



## Pacific Southwest, Region 9: Superfund

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# Carson River Mercury Site

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### Description and History

#### NPL Listing History

NPL Status: Final  
Proposed Date: 10/26/89  
Final Date: 08/30/90  
Deleted Date:

EPA #: NVD980813646

State: Nevada(NV)

County: Lyon, Storey, and Churchill

City:

Congressional District: 02

Other Names:

#### Bulletin Board

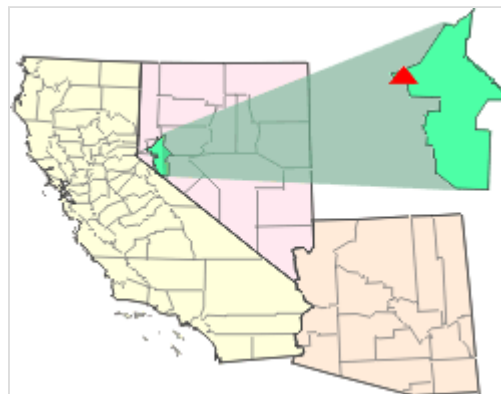
The third 5 year review is currently underway for the remedy in place in Operable Unit 1 for this site. If you would like to give your input on the site during this review, please contact Leana Rosetti, rosetti.leana@epa.gov, (415) 972-3070.

The Carson River Mercury Site includes mercury-contaminated soils at former mill sites, mercury contamination in waterways adjacent to the mill sites, and mercury contamination in sediments, fish and wildlife over more than a 50 mile length of the Carson River, beginning near Carson City, Nevada and extending downstream to the Lahontan Valley. Contamination at the site is a legacy of the Comstock mining era of the late 1800s, when mercury was imported to the area for processing of gold and silver ore. Ore mined from the Comstock Lode was transported to mill sites, where it was crushed and mixed with mercury to amalgamate the precious metals. The mills were located in Virginia City, Silver City, Gold Hill, Dayton, Six Mile Canyon, Gold Canyon, and adjacent to the Carson River between New Empire and Dayton. During the mining era, an estimated 7,500 tons of mercury were discharged into the Carson River drainage, primarily in the form of mercury-contaminated tailings.

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[Map this site in Cleanups in My Community](#)

#### Links

Nevada Department of Environmental Protection site overview:

[http://ndep.nv.gov/bca/carsonriver/criver\\_1.htm](http://ndep.nv.gov/bca/carsonriver/criver_1.htm)

Today, the mercury is in the sediments and adjacent flood plain of the Carson River and in the sediments of Lahontan Reservoir, Carson Lake, Stillwater Wildlife Refuge, and Indian Lakes. Nevada State Health Division advisories recommend limited or no consumption of fish and ducks at the Site due to high levels of mercury. In addition, tailings with elevated mercury levels are still present at and around the historic mill sites, particularly in Six Mile Canyon. EPA, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the Nevada Division of Environmental Protection (NDEP), University of Nevada researchers, and others have carried out studies to determine the extent of contamination, evaluate the human health and ecological risks, and better understand the processes that govern the movement and toxicity of the mercury. To better manage the site investigation and cleanup, EPA has established two Operable Units (OU) for the site. OU 1 consists of the old mill sites and related tailings. OU2 consists of the Carson River from the area of New Empire to its terminus in the Carson Sink.

## Contaminants and Risks

### Contaminated Media

- Surface Water
- Soil and Sludges
- Environmentally Sensitive Area

Surface water, sediment, soil, fish and wildlife at the site are contaminated with mercury. The primary human health threats are to children in long-term direct contact with highly-contaminated soils found in tailings piles or at former mill sites, and individuals who consume contaminated fish or wildlife. The Nevada Health Division advises that no gamefish or carp be consumed from most of the site. Risks to wildlife are also significant, particularly to fish-eating birds at the top of the food web.

Mercury levels in gamefish in Lahontan Reservoir (e.g., walleye, white bass) routinely exceed the Food and Drug Administration action level of 1 part per million (ppm). In 1998, a walleye had a record-high 16 ppm mercury present in its tissue.

## Who is Involved

This site is being addressed through Federal and State actions.

## Investigation and Cleanup Activities

### Initial Actions

In 1991, concerns over the possible exposure of vehicle users to contaminated materials prompted the removal of mercury-contaminated tailings near Dayton, NV. Also in 1991, a second removal action was completed at a park in Dayton. The contaminated materials were transported to a mineral resource recovery facility.

### Cleanup Complete

Carson River Operable Unit 1 (OU1): After the site was listed on the Superfund National Priorities list, EPA began the Remedial Investigation and Feasibility Study (RI/FS) at the site. The initial phase of the investigation, which lasted from 1993 to 1995, involved the collection and laboratory analysis of hundreds of samples including surface and sub-surface soils, sediments, groundwater, vegetation, garden crops, and indoor air. The resulting report, entitled *Revised Draft, Human Health Assessment and Remedial Investigation Report* (December 1994) evaluates the potential risk to human health from the mercury, arsenic, and lead present in the soil, sediments, surface water, groundwater, and vegetation in the area.

As part of the assessment, EPA established a site-specific cleanup level of 80 ppm mercury for contaminated soils in residential areas. The 80 ppm cleanup level is based on site-specific assumptions about the form of mercury in the soil.

Four areas in Dayton and Silver City, Nevada were found to exceed the 80 ppm soil cleanup level. Approximately 12 homes were located on or adjacent to the contaminated soils. In 1994, EPA developed a proposal to address the risks posed by the contaminated soils in the four areas and asked the public to evaluate the proposal. After considering public comments provided before, during, and after a public meeting held in 1995, EPA adopted its final cleanup plan (i.e., the "Record of Decision"). The plan called for excavation of the contaminated soils to a maximum depth of two feet, backfilling with clean soil, and offsite disposal of the contaminated soil. In one of the four areas, the remedy also included placement of clean soil on top of the contaminated soil in lieu of excavation and backfilling. Both approaches reduce risks by limiting contact with soils containing elevated levels of mercury. The remedy also included restoration and landscaping of contaminated areas after excavation and backfilling.

Between 1995 and 1997, EPA made preparations for the cleanup. EPA completed additional sampling to more precisely identify the extent of soils requiring cleanup; obtained permission from the property owners to proceed with the cleanup; made a decision to demolish five homes to allow a more complete and effective cleanup; reached agreements to compensate the owners and tenants of the residences slated for demolition; negotiated an agreement with the Nevada DEP for payment of the State's 10% cost-share; carried out preliminary archaeological investigations to comply with Historic Preservation requirements, selected a construction contractor through a competitive bidding process; and secured funding for the cleanup work.

From August 1998 through December 1999, EPA's contractors carried out cleanup work in Dayton and Silver City. Initial activities consisted of

clearing and grubbing of brush, downed tree limbs, personal property, and debris. Ultimately, approximately 9,000 cubic yards of contaminated soil were excavated. Most of the soils were disposed at a nearby landfill. In some of the soil, however, the mercury was less tightly bound to the soil and samples failed the Toxicity Characteristic Leaching Procedure (TCLP) test. These "high mercury" soils, comprising approximately 500 cubic yards, were transported out of state for treatment at an approved thermal treatment facility. After excavation, clean fill was brought in, re-seeding and landscaping were completed, and measures implemented to control erosion and temporarily irrigate re-seeded areas. Finally, pipelines, fences, walls, and other utilities were replaced or restored, and needed drainage improvements made.

To comply with the National Historic Preservation Act, and avoid or minimize adverse effects to significant archaeological artifacts or features during the cleanup, EPA hired archaeologists and other specialists to inventory and evaluate archaeological remains, test for subsurface archaeological deposits, monitor excavation activities, and analyze and document archaeological discoveries. The results of the investigations are summarized in a two volume report titled "Historical Archaeology of the Carson River Mercury Site, Dayton and Silver City, Nevada" (April 2001).

During cleanup work in one of the contaminated areas, the archaeologist monitoring excavation observed large timbers later identified as part of the foundation of the 19th century mill building. The surrounding soil, as well as the timbers themselves, contained small pools of elemental mercury. This discovery resulted in a seven month suspension in the cleanup as arrangements were made to handle the pools of mercury and the "high mercury" soils. The cleanup work is described in detail in the "Remedial Action Report, Carson River Mercury Site" (September 2000). Additionally, the cleanup work also includes the development of a "Long Term Sampling and Response Plan" to address risks in undeveloped, un-characterized areas with elevated levels of mercury.

The Long Term Sampling and Response Plan ("the Plan") describes EPA and the Nevada Division of Environmental Protection (NDEP) efforts to address risks to public health and the environment from mercury-contaminated soils at the CRMS in Lyon County. The Plan addresses risks that could result from long-term direct contact with soils having elevated levels of mercury. Long-term contact is most likely in new, uncharacterized, residential development settings. NDEP has worked on more than 70 development/project proposals, required analyses of soil samples for mercury at approximately 26 developments, and worked with the developer on mitigation at approximately two developments. Mitigation involved covering or capping contaminated soils. EPA's role has been to provide technical assistance to NDEP and occasionally to work directly with developers and their consultants.

#### **Site Studies**

Carson River OU2 - Mercury-contaminated sediments in the Carson River, Lahontan Reservoir, Carson Lake, and Stillwater National Wildlife Refuge are the cause of elevated levels of mercury in fish and wildlife in and near the contaminated areas. The contamination presents a health risk to those who consume mercury-contaminated fish.

EPA-sponsored investigation work began in approximately 1992 in order to provide information needed to support a decision whether to propose cleanup of the contaminated sediments. In 1992, EPA began an ecological assessment of mercury-related impacts in Lahontan Reservoir and upstream portions of the Carson River. The results of the initial ecological assessment are summarized in a report titled "Ecological Risk Assessment Carson River Mercury Site Upstream of Lahontan Dam" (May 1998). That study includes the results of analyses of surface water, sediment porewater, sediment, zooplankton, benthic invertebrates (midges), fish (Sacramento blackfish, carp, walleye), and bird blood and feathers (double-crested cormorants, bank swallows) collected from Lahontan Reservoir. The samples were collected in 1994 and 1995. One of the findings of the assessment was that fish-eating birds and possibly other wildlife at the site were exposed to levels of mercury contamination shown to cause harm to wildlife in other studies.

In 1997, EPA began a study to test the findings of the 1994-95 assessment and look for more direct evidence of mercury-related adverse impacts. This "ecological effects" study, carried out with researchers at the USGS Forest and Rangeland Ecosystem Science Center in Corvallis, Oregon and the Patuxent Wildlife Research Center in Laurel, Maryland, has examined the effects of mercury-contaminated water, sediment, and prey on the reproductive success and health of three species of fish-eating birds nesting at the site. The study focuses on fish-eating birds because mercury bioconcentrates, reaching the highest levels in organisms at the top of the food web. Eggs and blood samples have been collected annually from areas of the site where exposure to mercury is most likely to exceed safe levels, to evaluate year-to-year variability in exposure and to look for relationships between mercury exposure and nesting success. In 1997 and 1998, young nestlings and adult birds were also collected and examined to identify any sublethal effects of mercury exposure in vital organs and tissues.

The effort to correlate the reproductive success of egrets and herons with their exposure to mercury have been inconclusive, due to limited sample size and the greater importance of other factors on reproductive success. Measurements of biochemical markers associated with mercury exposure and histopathological examinations have, however, revealed potentially adverse effects on young birds associated with mercury exposure. The significance of the observed changes is currently being evaluated.

The ecological risk assessment at the Carson River site has been more extensive than is typical at Superfund sites, in part because of the absence of any simple or inexpensive cleanup options for the contaminated sediments.

Since 1997, most of the investigation work has continued through agreements with the US Geological Survey, the US Fish and Wildlife Service,

and university researchers. In addition to the ecological effects study carried out in cooperation with the USGS, studies have been completed to examine: i) the formation and degradation of methylmercury in contaminated sediments; ii) whether contaminated sediments in Lahontan Reservoir are a significant source of mercury to wildlife; iii) the transport of mercury in Stillwater National Wildlife Refuge; and iv) loadings of mercury into and from the Lahontan Reservoir.

Investigations are expected to continue through at least 2012. After the studies are complete, EPA will evaluate the costs and benefits of cleaning up mercury contamination in the river, reservoir, and wetlands and determine what type of cleanup, if any, is warranted.

## Cleanup Results to Date

Excavation and removal of mercury-contaminated tailings and soils from the Carson River Mercury Site have reduced the potential for exposure to contaminated soil while further studies are taking place.

## Potentially Responsible Parties

Potentially responsible parties (PRPs) refers to companies that are potentially responsible for generating, transporting, or disposing of the hazardous waste found at the site.

No PRPs have been named for contamination at the site..

## Documents and Reports

### Fact Sheets

04/25/11 [Archaeological Studies of Historic Mill Sites](#)

02/20/13 [EPA Conducting Five-Year Review of Cleanup Actions](#)

### Records of Decision

03/30/95 [ROD \(1995\)](#)

### Technical Documents

09/30/03 [First Five-Year Review Report for the Carson River Mercury Site, Cities of Dayton and Silver City, Lyon County, Nevada](#)

09/30/08 [Second Five-Year Review Report For Carson River Mercury Site, Cities of Dayton and Silver City, Lyon County, Nevada](#)

## Community Involvement

### Public Meetings:

## Public Information Repositories

## Additional Links

## Contacts

### EPA Site Manager

Jere Johnson  
Andrew Bain  
415-972-3094  
415-972-3167  
[Johnson.Jere@epamail.epa.gov](mailto:Johnson.Jere@epamail.epa.gov)  
[Bain.Andrew@epamail.epa.gov](mailto:Bain.Andrew@epamail.epa.gov)  
US EPA Region 9  
Mail Code SFD  
75 Hawthorne Street  
San Francisco, CA 94105

The public information repositories for the site are at the following locations:

Dayton Valley Library  
650 Highway 50, Space 6  
Dayton, NV 89403  
775-246-7444

Nevada State Library  
100 Stewart Street  
Carson City, NV 89710  
775-687-5160

Churchill County Library  
553 South Maine Street  
Fallon, NV 89406  
775-423-7581

**EPA Community Involvement Coordinator** <http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/7508188dd3c99a2a8825742600743735/2380a6ecf1b1731f88257007005e9424!OpenDocument>

Leana Rosetti  
415-972-3070  
1-800-231-3075  
Rosetti.Leana@epamail.epa.gov  
US EPA Region 9  
Mail Code SFD  
75 Hawthorne Street  
San Francisco, CA 94105  
**EPA Public Information Center**

415-947-8701  
r9.info@gov  
**State Contact**

Jeff Collins  
775-687-9381  
jrcollins@ndep.nv.gov  
Nevada Division of Environmental Protection  
901 South Stewart Street  
Suite 4001  
Carson City, NV 89701-5249  
**PRP Contact**

#### **Community Contact**

#### **Other Contacts**

#### **After Hours (Emergency Response)**

US EPA  
(800) 424-8802

The most complete collection of documents is the official EPA site file, maintained at the following location:

Superfund Records Center  
Mail Stop SFD-7C  
95 Hawthorne Street,  
Room 403  
San Francisco, CA 94105  
(415) 820-4700

Enter main lobby of 75 Hawthorne street, go to 4th floor of South Wing Annex.

Last updated February 14, 2013

Last updated on Friday, March 15, 2013