and commercial tax base and creating new employment centers.



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## CITY OF PUEBLO

PUEBLO, COLORADO,  
CONGRESSIONAL DISTRICT 3

PROJECT DATES: FEBRUARY, 2008—PRESENT  
AMOUNT: \$87,450

### Background

#### Project Accomplishments:

- *Based on EPA technical assistance, the city acquired Lake Minnequa and is developing a 243-acre park to serve the local population.*
- *Based on Phase I information, the city is planning a drainage project to mitigate flooding in residential neighborhood.*

EPA's Targeted Brownfields Assessment (TBA) program is designed to help minimize the uncertainties of contamination often associated with brownfields—especially for those entities without EPA Brownfields Assessment grants. The TBA program is not a grant program, but a service provided through an EPA contract in which EPA directs a contractor to conduct environmental assessment activities to address the requestor's needs. Unlike grants, EPA does not provide

funding directly to the entity requesting the services.

The city of Pueblo, working in cooperation with the local CARE (Community Action for a Renewed Environment) group requested that five targeted brownfield assessment projects be conducted. The CARE group is a community based effort, funded by EPA's Environmental Justice Program, to identify, prioritize, and address environmental health risks.

### Project Highlights

#### Lake Minnequa

The city requested a Phase I Targeted Brownfields Assessment for Lake Minnequa, a 243 acre property that includes a 100 acre lake in the southern portion of the city of Pueblo. Lake Minnequa was owned by CF&I Steel as a water storage facility. EPA completed a Phase I investigation, a historic investigation of the property use and a preliminary site inspection in March, 2008. Based upon the findings of the Phase I investigation, Pueblo requested a Phase II investigation, a more in-depth environmental site assessment, including sampling activities to identify the types and concentrations of contaminants and the

areas to be cleaned. Phase II was completed in July, 2008. This report provided decision makers with information on the limited scope of one contaminated area and documented that another area of concern was not contaminated. Pueblo acquired the Lake Minnequa property for use as a park with athletic fields and natural areas. It also serves as a stormwater detention facility.

#### Peppersauce Bottoms Drainage Project

Peppersauce Bottoms is a low income residential area in Pueblo that is prone to flooding. The neighborhood was ravaged by floods in the summer of 2006. The CARE project partnered

with the city of Pueblo to develop a storm water management plan to mitigate the flooding problems. The plan calls for the city to acquire a number of vacant parcels owned by the BNSF Railroad for the construction of facilities to detain and better convey floodwaters away from the community. EPA completed a Phase I investigation, a historic investigation of the property use and a preliminary site inspection, on the multiple parcels in October, 2008. Based upon the findings of the Phase I investigation, Pueblo requested a Phase II to sample areas of potential contamination. Phase II was initiated in March, 2009.



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## Discovery

PA/SI  
Proposed Listing  
on NPL in Federal  
Register

Public  
Comment on  
Proposed  
Listing

Response  
to  
Comments

Final Listing  
on NPL in  
Federal  
Register

Community  
Interviews

Community  
Involvement  
Plan (CIP)

Information  
Repository/  
Establish  
Admin.  
Record

Public  
Notice of  
Admini-  
strative  
Record

Public  
Notice of  
TAG  
Availability

RI/FS  
Begins

FS  
Completion  
and Proposed  
Plan

RI/FS and  
Proposed  
Plan Notification

Public Comment  
on RI/FS and  
Proposed Plan

Opportunity for  
a Public Meeting  
on Proposed  
Plan

Public Meeting  
Transcript  
Available

Responsiveness  
Summary to  
Comments on RI/FS  
and Proposed Plan

Notice and  
Comment on  
Consent Decree  
(if necessary)

Pre-ROD  
Significant  
Changes  
(if necessary)

Revised  
Proposed Plan  
and Discussion of  
Significant Changes  
(if needed)

Public  
Comment on  
Significant  
Changes  
(if needed)

Response  
to  
Comments

ROD

Public  
Notice of  
ROD  
Availability

Revised  
CIP

Post-ROD  
Significant  
Changes  
(if necessary)

Notice and  
Availability  
of Explanation of  
Significant Differences  
(if necessary)

Notice of Availability/  
Brief Description of  
Proposed ROD  
Amendment  
(if necessary)

Public Comment  
Period, Public Meeting,  
Meeting Transcript,  
Responsiveness  
Summary  
(if necessary)

Notice and  
Availability of  
Amended ROD  
(if necessary)

Remedial  
Design/  
Remedial  
Action

Fact Sheet  
on  
Final Engineering  
Design

Public Briefing  
on  
Final Engineering  
Design

Remedial  
Action  
Begins

O&M

Proposed NPL  
Deletion in  
Federal  
Register

Public Notice  
of Intent to  
Delete in  
Federal Register

Proposed  
Deletion  
Information  
to Information  
Repository

Public  
Comment  
on  
Intent to  
Delete

Response  
to  
Comments

Final NPL  
Deletion in  
Federal Register

Final Deletion Package in  
Information Repository