



Anaconda Smelter Superfund Site

January 2009

Site Overview

What Do You Think ?

EPA and DEQ will soon be releasing documents which contain modifications to past Decisions.

Please watch for these documents !

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

Do You Need More Information?

Copies of most project documents, including EPA fact sheets with easy-to-read, detailed information on specific areas can be found at the Arrowhead Foundation office located at 118 E. 7th Street.

Please call any of the individuals listed below, if you have questions or need information.

- **EPA:** **Charlie Coleman**, Remedial Project Manager, 457-5038, or **Wendy Thomi**, Community Involvement Coordinator, 457-5037
- **Montana DEQ:** **John Brown**, Project Officer, 841-5036
- **Anaconda-Deer Lodge County:** **Becky Guay**, Chief Executive 563-4000
- **Arrowhead Foundation:** **Jim Davison**, Grant Administrator 563-5538
- **Atlantic Richfield Company:** **Trey Harbert**, Project Manager, 723-1816



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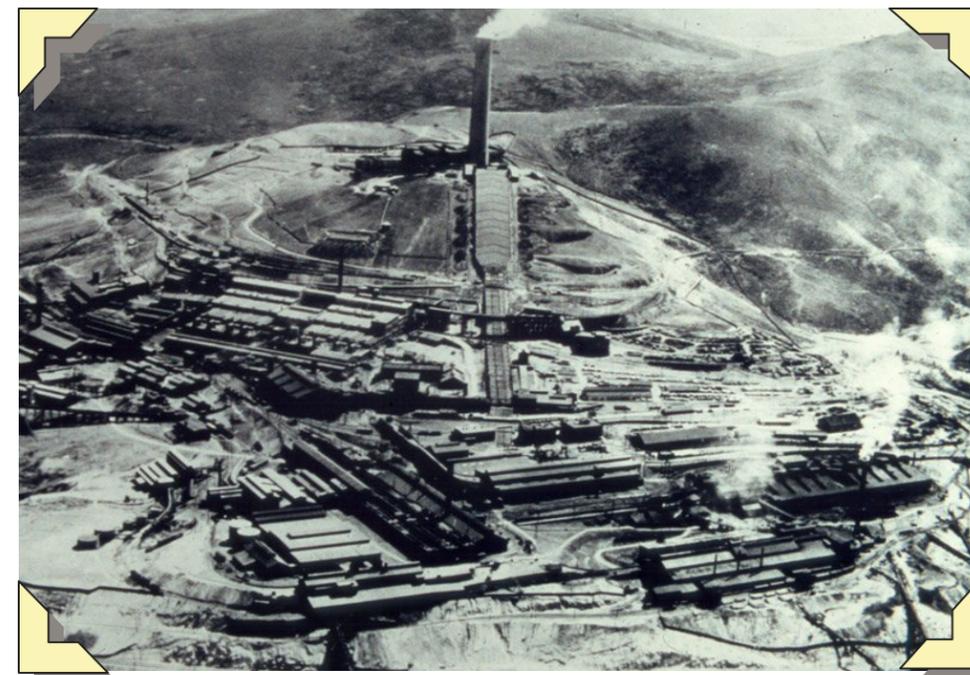
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The Anaconda Smelter National Priority List site is located at the southern end of the Deer Lodge Valley. The site includes the former Anaconda Copper Mining Company's ore processing facilities (above). These and other facilities were developed to remove copper from ore mined in Butte from 1884 through 1980. In 1977, the Atlantic Richfield Company (ARCO) purchased the assets of Anaconda Copper. Four years later, ARCO ceased smelting activities in Anaconda.

The Site covers about 300 square miles and includes the Old Works; Arbiter Plant; Smelter Hill; numerous piles, waste ponds, and demolition dumps. Extensive acreage contaminated by areal deposition of smelter stack emissions resulted in elevated concentrations of metals and low pH in the upper few inches of the soil. This harmed existing vegetation and limited seed germination, leaving a sparsely-vegetated easily eroded landscape.

Smelter wastes contain elevated levels of arsenic and metals (copper, cadmium, lead, and zinc) posing potential risks to human health, wildlife, and aquatic organisms. An assessment of the problems associated with the site led EPA to include it on the National Priorities List (NPL) of Superfund sites in 1983. As owner, ARCO is the potentially responsible party (PRP). This means that under the Superfund law, EPA looks to them to clean up contaminants that may cause a risk to human health and the environment.

Superfund

A basic understanding of the Superfund investigation and clean-up process can be helpful in reviewing the past, current and future clean-up actions at the Anaconda Smelter Site. The steps are listed here in the order they *usually* occur. Public participation occurs during many of these processes. There will be opportunities for public input in upcoming decisions.

The **Preliminary Assessment and Site Investigation (PA/SI)** is the initial investigation of site conditions.

A **Removal Action** is an immediate or short-term cleanup. These actions are taken to address releases or threatened releases of hazardous substances that may pose an immediate threat to human health or the environment. They usually require cleanup before all the remedial studies and documents can be completed.

Examples

EPA's **National Priorities List (NPL)** is a list of sites with the most serious threats, most complicated issues or largest scope. EPA has identified them as national priorities for long-term cleanup.

The **Remedial Investigation (RI)** documents the nature and extent of contamination.

The **Feasibility Study (FS)** assesses the treatability of site contamination and evaluates the potential performance and cost of treatment technologies.

The **Record Of Decision (ROD)** is a decision document that explains which clean-up alternatives will be used at NPL sites. Conclusions from the RI/FS and Risk Assessment are summarized in this document.

Remedial Designs (RD) are the preparation and implementation of plans and specifications for carrying out Remedial Actions.

A **Remedial Action (RA)** is a long-term clean-up. The bulk of cleanup on NPL sites occurs during this phase. A site may have several Remedial Actions to fully address the contamination. These cleanups permanently and significantly reduce the dangers associated with releases or threatened releases of hazardous substances that are serious, but not an immediate threat to human health or the environment.

Construction Completion marks the end of a phase of physical clean-up construction, although this does not necessarily indicate whether final clean-up levels have been achieved site-wide.

The **Post-Construction Completion** phase provide for the long-term protection of human health and the environment. Included here are Long-Term Response Actions (LTRA), Operation and Maintenance, Institutional Controls, Five-Year Reviews, and Remedy Optimization.

National Priority List Deletion—Removes a site or a part of a site from the NPL when response actions on the site or a portion of it are complete and clean-up goals have been achieved.

Reuse—The Superfund program routinely works with communities and other partners to return hazardous waste sites to safe and productive use without adversely affecting the remedy.

For more detail on the Superfund process please call Wendy Thomi (toll-free) at 1-866-457-2690.

Anaconda Regional Waste, Water & Soils (ARWW&S)

This OU addresses all remaining contamination and impacted areas (surface water, groundwater, waste source areas, and non-residential soils) not cleaned up under other response actions. This was the last major remedy decision at the site and brings closure to several previous OUs and removal actions (Smelter Hill, Mill Creek, and Flue Dust). Finally, this OU incorporates land use decisions being made by Anaconda Deer Lodge County through redevelopment planning.

Since the area included in this Operable Unit is so large, EPA subdivided it into 15 **Remedial Design Units (RDUs)**.

Some RDUs are classified as **Uplands**. These are primarily contaminated by smelter emissions. They generally have large portions of moderate to steep sloped areas, areas of impacted vegetation, and multiple landowners. Some RDUs are **Waste Management Areas WMAs** and are set aside for management of slag, tailings, or processing wastes.

- RDU 1— Stucky Ridge Uplands—ongoing
- RDU 2— Lost Creek Uplands
- RDU 3— Smelter Hill Uplands
- RDU 4— Anaconda Ponds WMA—completed
- RDU 5— Active Railroad/Blue Lagoons—ongoing
- RDU 6—South Opportunity Ponds Uplands—ongoing
- RDU 7— North Opportunity Uplands—ongoing
- RDU 8— Atlantic Richfield Land Management Area (formerly Opportunity Ponds WMA)-ongoing
- RDU 9— Fluvial Tailings
- RDU 10— Warm Springs Creek
- RDU 11— Cashman Concentrate—completed
- RDU 12— Slag—ongoing
- RDU 13— Old Works WMA
- RDU 14—Smelter Hill Facility Area WMA—ongoing
- RDU 15— Mount Haggin Uplands

Possible Changes to ARWWS

Based on information collected during the remedial design the site has been expanded to address additional areas of contamination.

Most notably are the West Galen and Dutchman Expansion Areas. These areas are currently addressed through the design and clean-up process. Other changes are expected to occur through the design process including the removal of additional waste materials such as those in Yellow Ditch and Blue Lagoon and possible closure of the Main Slag pile.

Since the final clean-up decision was made, the Arsenic drinking water standard has been lowered to 10 micrograms per liter. EPA, in consultation with DEQ, has determined that it is technically impracticable to clean up portions of ground and surface water in the Anaconda area to the new drinking water standard. EPA is going through the formal process of waiving this standard. It is important to note that although the standard may be waived, EPA anticipates that most people will still have access to clean drinking water. Additionally, If it is determined that any resident does not have clean water, deeper wells and/or another source of water will be provided. Domestic wells will be monitored on an ongoing basis.

For surface water, the aquatic standard for Arsenic will remain in effect and EPA does not expect any detrimental effects to fish and other aquatic organisms.

Documents

- **September 1998- ARWW&S ROD**
- **Monthly and Quarterly Air Monitoring Reports from A-DLC**
- **Groundwater/Surface Water Characterization Reports**
- **Technical Impracticability Analysis**
- **Upcoming ROD Modifications**

Community Soils

The **Community Soils** OU addresses residential and commercial soils throughout the entire Anaconda Smelter Site, including soils within the city limits of Anaconda and the community of Opportunity. Residential soils in surrounding rural areas such as Crackerville, Aspen Hills, West Galen, and Antelope Springs are also being addressed through this OU. Other water and soil issues in the rural areas are being cleaned up under the ARWW&S OU. Railroad beds within Anaconda are also included in the Community Soils ROD.

EPA's 1996 clean-up decision specified that all residential soils exceeding an arsenic concentration of 250 parts per million (ppm) must be cleaned up. The action level for commercial/industrial areas is 500 ppm. Although EPA's Human Health Risk Assessment (1996) indicated that Anaconda, as a whole, was not at significant risk, individual areas having elevated arsenic in soils could still pose a risk to residents.

Based on environmental samples and statistical analysis, EPA identified "focus areas" - areas within the OU that have a potential to exceed the 250 ppm action level. During the remedial design, additional samples were collected to better define the focus areas and to determine appropriate clean up strategies. EPA determined that a systematic yard-by-yard sampling in the focus areas was the most effective way to find and clean up hot spots.

To date, since 2002, AR has sampled more than 1500 yards, cleaned up over 300 yards in Anaconda and 50 in the nearby communities. Other soils within southern Deer Lodge County that may have been impacted by smelter emissions and mining wastes will be addressed through the ICs Program (page 9).

Capping of the active railroad line through Anaconda was completed in 2008. Cleanup of commercial areas adjacent to active and abandoned railroads is expected to be completed in 2009.

Possible Changes to Soils Clean-up Decision



Residents may have their yard sampled by calling **Luke Pokorny at the Atlantic Richfield Company in Butte.**

782-9964

Based on information collected during the remedial action for Residential soils, EPA, in consultation with DEQ, has determined that the Residential Soils component of the Community Soils ROD should be revised. Proposed changes may include:

Adding a lead action level for residential soils with elevated lead levels. Either a site-specific action level based on sampling or a default level based on modeling will be used.

Changing the implementation methodology to address contamination at depth. The "focus area" may also be revised if appropriate. Areas outside the focus area could still be addressed through the institutional controls program. EPA will also consider other changes to the sampling and clean-up protocols.

Adding remediation of interior dust including attic dust if sampling shows elevated levels of arsenic and lead that may pose a risk to human health.

Remediating all vacant properties within the community to reduce exposure to adjacent residents.

- **September 1996—Community Soils ROD**
- **April 2008—Interior and Attic Dust Characterization Study / Data Summary**
- **September 2008—Data Interpretation Analysis Report**
- **Upcoming ROD Modifications**

Documents

Completed Removal Actions

Anaconda Smelter Demolition and Initial Stabilization Time Critical Removal Actions

From 1983-1986, EPA oversaw smelter demolition and initial stabilization efforts.

Mill Creek Time Critical Removal Action

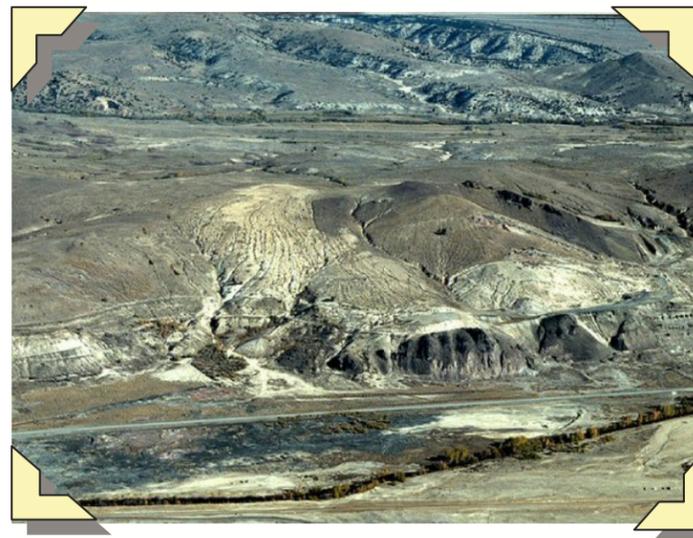
In May 1986, EPA temporarily relocated families with small children. In 1987-1988, all Mill Creek residents were permanently relocated as part of the remedial action. The area was cleaned up, graded and replanted in 1999.

Anaconda Yards Time Critical Removal Action

From 1991-1992, under an emergency removal action, arsenic contaminated soils were cleaned up in three Anaconda neighborhoods: Teresa Ann Terrace, Elkhorn Apartments and Cedar Park Homes.

Old Works Stabilization Time Critical Removal Action

In 1992, EPA and ARCO began to address immediate concerns about contaminants released into Warm Springs Creek by stabilizing the Red Sands adjacent to the Creek, repairing breaks in the levees and installing fencing to limit access.



Old Works before cleanup. Warm Springs Creek can be seen at the bottom of the picture.

Common Acronyms for the Anaconda Smelter Site

- CD**—Consent Decree—a legal agreement.
- ERA**—Ecological Risk Assessment—a study of potential impacts to environmental receptors.
- ESD**—Explanation of Significant Differences—documents significant changes to a ROD.
- HHRA**—Human Health Risk Assessment—a study of potential health risks to humans.
- FDR**—Final Design Report—documents clean-up goals.
- ICs**—Institutional Controls—administrative or legal controls that are a part of the cleanup.
- OU**—Operable Unit—a sub-unit of the site based on geographic area, contaminant or contaminated media.
- ppm**—parts per million—a measure of concentration of a substance.
- RAR**—Remedial Action Report—determination that clean-up objectives have been achieved.
- RAWP**—Remedial Action Work Plan—describes the detailed steps of the cleanup including construction drawings and technical specifications.
- RDU**—Remedial Design Unit—a sub-unit of an Operable Unit.
- WMA**—Waste Management Area—an area set aside specifically to manage waste left in place.

Arbiter Non-Time Critical Removal Action

In 1994, approximately 275,000 cubic yards of waste material (including arsenic, cadmium, lead and zinc) from the Arbiter Plant were dug up, and moved to a repository on Smelter Hill.

Beryllium Non-Time Critical Removal Action

In 1994, excavation and disposal of previously disposed wastes and contaminated materials from a former beryllium flake metal pilot plant and a beryllium oxide pilot plant was completed. The wastes were sent to the Smelter Hill repository.

Site Organization

The Anaconda Smelter site spans more than 300 square miles and so must be divided into smaller areas to make design and cleanup more manageable. First the site is categorized into five Operable Units (OUs). Two of the OUs are further divided into sub-areas. The following Operable Units and sub-areas, sometimes called Remedial Design Units (RDUs) comprise the Anaconda Smelter Site.

- 1) **Mill Creek**—page 5
- 2) **Flue Dust**—page 5
- 3) **Old Works/East Anaconda Development Area (OW/EADA)**—This OU is divided into six sub-areas described on page 8.
- 4) **Community Soils**—page 10
- 5) **Anaconda Regional Waste, Water and Soils (ARWW&S)**—This OU is divided into fifteen Remedial Design Units described on page 11.

Each of these Operable Units has a Record of Decision describing the selected clean-up action, including any Institutional Controls (ICs) that are required. ICs are described on page 9.

Common, Recent and Upcoming Documents

Common for all OUs and sub-areas

- Remedial Action Work Plans/Final Design Reports
- Interim Remedial Action Reports/Construction Completion Reports
- Annual Monitoring Reports

Recent

- September 2005—Third Five-Year Review of the cleanup

Upcoming documents are listed in red

Recent Community Issues

Dust:

The Atlantic Richfield Land Management Area has been a source of fugitive dust emissions during extreme wind conditions. EPA continues to work with AR on dust control measures.



ARCO Applies surfactant to prevent blowing dust



Milltown sediments to Atlantic Richfield WMA:

The decision was made to transport Milltown Dam sediments by rail back up river to the waste repository that was already established rather than to create another contaminated area.

Milltown sediments are offloaded from a rail car at the Atlantic Richfield Land Management Area



Implementation of Community Soils Cleanup:

Questions have been raised about how EPA determined the arsenic action level of 250 ppm for residential areas in Anaconda and whether it is protective enough. The arsenic level differs from other arsenic cleanups around the nation because of site-specific data showing the arsenic's availability for uptake in the body. EPA and DEQ are taking another look at the issue of "hot spots." Cleanup has been done based on the averaging of several samples around the yard and EPA may revise this protocol, giving more weight to individual samples.

Technical Assistance Grant to the Community

The Arrowhead Foundation formed in 1994 to receive a \$50,000 Technical Assistance Grant from EPA to facilitate the community's involvement in the reuse of the Old Works site through design and construction of a world class golf course. In coordination with ADLC, and several community groups, the golf course was finished in 1997. The TAG group continues to reach out to the community members who may want to be more involved in the Superfund cleanup and reuse of properties.



The Arrowhead Foundation now has an online directory of Superfund documents available for public review. And the library continues to grow.

Simply go to: www.library.anacondasuperfund.com

You can search by Site (Smelter Hill, Old Works, Residential soils etc), Remedial Design Units (RDUs) or simply by a document name.

The joint-Deer Lodge County/Arrowhead Foundation Superfund Document Repository is located at 118 East Seventh Street.

To get more involved or become a member of the TAG group call Mark Sweeny at 560-0171 or Jim Davison at 563-5538.

Redevelopment and Institutional Controls

The remedy calls for a fully-funded Institutional Controls program at the local government level. Anaconda Deer Lodge County (ADLC) is currently working with EPA to develop this program. The program will include a Geographic Information System (GIS); a Development Permit System (DPS) and a Community Protective Measures Program (CPMP). The comprehensive ICs program will ensure monitoring, protection of clean-up actions, public outreach and education and other administrative and/or legal tools to ensure that public health is protected and redevelopment is conducted in a protective manner.

In addition, ADLC is working on a Redevelopment Priority Program to help focus cleanup on areas where redevelopment is most likely to occur.

ADLC government will be responsible for implementing the overall ICs program. This will include ongoing coordination with EPA, Atlantic Richfield, and private citizens. The GIS will function as a tracking system for clean-up actions and provide the regulating Agency information to plan for potential future land use. The DPS will ensure that appropriate assessments are done before redevelopment occurs. The county will also provide public information and outreach through the CPMP.



Industrial Area

Old Works/East Anaconda Development Area

This Operable Unit is located on the east side of Anaconda and contains large volumes of waste and debris from the Old Works operations. The smelter process consisted of several steps that generated different types of waste. Lower grade ore was crushed and screened and then jigged (agitated) to concentrate the ore material. The Jig Tailings were discarded onto the floodplain. The Heap Roast Slag, composed of partially vitrified slag, was generated by an air cooling process. Jig tailings and slag were sluiced, or channeled, across Warm Springs Creek between 1890 and 1901 to form the Red Sands. All operations ceased at the Old Works when, in 1902, the much larger and more modern Washoe Works (later known as the Anaconda Reduction Works) began production across the valley on Smelter Hill.

There are approximately 440,000 cubic yards of floodplain wastes, 300,000 cubic yards of Heap Roast slag, 600,000 cubic yards of Red Sands, and 32,000 cubic yards in the miscellaneous waste piles.

Six distinct sub-areas make up the OW/EADA OU. Most of the remedial actions in this OU were completed in the 1990's. The remaining work at the Industrial Area and Arbiter Complex includes construction of a cap and storm water controls for the Arbiter Complex. Other Industrial Area soils will be removed below the arsenic action level (250 mg/kg for residential, 500 mg/kg for commercial industrial.)

The Mill Creek Addition and Aspen Hills were also added to the OU later. (See Mill Creek on page 4.) Aspen Hills is a portion of the former Smelter Hill railroad loop track that is located within the Aspen Hills Subdivision. Construction of soil covers over waste materials, addition of lime and drainage controls were completed in 1998.

1) The Historic Structures—This area, defined by steep slope areas above the golf course, contains flues and oven foundations-remnants of the Upper and Lower Works. Drainage controls were completed with the golf course construction.

2) Golf Course—This area consists of about 250 acres of tailings and contaminated soils. The golf course cleanup included moving over 600,000 cubic yards of material. Control of water running on and off the site was accomplished through extensive drainage, collection and recycling systems. An 18 inch soil cover was placed over 2 inches of lime rock to cap the site. The work was completed in 1996.

3) Industrial Area including the Arbiter Plant—This area is defined by properties within the OW/EADA OU in private ownership, including the Anaconda Industrial Park and the former Arbiter Plant. Construction of engineered controls and drainage areas is expected to be completed in 2009.

4) Red Sands—This area is defined by the remaining red sands and jig tailings located adjacent to the golf course. Construction of a soil cover and drainage controls on about 300 acres was completed in 1998.

5) East Anaconda Yards—This area is defined by about 100 acres of the Smelter Hill facility located adjacent to the community of Anaconda. Drainage controls and some soil cover placement was completed in 1998. Additional hazardous waste materials and beryllium were discovered during redevelopment activities in 2004. These materials were excavated and disposed of at an off-site hazardous waste facility and the Aspen Hills Repository on Smelter Hill (beryllium). A final cover is currently being evaluated.

6) Drag Strip—This area is about 200 acres of contaminated soils owned by a local drag racing organization. Deep tilling, lime addition and drainage controls were completed in 1999. Additional cover material was placed in 2007.

• March 1994—OW/EADA ROD

Documents

Millcreek

The former community of Mill Creek is located 1.5 miles east of Anaconda and adjacent to the Smelter complex. Approximately 37 families were affected by uncontrolled releases of contaminants from the Smelter facility.

EPA selected the remedial action in 1987 after temporarily relocating residents in a 1986 removal action.

EPA entered into a consent decree with Atlantic Richfield in January 1988 to implement a permanent relocation for Mill Creek residents. The relocation was completed by fall of 1988. Atlantic Richfield completed home demolition and site stabilization activities in late 1988. Demolition debris and contaminated soils were disposed of on Smelter Hill. Foundations were buried on-site and the area was re-graded and vegetated. Fences and signs were installed to control access and maintain the vegetation.

EPA consolidated the remaining area of Mill Creek into the Old Works/East Anaconda Development Area OU as the Mill Creek Addition. The OW/EADA ROD provided for the cleanup of soils exceeding 1000 ppm arsenic using engineered covers and /or re-vegetation techniques. Ground and surface water issues were also deferred to the Anaconda Regional Waste, Water and Soils OU.

Construction to address contaminated soils began in 1998. Approximately 100 acres were covered or tilled. Drainage controls include ditches and sediment basins. Construction was completed in 1999.

This area is currently being evaluated to coordinate additional cleanup with a proposed development to provide for energy related projects.

- October 1987—Mill Creek ROD
- April 1994—Old Works/East Anaconda Development Area Explanation of Significant Differences (ESD)

Documents

Flue Dust

Flue dust is a by-product of copper smelting. It contains copper, arsenic, cadmium and other metals and is considered a hazardous material. Most of the flue dust generated by smelter operations was reprocessed. However, hundreds of thousands of cubic yards remained stockpiled on and around Smelter Hill.

The cleanup required treatment and disposal of all flue dust from nine locations on Smelter Hill. In 1991, EPA stabilized the flue dust with cement and lime, and then placed treated materials in a repository on Smelter Hill. The repository was engineered to include a liner, a leak detection and collection system, groundwater monitoring wells both up and down-gradient from the repository and a cap. Treatment of over 500,000 cubic yards of flue dust was finished in December 1993. Closure of the repository was completed in November 1994. Long-term maintenance and monitoring and limited site access continues to be required.



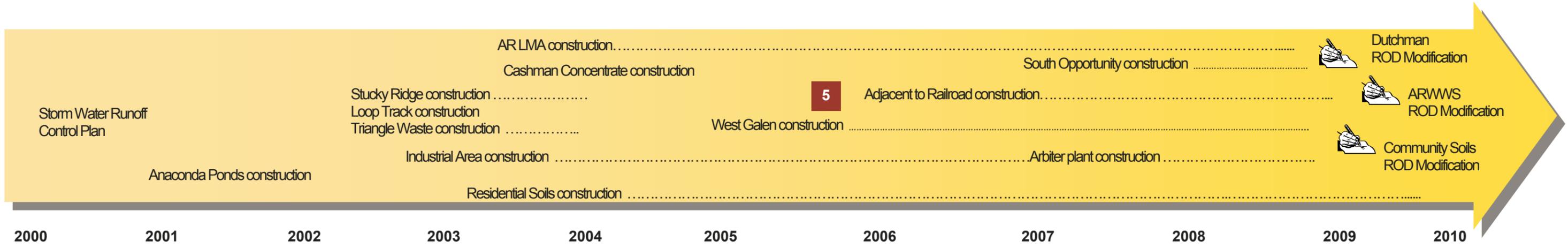
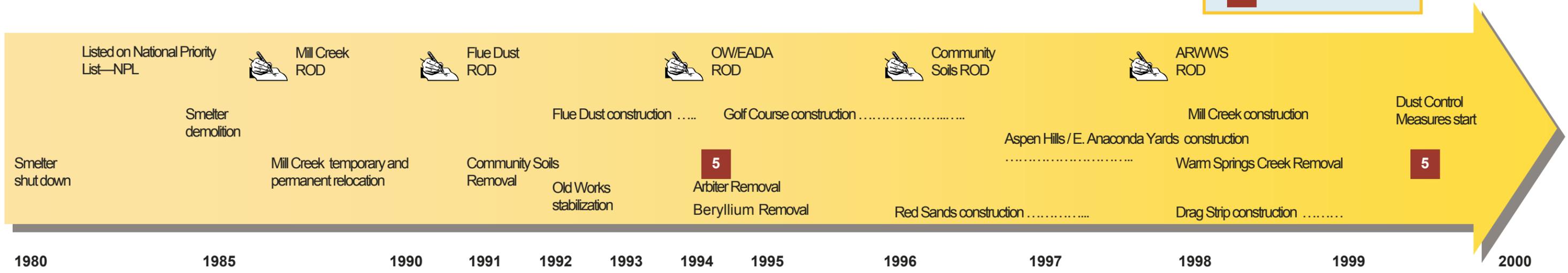
The Flue Dust Repository (center) can be seen on Smelter Hill below the Anaconda Ponds WMU (upper left). The Mill Creek highway (upper right) provides context.

- September 1991—Flue Dust ROD

Documents

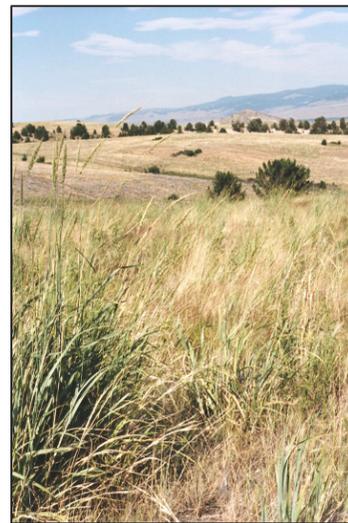
Anaconda Smelter Site Clean-up Timeline

 Record of Decision
5 Five-Year Review



Demolition: Smelter Hill

Removal Action: Excavation of Waste from Arbiter Plant



Reclamation: Stucky Ridge

Remedial Action: Residential Yard Cleanup



Closure: Spreading Cover soil over Waste at Atlantic Richfield Land Management Area