EPA Anaconda Mine Site

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • August 2013

Yerington, Nevada

Groundwater Investigation Update

Progress continues to be made on the investigation of the nature and extent of groundwater contamination associated with the Anaconda Mine. The groundwater investigation work has been conducted by the Atlantic Richfield Company (ARC) under the direction of the U.S. Environmental Protection Agency (EPA) and the Nevada Division of Environmental Protection (NDEP). The purpose of this Fact Sheet is to provide an update on the status of the investigation and inform the community of the next steps needed to make sure that the groundwater contamination is cleaned up.

Community Meeting

EPA invites the public to a community update meeting to learn more about the status of the cleanup work at the Anaconda Mine.

September 12, 2013
6:30.m. to 8:30p.m.

Yerington High School Multi-purpose Room
114 Pearl Street, Yerington, NV

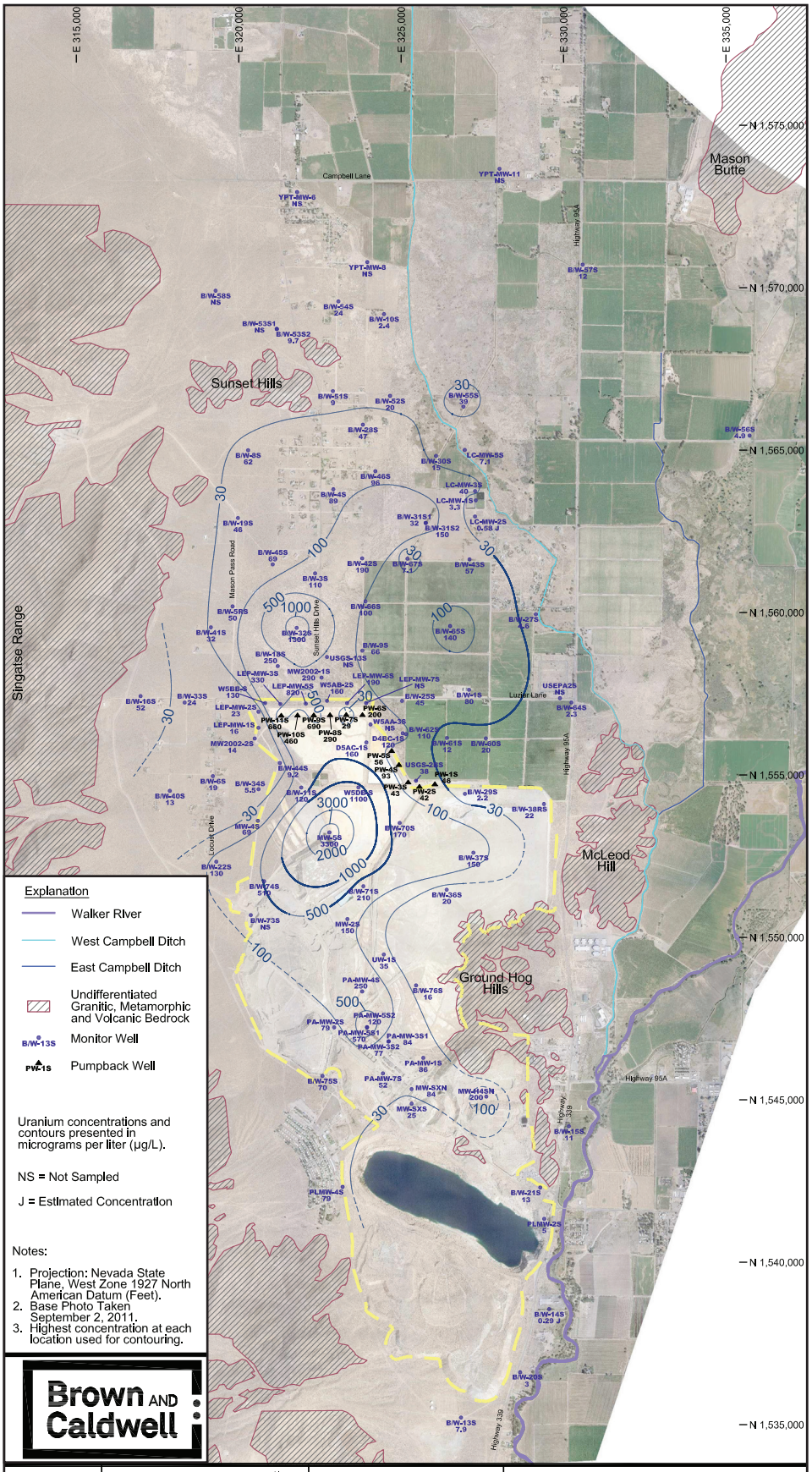
What Do We Know About the Groundwater Contamination?

We know that groundwater beneath the Anaconda Mine site is contaminated with heavy metals, radiological compounds, and other site-related contaminants. The contaminants were released into the soil and groundwater as a result of the processes which extracted copper from the ore at the site. Site copper extraction processes were conducted by the Anaconda Mining Company from 1952 to 1978 and by the Arizona Metals Company (Arimetco) from 1989 to 2000. ARC purchased Anaconda in 1977; Arimetco is bankrupt and therefore unable to fund any of the investigation or cleanup actions.

From groundwater monitoring, we know that there are elevated levels of contaminants beneath the old Anaconda evaporation ponds, indicating that the pond area is a continuing source of contamination to the groundwater. We also know that as the groundwater naturally moves through the soil to the north/northwest of the mine site boundary, the contamination has moved with it. We have confirmed elevated levels of contaminants associated with the site as far north as Sunset Hills. We also know that the groundwater contamination extends vertically, depending on the location, from the most shallow groundwater zone to as deep as bedrock found more than 400 feet below the ground surface. The metals and radiological compounds released by the mine site have added to levels which occur naturally in groundwater in the area.

The contamination moving in the groundwater has impacted wells used to supply homes to the north of the site boundary, although the interface between site contamination and the levels of contaminants that occur naturally in the groundwater is still unclear and a major focus of the current investigation. There are approximately 73 homes receiving bottled water from ARC because testing of their drinking water wells over the last years has found at least one instance of uranium levels above 25 micrograms/liter (ug/L). The federal drinking water standard for uranium is 30 ug/l.

The figure on the next page shows the aerial extent of concentrations of uranium detected in monitoring wells in the shallow groundwater zone in October 2012. The concentration lines on the map delineate areas with similar uranium concentrations. As the map shows, there is a high concentration of uranium in groundwater in the eastern area of the evaporation



ponds, and at two other localized areas of elevated contamination to the north of the site boundary. Much of the residential area to the north of the site has concentrations of uranium in the shallow groundwater between 100 ug/L and the federal maximum contaminant level of 30 ug/L.

What Information Do We Still Need?

We are beginning to transition from a well installation/data collection mode to a data interpretation mode. The groundwater investigation at the Anaconda Mine site is nearing the conclusion of the Remedial Investigation / Feasibility Study phase (please see The Superfund Process box). This phase has taken many years to complete because the Remedial Investigation must gather enough information about the contamination at a site to identify and evaluate cleanup actions that will protect public health and the environment, and the Anaconda site is large and complex. The cleanup alternatives evaluation takes place in a Feasibility Study. The Feasibility Study is generally completed after the Remedial Investigation, but it is started towards the end of the Investigation. At the Anaconda Mine site, we are nearing completion of the Remedial Investigation and transitioning into the Feasibility Study.

The extensive network of monitoring wells installed by ARC over the last few years has given us a much better picture of what is happening below the ground surface. There are now more than 300 wells used to monitor groundwater quality, from the southern part of the Mine site north past Sunset Hills.

The Superfund Process

» **Discovery of a Contaminated Site**

» **Preliminary Assessment/Site Inspection** – Evaluates the potential for release of hazardous substances from a site and determines if the site qualifies for Superfund attention.

» **NPL Site Listing Process** – The addition of a site to the National Priorities List makes the site eligible for federal monies to conduct the Remedial Action if the parties responsible for the contamination are financially unable to do so.

Important Note: The Anaconda Mine site is not on the NPL. ARC is paying for the investigation and cleanup of the majority of the site. EPA has been using emergency funds and contributions from ARC and SPS to clean up the Arimetco portion of the site because Arimetco is bankrupt. If funding for Arimetco work becomes unavailable, EPA may need to ask the State of Nevada to concur on NPL listing.

» **Remedial Investigation/Feasibility Study** – The RI determines the nature and extent of contamination and the FS assesses the treatability of site contamination and evaluates the potential performance and cost of cleanup technologies.

» **Record of Decision** – The ROD explains which cleanup alternatives will be used at a site.

» **Remedial Design/Remedial Action** – The RD/RA stage involves preparation and implementation of plans and specifications for applying site remedies. The bulk of the cleanup usually occurs during this phase.

» **Construction Completed** – Construction Completed identifies completion of physical cleanup construction, although this does not necessarily indicate whether final cleanup levels have been achieved.

Important Note: The groundwater cleanup component for the Anaconda Mine will take decades to lower contamination to levels protective of public health. Construction Completed for groundwater will mean the physical completion of the cleanup system.

» **Post Construction Completion** – This step ensures that Superfund response actions provide for the long-term protection of human health and the environment. Important activities include Operation and Maintenance of treatment systems and Institutional Controls like deed restrictions.

» **NPL Deletion** – A site is removed from the NPL once all response actions are complete and all cleanup goals have been achieved.

» **Site Reuse/Redevelopment**

Community Involvement, Enforcement, and Short-term Cleanup Actions (Removal Actions) can take place continually or at any time during the Superfund Process.

However, there are still some remaining questions that need to be answered completely:

- What concentrations of site contaminants occur naturally in site groundwater and what have been caused by site activities? (Most of the contaminants released at the site came from processing ore which was extracted from the on-site open pit and therefore occur naturally at the site in soil and groundwater.)
- How and where are contaminants being released into the groundwater and what physical and chemical processes of the water and Site geology are influencing concentrations and movement?
- Where will the contamination move in the future?
- What influence does agricultural pumping and application of irrigation water and agricultural chemicals have on groundwater?

What is the Plan to Obtain the Information?

To answer the remaining questions, and complete the Remedial Investigation, the following work will be conducted by ARC under EPA and NDEP supervision (please see Schedule of Groundwater Remedial Investigation Activities during 2013 – 2014):

- Assess background groundwater quality to determine levels of contaminants which occur naturally in Yerington groundwater or are a result of non-mining activities vs. levels that occur as a result of activities at the Anaconda site.

- Test groundwater system hydraulic properties to assess how fast groundwater moves, especially in the north/northeastern portion of the Site.
- Perform geochemical analyses to assess how contaminants are released into groundwater and the effect of natural processes on how fast contaminants move in groundwater.
- Install and test bedrock wells to assess the presence and movement of contamination.
- Model groundwater flow and chemical transport rates to assess where and how fast contamination will move in the future.
- Install additional monitor wells to assess the influence of agricultural activities on groundwater.
- Conduct a human health risk assessment.

How Will the Groundwater Be Cleaned Up?

EPA, NDEP, ARC, and other stakeholders will be meeting later in October to discuss remedial measures that can be implemented to address the movement and treatment of contaminated groundwater. This discussion will be the first event in the Feasibility Study process.

The Feasibility Study itself will identify alternatives for groundwater cleanup and will evaluate the alternatives using nine criteria established by the Superfund program: 1) Overall protection of human health and the environment, 2) Compliance with applicable and appropriate standards, 3) Long-term effectiveness and permanence, 4) Reductions in toxicity, mobility, and volume through treatment, 5) Short-term effectiveness, 6) Implementability, 7) Cost, 8) State Acceptance, and 9) Community Acceptance. The process of identifying,

Schedule of Groundwater RI Activities During 2013 – 2014

Activity	Estimated Duration or Submittal/Completion Date
Background Groundwater Quality Assessment	
Background Groundwater Quality Assessment – Revision 1	Submitted
Evaluation of Tracer Data	June 2013
Background Work Plan	December 2013
Groundwater Hydraulic Testing/Geochemical Assessments	
WDW019 Borehole Flowmeter Testing Work Plan	Submitted
YPT Well Pump Test Work Plan	November 2013
Implementation of Hydraulic Testing	December 2013
Geochemical Assessments	June - December 2013
Bedrock Characterization	
Initial (Phase 1) Bedrock Characterization Work Plan	Submitted
Phase 1 Implementation	June 2013
Data Summary Report	September 2013
Phase 2 Bedrock Characterization Work Plan	December 2013
Phase 2 Implementation	June - December 2014
Modeling of Groundwater Flow and Chemical Transport	
Draft Groundwater Flow Model Work Plan	Submitted
Final Groundwater Flow Model Work Plan	July 2013
Groundwater Modeling Report	December 2013
Additional Monitor Well Installations	
Additional Monitor Well Work Plan	June 2013
Implementation of Field Work	July 2013- February 2014

screening, and evaluating alternatives is conducted with input from stakeholders and provides for community review and comment.

The alternatives evaluated for cleanup using the nine criteria will include both measures to provide near-term protection to human health and the environment and measures to address the long-term restoration of the groundwater. The alternatives for protection of human health will address exposure to site contaminants in domestic well water and will probably include but are not limited to:

- Connection of homes to the municipal water supply
- Installation of individual home treatment systems

Based on Superfund experience with other groundwater contamination sites, the Feasibility Study is expected to evaluate groundwater restoration alternatives from the following remedial categories:

- Containment Technologies: Capping of source areas, vertical and/or horizontal barriers to groundwater movement like slurry walls and liners
- Extraction Technologies: Groundwater collection/pumping
- Treatment Technologies: Physical and/or chemical treatment of groundwater that has been pumped from the ground, or treatment of groundwater in the subsurface
- Disposal Technologies: Discharge of the groundwater to ponds, surface water, or commercial uses after treatment to remove contamination
- Natural Attenuation: Monitoring of the contamination to assure that human health and environmental pathways are not adversely impacted

It is likely that the final plan for groundwater restoration will include a combination of the technologies described above.

EPA must caution the community that, based on our experience at numerous other sites, groundwater contamination as complex as that found at the Anaconda site can take decades to clean up.

Further Improvements Are Planned for Arimetco Fluid Management System (OU8)

Recent studies completed by Atlantic Richfield Company (ARC) and Singatse Peak Service (SPS) have determined the current Fluid Management System (FMS) does not have sufficient capacity to assure that a large storm event will not result in a release of highly acidic fluids. Prudent and widely recognized engineering design requires that the system be able to accommodate a 24-hour storm of 25-year return frequency. The capacity of the existing FMS system has been reduced over time due to the accumulation of sediments within the Four Acre Pond, increasing the possibility of a release of fluids into the environment in the event of a significant winter precipitation event.

Based on ARC/SPS calculations, 3.2 million gallons of additional capacity needs to be created. EPA and NDEP are planning to add capacity in the form of a pair of double-lined ponds with leak detection adjacent to the existing Four Acre Pond. Each pond would be approximately 400 feet long by 110 feet wide by 10 feet deep, with a capacity of about 1.6 million gallons. As part of this work, power lines would be extended to the area to enhance bird mitigation by allowing for the addition of electrically-operated deterrent devices.

The work would be implemented by NDEP and its contractor under removal authority provided by the federal Superfund law, also known as CERCLA. It is anticipated that the cost of this work would be funded 50% by EPA and 50% through a voluntary contribution by ARC. SPS would contribute the land on which the new ponds would be built. SPS also plans to test a copper cementation process, which, if successful, would remove solids from the Four Acre Pond while recovering copper from those solids.

EPA's goal in performing this work is to minimize the potential for the release of FMS fluids into the environment by taking response actions as necessary to maintain system capacity and integrity. We continue to take these actions with the objective of developing more permanent solutions in collaboration with the property owner or other interested parties at the Site, or failing that, through remedial action authority under Superfund.

United States Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-6-3)
San Francisco, CA 94105
Attn: Jere Johnson (Anaconda 8/13)

FIRST-CLASS MAIL
POSTAGE & FEES
PAID
U.S. EPA
Permit No. G-35

Official Business
Penalty for Private Use, $300

Address Service Requested

Jere Johnson
Project Manager
(415) 972-3094
johnson.jere@epa.gov

David Seter
Project Manager
(415) 972-3250
seter.david@epa.gov

Tom Dunkelman
On Scene Coordinator
(775) 687-9480
dunkelman.tom@epa.gov

Jeryl R. Gardner, P.E., C.E.M.
Abandoned Mine Lands
Program Coordinator
NDEP Bureau of
Corrective Action,
(775) 687-9484
jgardner@ndep.nv.gov

EPA Contacts

Information Repository

For site documents, please visit the Information Repository at:

Lyon County Library
20 Nevin Way
Yerington, NV 89447
(775) 577-5042

Anaconda Mine Web Site:
http://www.epa.gov/region09/anaconda

EPA Anaconda Mine Site

Groundwater Investigation Update