



SULPHUR BANK MERCURY MINE SUPERFUND SITE

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

SAN FRANCISCO, CA

FEBRUARY 2017

Since 1990, the United States Environmental Protection Agency (EPA) has worked to clean up mercury and arsenic contamination at the Sulphur Bank Mercury Mine Superfund Site (Site) and has conducted several cleanup actions at the Site. The purpose of this fact sheet is to provide the public with updated information on EPA's cleanup efforts and upcoming activities at the Site.

EPA is cleaning up the Site through the Superfund process, which includes many detailed steps (see page 4). Superfund is the commonly-used name for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), a federal law enacted in 1980 and amended in 1986. CERCLA enables EPA to respond to hazardous waste sites that threaten public health and the environment.

Contaminants of Concern

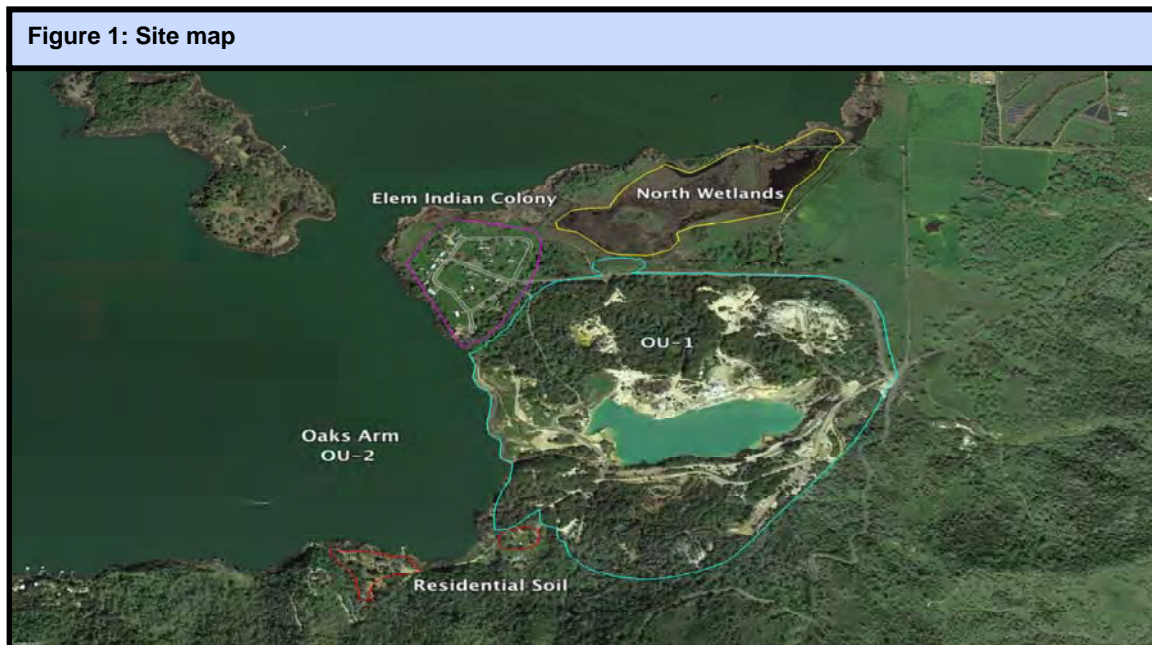
Site Background

The Site is a former mercury mine located near the southeastern end of Clear Lake's Oaks Arm. The mine, once one of the largest producers of mercury in California, has remained inactive since 1957. The area was mined for sulphur from 1856 to 1871, then intermittently mined for mercury from 1873 to 1905. From 1915 to 1957, the site was an open pit mercury mine.

Mine tailings, waste rock, and the water-filled open pit are located on the property. Approximately two million cubic yards of mine wastes and tailings remain on the mine site. These mercury-contaminated mine wastes extend outside the mine site and are also detectable in Clear Lake **sediment**, in the wetlands to the north of the mine property, and at the Elem Indian Colony (EIC) (see Figure 1 below).

The soils and mine wastes at the mine property and in the surrounding area are contaminated with high levels of mercury and arsenic. Mercury is a neurotoxin, therefore people exposed to high levels may experience adverse health effects. Exposure to high levels of arsenic may also lead to adverse health effects, including cancer. EPA has found mercury in the surface water and groundwater that discharge from the Site, as well as in the sediment and biota of Clear Lake. High levels of mercury are also present in many fish in Clear Lake. EPA strongly recommends that the public follow the State of California Clear Lake Fish Advisory and limit the consumption of fish from the Lake. Pregnant women, children, and women of childbearing age are especially recommended to follow the fish advisory, as they are particularly vulnerable to the health effects of mercury exposure. **Details regarding the fish advisory can be found here:** www.oehha.ca.gov/advisories/clear-lake

Figure 1: Site map



Glossary of Terms:

Sediment: Sand and dirt settled on the bottom of a lake.

Feasibility Study: The stage in the Superfund Remedial Process when EPA explores, compares and evaluates potential cleanup options for the site.

Pilot Study: A small scale, preliminary study conducted to determine the efficacy, cost, and overall feasibility of a proposed treatment.

Methyl mercury: The mercury-containing compound that most often finds its way into the food chain and into the tissue of fish, where it is a health hazard for humans and wildlife.

Operable Units

To better manage the cleanup, EPA divided the site into two project areas, known as “operable units.” Operable Unit 1 (OU-1) consists of the mine property, including the pit lake and waste rock piles, and the adjacent off-site residential soils where site contaminants have migrated. Operable Unit 2 (OU-2) includes the contaminated sediment within Clear Lake’s Oaks Arm and the North Wetlands.

EPA Actions at Sulphur Bank

EPA has taken several actions to protect human health and limit the impacts of contamination to the environment. Currently, EPA conducts annual groundwater and surface water sampling at the Site. EPA also conducts semi-annual storm water monitoring, inspects all the storm water culverts, and maintains site controls to keep unauthorized individuals from entering the site. EPA is working on both Operable Units at the same time, though they are at slightly different stages in the Superfund Process.

What are we currently doing at OU-1?

EPA is preparing the Focused Feasibility Study for OU-1. This is when EPA explores, compares and evaluates potential long-term cleanup options for the operable unit. When the Focused Feasibility Study is complete, EPA will share a Proposed Plan for cleanup with the community and ask for input from the public through an official public comment period and public meeting. At this time, EPA is on schedule to share the Proposed Plan with the community in late 2017.

Past Actions at Operable Unit 1

- ◆ 1992 – EPA installed erosion control measures to stabilize the Waste Rock Dam adjacent to Oaks Arm and limit the movement of contaminants into Clear Lake.
- ◆ 1997 – EPA worked with community members to remove contaminated soil from residential yards in the EIC located adjacent to the mine property.
- ◆ 1999-2000 – EPA constructed surface water controls to divert storm water away from the pit lake to prevent contaminated water from reaching Clear Lake.
- ◆ 2004 – EPA issued a draft Remedial Investigation report describing the nature and extent of contamination in OU-1.
- ◆ 2006 – EPA removed contaminated mine waste from the gravel roadway and adjacent areas along the Sulphur Bank Mine Road.
- ◆ 2006 – EPA issued a draft Feasibility Study report comparing cleanup alternatives for OU-1.
- ◆ 2007 – EPA removed additional contaminated soil from residential areas in the EIC.
- ◆ 2008 – EPA removed contaminated soil from residential areas near Sulphur Bank Mine Road.
- ◆ 2010 – EPA covered Bureau of Indian Affairs Road 120 roadway and shoulders to contain soil with elevated levels of mercury and arsenic.
- ◆ 2011 – California Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board (RWQCB) developed an alternative proposal to address contamination in OU-1.
- ◆ 2012 – EPA compared the new remedial proposal with the 2006 Feasibility Study to refine cleanup alternatives for OU-1.
- ◆ 2012-2014 – EPA Optimization Review team independently reviewed and provided recommendations for site cleanup approach.
- ◆ 2014-2016 – Stakeholder workshops with EPA and Elem Tribe, DTSC, and RWQCB were conducted to refine OU-1 cleanup alternatives.
- ◆ Upcoming in 2017 – Draft Focused Feasibility Study to be issued comparing remedial alternatives for OU-1.

OU-2: EXPLORING METHODS FOR CONTROLLING CONTAMINATION IN CLEAR LAKE

One of EPA's primary goals at Operable Unit 2 (contaminated areas within Clear Lake's Oaks Arm and North Wetlands) is to prevent the spread of lake bottom sediments from the area where contaminants are in highest concentration, adjacent to the mine site, to other areas in the Oaks Arm and other arms of Clear Lake. In the past, erosion and lake currents have transported mercury to other parts of Clear Lake, leading to more widespread contamination. While the high levels of mercury in the lake bottom sediments near the mine site do not make the water in Clear Lake dangerous to humans, they do result in unhealthy levels of mercury in the tissue of some fish in the lake. EPA anticipates that physically covering the most contaminated sediments will prevent further erosion and isolate the contamination from humans, animals and the environment. It will also allow the less contaminated parts of the lake to recover naturally.

To test this idea, EPA implemented a **pilot study** to physically cover a portion of the contaminated sediment and then monitor the effects. The pilot capping study was conducted in three phases:

1. Baseline monitoring and a survey of the lake, including depth and contaminant levels, before construction of the cap

2. Construction of two caps in pilot study areas
3. A two year monitoring period after cap construction

Design and Results of the Pilot Caps

The 16-inch thick caps consist of two sediment layers- a sand filler material layer and a gravel armor layer (see Figure 3). Combined, the two caps cover just over half an acre and were placed at the bottom of Oaks Arm in early 2013.

Over a two-year period after installation, EPA collected monitoring data to determine the effectiveness of the caps. The study determined that the caps were successful at reducing the physical movement of the contaminated sediment they were covering and that the movement of mercury into the lake was reduced. The caps were also found not to significantly increase the amount of **methyl mercury** (the form of mercury that contaminates fish) being formed in the sediments beneath the caps. The study also identified areas where the capping design may need to be modified for a full scale remedial option. Informed by this data, EPA is now able to proceed with the development of the remedial investigation and evaluation of capping alternatives in the OU-2 **feasibility study**.

Figure 2: Pilot cap map locations



Figure 3: Cross-section of Pilot Cap

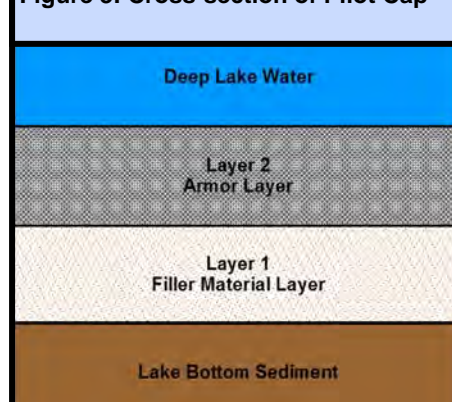


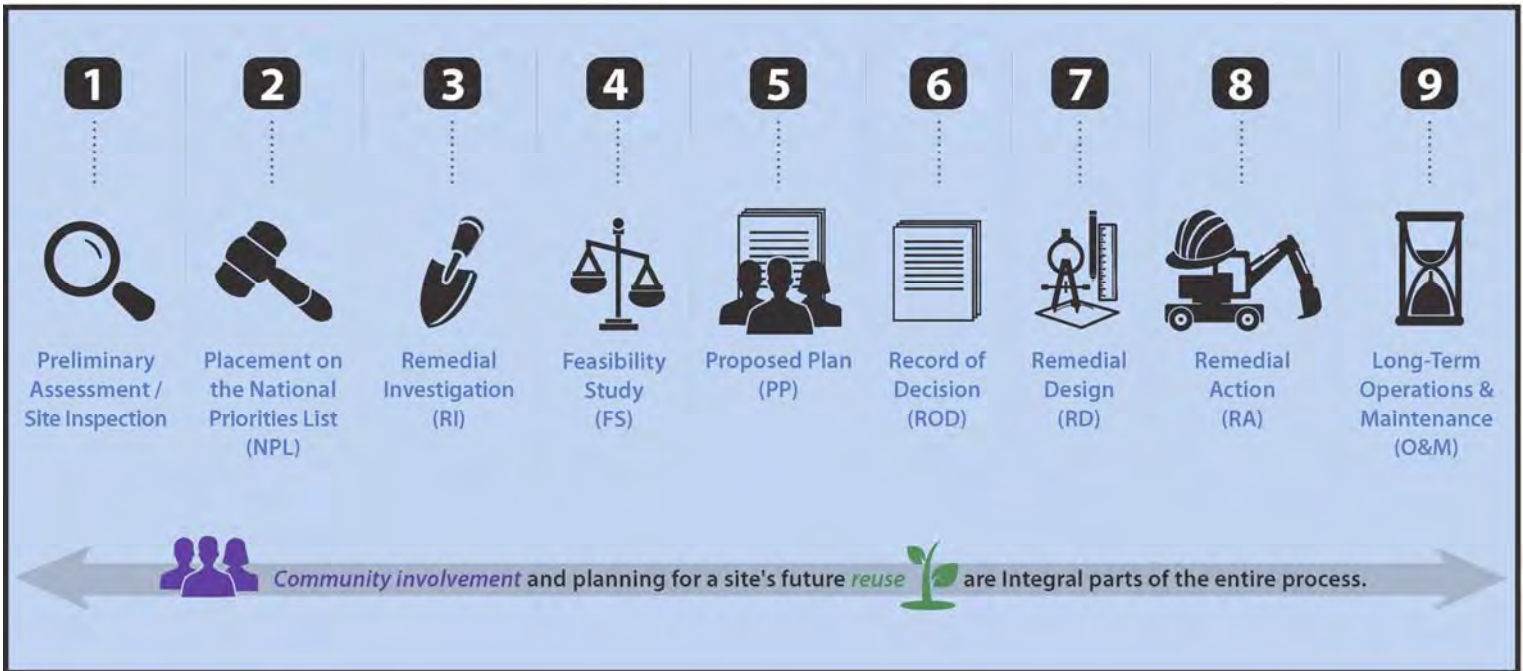
Figure 4: Installing Pilot Caps



Updating the Community Involvement Plan

EPA maintains a Community Involvement Plan (CIP) document for each Superfund Site. The CIP describes in detail the ways EPA will engage with the Site's community members and stakeholders, therefore supporting an informed and engaged public. The CIP is written based on interviews with community members. EPA would like to interview any interested community members as part of an update to the current CIP. EPA is interested in hearing from tribal members, local residents, government workers, fishermen, and anyone interested in the Site.

The Superfund Process



What's Next in 2017?

- ◆ OU-1 Focused Feasibility Study
- ◆ OU-1 Proposed Plan and Public Meeting
- ◆ OU-1 Record of Decision
- ◆ OU-2 Pilot Cap Treatability Study Report
- ◆ Community Interviews for the Community Involvement Plan Update

We want to hear from you!

If you are interested in participating in a CIP interview, please contact Sarah Cafasso (information below). The interview consists of basic questions about how you like to receive information, best times for meetings, and what you want to know about the Site. It can last anywhere from fifteen minutes to an hour, depending on your preference. We thank you in advance for your participation!

You can find more information at: www.epa.gov/superfund/sulphurbankmercury

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