US Environmental Protection Agency
10 West 15th Street, Suite 3200
Helena, Montana 59626

Anaconda Minerals Company
Great Falls Refinery

Montana Department of Environmental Quality

July 2009 — ***History of Operations, Contamination and Cleanup***

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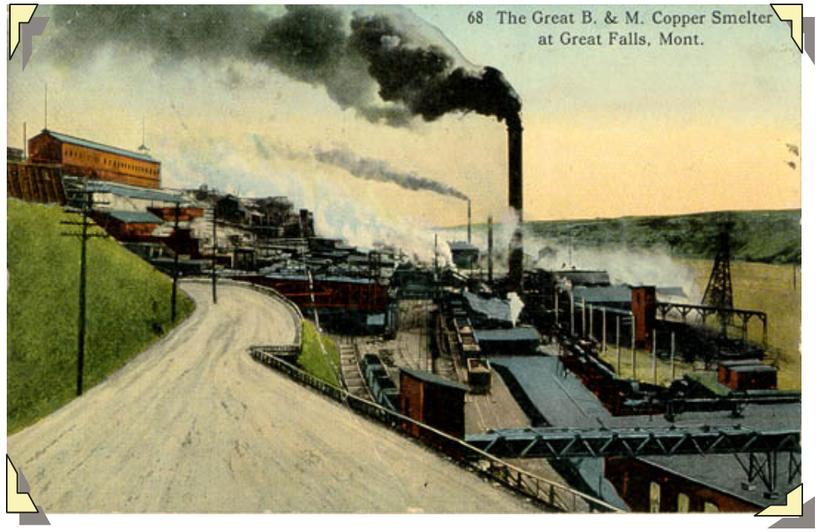


The Boston & Montana Consolidated Copper and Silver Mining Company began construction of the first smelter at the refinery site in 1892. Operations began in 1893 when copper ore from mines in Butte, Montana was concentrated, smelted, and refined into blister copper. In time, this refinery came to construct and operate the tallest plant stack in the world, more than 502 feet high. Electrolytic and furnace refineries also operated at the site.

The property was acquired by Anaconda Copper Mining Company in 1910 and renamed the Great Falls Reduction Department. Copper was made into commercially useful shapes. Smelting activities continued at the facility until the early 1970s. The property again changed hands in 1977, when these holdings were purchased by Atlantic Richfield Company (ARCO). Primary products from activities at the site were copper, zinc, arsenic, and cadmium.

The community of Black Eagle was founded in 1882 by workers at the nearby Great Falls Refinery. The community was originally known as Martinville. The older established section of Black Eagle lies between U.S. Highway 87 and the Anaconda Minerals Company (AMC) Great Falls Refinery.

To be added to or deleted from EPA's Direct Mail List Call toll free 1-866-457-2690 X 5034

Toll Free Numbers
DEQ Helena 1-800-246-8198
EPA Helena 1-866-457-2690
EPA Denver 1-800-227-8917

Public Meeting
Please Attend
Tuesday, July 14, 2009
7:00 pm — 8:30 pm

Black Eagle Community Center
1222 Main St.
Black Eagle, Montana

Do You Have Questions?

Please contact any of these individuals for additional information.

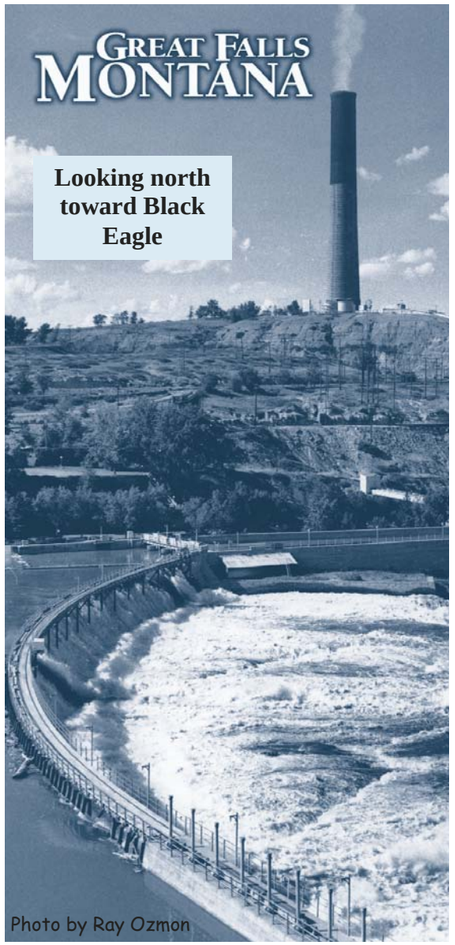
- **EPA**
  - **Gwen Christiansen**, Site Assessment Manager — 303-312-6463 — christiansen.gwen@epa.gov
  - **Wendy Thomi**, Community Involvement Coordinator — 406-457-5037 — thomi.wendy@epa.gov
- **Montana DEQ**
  - **Denise Martin**, Site Response Section Supervisor — 406-841-5060 — demartin@mt.gov
- **Cascade County**
  - **Sandy Johnson**, Sanitarian — 406-454-6950 — sjohnson@co.cascade.mt.us
  - **Alicia Thompson,** Health Officer — 406-454-6950 — athompson@co.cascade.mt.us

Refinery Closure and Demolition

Demolition of plant facilities had begun in 1972 and all operations at the Great Falls Refinery ceased in September 1980. ARCO began closure in 1981 completing the process in 1999. There are no records of any regulatory agencies overseeing the closure activities. Closure activities included building demolition and removal, basement substructure backfilling, salvaging and on-site waste burial of flue dust, granulated slag, asbestos-containing material, demolition debris, and other waste. Wastes were covered with anywhere between six inches and five feet of soil.

Metals Contamination

Over the years, wastes at the AMC site were placed in a landfill on-site or dumped directly into the Missouri River. Tailings and slag were dumped into the River from a tramway that ran along the riverbank below the Black Eagle dam raceway. An estimated 950,000 tons of slag and tailings were released to the river in 1907 alone.



Looking north toward Black Eagle

Photo by Ray Ozmon

Smelter operation at the Refinery site employed a 502-foot-tall plant stack for several years before pollution control technology was common. Such a stack allowed contaminants to be aerially dispersed over a wide area in the vicinity of the facility.

Analytical results (2003) documented the presence of metals on-site, in Missouri River sediments and surface water, and along the railroad bed, including antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, sodium, and zinc.

In 2007 and 2008 additional sampling was conducted to assess residential soils in the area. Elevated levels of arsenic, lead, and cadmium were found. The U.S. Environmental Protection Agency (EPA) is principally concerned with lead and arsenic in residential soils because of the effects they may have on human health.

Lead and arsenic levels found in residential yards were compared with screening levels of 400 mg/kg lead and 40 mg/kg arsenic. Any samples found with numbers above these screening levels indicates that further investigation needs to be done to determine the extent of contamination and the potential risk. This additional information will help determine if cleanup is warranted.

If highly elevated levels are found, EPA conducts a time critical removal using an emergency response team. The investigations so far have shown that residential soil metals are not high enough to cause immediate concern or warrant a removal action. A closer comprehensive look will be taken to determine if there may be long-term health risks.

Common Questions

What is Superfund and how can it help address a contaminated site?
In response to growing concern over health and environmental risks posed by uncontrolled or abandoned hazardous waste sites, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - also known as Superfund - in 1980. The Superfund program provides authority to thoroughly investigate and clean up contaminated sites. If an immediate human health or environmental threat is discovered the program provides for immediate action. If a more long-term cleanup is necessary, EPA and DEQ evaluate several alternatives, including removal, containment or treatment of the contamination, making sure the final decision meets strict criteria for a lasting remedy. Where possible, EPA works with communities to restore cleaned-up sites to productive use through the Superfund Redevelopment Initiative.

What is the State of Montana's Superfund Program?
The 1985 Montana Legislature passed the Environmental Quality Protection Fund Act. This Act, as amended in 1989, provided the Department with similar authorities as provided under Superfund. The name was changed to Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) and the Voluntary Cleanup and Redevelopment Act (VCRA) was added.

Will the community lose control of cleanup decisions if Superfund takes over?
While Superfund is a national program, its impacts are local and EPA works hard to incorporate the community's and local and state government's priorities into the response. Throughout the process, EPA consults with DEQ and welcomes opportunities to meet with local officials and the public, soliciting input into major decisions. While EPA and DEQ have certain public involvement activities that are required by law, they can also be flexible, tailoring communications activities depending on the needs and interest of the community.

What if I would like my yard sampled?
EPA does not currently have additional sampling planned. If the site is proposed for Superfund, EPA will take additional samples to determine the nature and extent of contamination. Residents will have the opportunity to have their yard sampled at no cost to them at that time. It is important to note that recent sample results do not indicate an immediate health risk or support taking immediate action. EPA and DEQ are concerned about potential long-term exposure to contaminated soil; potential contact with water and sediments during recreation on the Missouri River below the Black Eagle dam, and effects on the food chain, i.e. fish and birds.

What will be the impact to the county or community (i.e. real estate values, historical values) if the smelter is listed as a Superfund site?

Studies show that it is the discovery of the problem, which generally predates NPL listing by several years, that causes home prices to decline, not placement on the NPL. Evidence suggests that placing sites on the NPL either has no effect on home prices, or may actually raise them. Because the listing of a site implies a federal commitment to clean up the site, this step reduces uncertainty and may act as a signal to real estate markets that property values will soon rise.

The large smokestack at the apex of "Smelter Hill." The complex below includes a dam and powerhouse, rail lines, wagon roads, water pipes and electrical lines.

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Gardening in areas that may be contaminated with lead

It is a possibility for lead to get into your body by eating certain vegetables grown in soil that contains lead. Health problems associated with lead ingestion could result, especially for pregnant women and small children.

When you grow vegetables, you can lower the amount of lead that gets into your body by taking some simple steps :

☑ Clean vegetables well before cooking or eating.

- Throw away old and outer leaves of vegetables.
- Wash all vegetables with cold water. Scrub vegetables with a brush to help remove dirt. Rinse vegetables well before eating.
- Scrub and peel root crops such as carrots, potatoes, turnips, and onions before eating them.

☑ Avoid planting root crops in contaminated soils. Try growing vegetables in raised beds or containers.

- Grow crops such as tomatoes, peppers, squash, cucumbers, peas, beans, or corn. They are less likely to absorb lead.
- Grow leafy vegetables such as lettuce and root crops (carrots, potatoes) in containers or raised beds filled with lead-free soil.

  You can purchase lead-free soil from nurseries or garden stores.

☑ Do…

- add peat moss, compost, or manure to your soil. These bind the lead in soil so that vegetables absorb less lead.
- keep soil pH at 6.5 or higher so that plants will absorb less lead.
- cover all bare soil in the garden with 2 to 4 inches of lead-free mulch such as wood chips, grass clippings, lead-free soil, or compost.

☒ Do not…

- grow vegetables in the drip zone. There may be lead dust on the roof shingles that drips down.

- grow vegetables around the foundation of older buildings. They may be painted with lead based paint.
- grow root crops and low-growing leafy vegetables in soil that contains more than 1,000 parts per million (mg/kg) of lead.
- garden in soil that contains more than 1,500 parts per million (mg/kg) of lead.

Less likely to absorb lead

tomatoes
peppers
squash
cucumbers
peas
beans
corn

More likely to absorb lead

carrots
beets
potatoes
turnips
onions

Assessing the Risk

Now that EPA has collected this data, the agency will do an “exposure assessment.” The levels of lead and arsenic found generally in the area do not appear to be at a level warranting an immediate EPA cleanup action. However, EPA and the Montana Department of Environmental Quality (DEQ) will look closer at potential risks for individuals exposed over a long period of time to elevated levels of metals that may be in or near their yards.

EPA compares soil sampling results to a *screening level* typically used for soil exposure assessments- 400 mg/kg for lead, 40 mg/kg for arsenic. These concentrations are based on assumptions about people’s exposure. To be protective, EPA makes assumptions, estimating high, about how often people are exposed; for how long they are exposed each time and for how many total years they are exposed. This ensures that the scientists don’t overlook the possibility of elevated risk. Using these protective exposure assumptions may point to a problem in some instances where a significant risk may not actually be present. In this way, EPA believes that they are being as protective as possible rather than possibly missing something.

If sample results are higher than the screening levels, an exposure assessment will need to be done. Meanwhile, EPA suggests limiting exposure to these soils and following the guidelines on page 6 of this fact sheet. EPA or DEQ will likely request additional samples on specific properties to further assess potential long-term risk. If results are below these thresholds, we will likely not need to re-sample the property. Remember, the screening levels are very protective.

Risk Assessment Process

Data Collection and Evaluation
⇩
Exposure Assessment
⇩
Toxicity Assessment
⇩
Risk Characterization
⇩
Clean-up Options

Exposure Assessment

You could come into contact with contaminants in a variety of ways. Breathing contaminated air, or touching or drinking contaminated water, soil or food are called “exposure pathways.” Through this step, a risk assessor estimates how a contaminant could reach a person’s lungs, digestive system or skin.

Data Collection and Evaluation

Risk assessors estimate current and possible future risks to your health from contamination. Scientists collect samples and other information on chemicals of potential concern such as lead, arsenic or cadmium.

Risk Characterization

This step uses information from the first three to understand whether there are unacceptable risks and determine if cleanup will be necessary to protect you and your family.

Clean-up Options

If cleanup of the contamination is necessary, the cleanup project manager uses the information provided by the risk assessors to evaluate how to eliminate or reduce the exposure.

Toxicity Assessment

Unique and specific characteristics of the contaminant are considered. For example, how much of the contaminant does it take to pose a risk? How does the contaminant affect human health?

Past, Present and Future

Why Now?

A post closure solid waste inventory was conducted in 1981 and identified 27 areas of concern (Anaconda Minerals Company (AMC) 1981). A preliminary assessment completed in 1982 recommended that further investigations be conducted at the site and, in 1983, a screening site investigation was conducted by ARCO documenting both on-site and off-site groundwater and surface water contamination. ARCO submitted a voluntary cleanup plan to the Montana Department of Environmental Quality in 2000, which the DEQ determined to be incomplete. DEQ requested that EPA review the site. EPA conducted an Expanded Site Inspection in April 2003 that involved collecting surface water, sediment, soil and source samples. This Site Inspection of the AMC Great Falls Refinery site documented elevated levels of arsenic, cadmium, chromium, lead, mercury and zinc both on and off-site. These contaminants are the result of various processes of site operations between 1893 and 1980.

EPA conducted a Superfund Site Assessment of residential soils during the summer of 2007. The assessment focused on neighborhoods in Great Falls, Montana, on the south bank of the Missouri River across from the former refinery site and in the community of Black Eagle, west and northwest of the former refinery site.

The investigation found an approximate area of 3,400,000 square feet (about 78 acres) encompassing 375 residences in Black Eagle to be contaminated with arsenic and lead above screening levels. Another Expanded Site Inspection was conducted during 2008 to further define areas of residential soil contamination. The investigation confirmed that Black Eagle residents may be exposed to levels of lead, arsenic, and cadmium in soil that are elevated from normal background levels of these metals. **EPA found no levels considered to pose immediate health risks. The levels indicate only that further investigation is needed.**

What Now ?

As a result of recent investigations, Montana DEQ is determining whether cleanup can be done under the State Superfund Program or should go to EPA for placement on the National Priorities List (NPL). In August, 2008 Cascade County wrote to the Governor to ask for the site to be addressed by either the State Superfund Program or Federal Superfund Program. The state has been exploring options and will make a decision this summer.

What Next?

With the current information, EPA will recommend adding the site to the National Priorities List (NPL) - also known as Superfund - pending DEQ making a decision to take the lead under the State Superfund Program.

EPA and DEQ have met with local officials twice during the last year (May 6, 2009 and August 26, 2008) to provide information about possibilities for proceeding with investigation and cleanup, including listing the site on the Superfund List. Twice a year—every six months—EPA has a listing event to add sites from around the country to the NPL, or list of Superfund sites.

At the time a site is proposed, a public notice and news release are sent to local papers announcing the proposal. EPA will describe how the public can access the proposal in the Federal Register. There is a 60-day comment period during which the public may review the documents used to support the proposal and comment on the proposed action. If there are no significant comments, the site becomes officially listed during the next listing event.

After the comment period, the site will be assigned to a Remedial Project Manager with EPA and DEQ. Then, to prepare for sampling, EPA will reach out to residents in a variety of ways to ensure that people in the affected area have the opportunity to request sampling, express concerns and get answers to questions they may have about site activities. Throughout this process, EPA will provide opportunities to attend informational meetings, to learn about proposals and to ask questions and comment on what EPA is proposing.

EPA wants to hear from the stakeholders throughout the various stages of investigation and cleanup. Hearing from the public is one of the things that ensures EPA is working with the very best information in its decision-making process. We welcome your ideas about how we can best keep each other informed. Contacts are on last page!

Timeline of significant events related to the AMC Great Falls Refinery