

East Helena Facility

Corrective Measures Study Report

April 11, 2018





Agenda

- Welcome and Opening Remarks (EPA)
- Results to Date
 - Observed Groundwater Quality
 - ET Cover
 - Prickly Pear Creek
- CMS Report Overview
- Next Steps
- Questions
- Public Comment



ET Cover System (57 Acres)



Construction

- ET Cover System over West Portion Completed in 2015
- ET Cover System over East Portion Completed in 2016

Performance

- Vegetation growth on ET Cover System has been vigorous and is in good condition.
- Stormwater controls functioned as designed during runoff from rapid snowmelt earlier this year.
- Slopes along the ET Cover System boundary appear to be stable and have good vegetative cover and no visible erosion or sloughing.
- No indications that ET Cover System is not functioning as designed.



SMELTER DAM AND LOWER LAKE





CREEK UNDERCUTTING THE SLAG PILE





UPPER LAKE DIVERSION





Smelter Dam





PPC REALIGNMENT FLOOD PLAIN RECONSTRUCTION





RESERVOIR SEDIMENTS AND GROUNDWATER





Iron Rich Water





STREAM AND FLOODPLAIN RECONSTRUCTION





DAM AND SLAG REMOVAL



LOWER LAKE DEWATERING





LOWER LAKE DEWATERING





LOWER LAKE ADDITIONAL REMOVALS





LOWER LAKE AFTER REMOVALS





LOWER LAKE STREAM/ FLOODPLAIN AND WETLANDS





LOWER LAKE WETLANDS FILLING





LOWER LAKE WETLANDS NEARLY FULL





LOWER LAKE WETLANDS SPRING 2017





PLANTING LOWER LAKE WETLANDS JULY 2017





LOWER LAKE WETLANDS SPRING 2017



LOWER LAKE WETLANDS OCTOBER 2017





DEWATERING AND DROUGHT 2016





VEGETATION RESPONSE TO STREAM DIVERSION





STREAM RESPONSE TO DIVERSION





FLOODPLAIN AND WETLANDS RESPOND





FIRST SPRING – 2017 – GRASS OVERTAKES THISTLE





FLOODPLAIN SUMMER 2017



FLOODPLAIN AUGUST 2017





FLOODPLAIN AUGUST 2017





FLOODPLAIN EARLY OCTOBER 2017





FLOODPLAIN EARLY OCTOBER 2017





STREAM BEFORE DIVERSION





STREAM AFTER DIVERSION





LIVE TRANSPLANTS AND SALVAGED



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S. Bohcat
SUMMER 2017...





TRANSPLANTS JUNE 2017





TRANSPLANTS JULY 2017



TRANSPLANTS AUGUST 2017





ROCK RAMP BEFORE DIVERSION



FIRST FLOW THROUGH THE ROCK RAMPS





ROCK RAMPS FALL 2016





ROCK RAMP SUMMER 2017





ROCK RAMP MARCH 23, 2018





INLET CULVERTS March 23 Early Runoff





MARCH 23, 2018 EARLY RUNOFF





MARCH 25, 2018 – POST EARLY RUNOFF





MARCH 23, 2018 EARLY RUNOFF





MARCH 25, 2018 BMP TEST – PASSED





Corrective Measures Study (CMS) Report Overview



RCRA Corrective Action Process

- ✓ RCRA Facility Investigation (RFI)
- ✓ Preliminary Human Health and Ecological Risk Assessments (HHRA and BERA)
- Corrective Measures Study (CMS)
- EPA Selection of Final Remedy
- Corrective Measures
 Implementation



Public

Involvement

Corrective Measures Study (CMS)

- 1. Introduction
- 2. CMS Goals, Objectives and Scope
- 3. Current Conceptual Site Model
- 4. Risk Assessments
- 5. Selection and Evaluation of Corrective Measures Alternatives
- 6. Proposed Final Corrective Measure
- 7. Public Involvement Plan



Introduction

- Regulatory Framework
- Definitions
- Report Organization

"...the primary purpose of a CMS is **to investigate and evaluate potential alternative remedies to protect human health and the environment** from the release or potential release of hazardous waste or hazardous constituents from the Facility and to restore contaminated media to standards acceptable to EPA."



CMS Goals, Objectives, and Scope

- Presented and approved in CMS Work Plan
- Goals
 - Meet First Modification and all other applicable regulatory requirements for RCRA Corrective Action.
 - Analyze potential actions with consideration of known risks to actual or potential receptors .
 - Include in the evaluation potential actions that will create the greatest net environmental benefit and which are compatible with expected future use, considering finite Custodial Trust funds.



CMS Goals, Objectives and Scope

- EPA Objectives
 - Threshold Criteria
 - Protection of human health and the environment
 - Source Control
 - Media Cleanup Standards
 - Balancing Criteria
- Site-specific Remedial Action Objectives
 - Minimize long-term stewardship.
 - Maximize use of sustainable remediation approaches.
 - Allow continued asset recovery from slag pile.
 - Develop alternatives that are consistent with the Custodial Trust's purpose ...and, ultimately, to sell, transfer, facilitate the reuse of, or otherwise dispose of or provide for the long-term stewardship of the properties.





Anticipated Land Use Reflects City of East Helena Zoning







Figure 2-1 Reasonably Anticipated Land Use Former ASARCO East Helena Facility Corrective Measures Study Report East Helena, Montana

Current Conceptual Site Model

- Historic models based on:
 - RFI
 - 2011 Conceptual Site Model
 - Source Area Investigations
 - Information from IM implementation
 - Groundwater monitoring & modeling
 - Supplemental RFI surface soil investigation
- Updated, "post-IM" Conceptual Site Model used for final risk assessments and remedy evaluations









Risk Assessments

- Identify areas where remedial action is required
- Compares sampling results to protective criteria
 - Human Health
 - EPA Maximum Contaminant Levels (MCLs) for groundwater
 - EPA Regional Screening Levels (RSLs) for Soil
 - Ecological
 - Initially used criteria for multiple ecological receptors
 - Used Anaconda lead cleanup level protective of songbirds
- CMS Report updates previous risk assessments with post-IM data



Risk Assessment Evaluations and Results

- Human Health
 - Evaluated exposure to metals to groundwater, soil, sediment, and beef
 - Results
 - IMs addressed direct contact risk
 - Unacceptable risk only from ingestion of groundwater with metals above MCLs(within plume)
- Ecological Receptors
 - Evaluated exposure to metals in soil, water, sediments, plants and biota
 - Results
 - IMs addressed risk for over 400 acreas
 - Lead levels exceeded for song birds on Parcels 2A and 15



The Final Remedy Proposal is Based on Comprehensive Technical Evaluations

- <u>2011-2014</u>: Studies done to evaluate and design the IMs
 - Upper Lake Drawdown Test
 - MVS modeling
 - Stream flow assessments
- <u>2014-2015</u>: Identification and further investigation of key source areas
- <u>2015</u>: Identification and screening of remedial alternatives
- <u>2016</u>: Detailed alternative evaluation and final remedy proposal
- <u>2013-to date</u>: IM performance groundwater monitoring

Predictive Groundwater Modeling



Challenge in East Helena

Remediate a large area of contamination....

- Surface soil contamination across over 2000 acres of former ASARCO properties and surrounding area
- 3.5 million cubic yards (16 million tons) of slag
- Over 2.1 million cubic yards of contaminated soil
- Contaminated groundwater under ~150 acres

...using finite Trust funds



Initial CMS Evaluations

- High concentrations of metals in soil
 - Unacceptable risk from direct contact
 - Contaminating storm water and groundwater
- Groundwater with metals concentrations above MCLs
 - Drinking could be a health risk
 - Contaminated "plume" continuing to spread
- First question Could we remove all contaminated soils and slag?
 - Preliminary evaluations = not feasible
 - Huge volume
 - Huge cost



Next Question – Can We Take Groundwater Out of Soil?

- Preliminary evaluation showed "Pump & Treat" not feasible
 - Lots of wells, lots of water
 - Very expensive, over \$100MM
 - Long-term operating and maintenance required
 - Might not be effective, definitely not sustainable
- Drawdown tests and modeling indicated that draining upper/lower Lakes could result in sustainable drop in GWT
- Relocation of Prickly Pear Creek had additional benefit



Evaluations Focused on Areas Most Affecting Groundwater

- Investigations confirmed primary source areas:
 - Site-wide groundwater
 - West Selenium
 - North Plant
 - Speiss-Dross
- Potential remedial alternatives retained for further evaluation
 - Source removal
 - Permeable Reactive Barrier (PRB)
 - Slurry Wall
 - Focused Pump & Treat



West Selenium:

- Source Removal
- Slurry Wall

Groundwater modeling showed minimal additional environmental benefit

Final Detailed Evaluations with Slag Pile



Detailed Evaluations Weighed Potential Environmental Benefits

- Developed conceptual remedy designs
- Groundwater Fate & Transport model estimated potential benefits
- Remedy costs estimated



Selenium Mass Flux



Notes:

I) See Appendix B for detailed information regarding model operations and predictions

Figure 5-6 Predicted Change in Selenium Mass Flux Across the Facility Boundary Former ASARCO East Helena Facility Corrective Measures Study Report East Helena, Montana

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2) mg/day = milligrams per day;WSA = West Selenium Area.

NewFields

3) Results are from NewFields (2016a).


Selenium Contours in Slag Pile **Simulations**



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Created by



CMS **Evaluated 3** Conceptual Designs For Slag Pile Cover

SOL COVER: UNFUMED MOUND SURFACE AREA REMAINING SOIL COVER AREA 364,000 REQD SOIL VOLUME, 3-FT ET COVER-96,700 CY

ADDITIONAL NOTES 31 TO 3.51 NEAR NORTHEAST CORNER 61 SLOPE ON EAST RAMP 2% - 5% SLOPES FOR DRAINAGE

Figure 6-1

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Slag Pile Grading Plan Former ASARCO East Helena Facility Corrective Measures Study Report East Helena, Montana

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Proposed Final Corrective Measures

Proposed Final Remedy: Engineering Controls		Threshold Criteria			
	Remedy In Place	Protective	Source Controlled	Attain Media Cleanup Standards	
Maintain ET Cover	\checkmark	\checkmark	\checkmark	\checkmark	
South Plant Hydraulic Control	\checkmark	\checkmark	\checkmark	TBD	
Focused Source Removal	\checkmark	\checkmark	\checkmark	\checkmark	
Maintain CAMUs	\checkmark	\checkmark	\checkmark	\checkmark	
Speiss-Dross Slurry Wall	\checkmark	\checkmark	\checkmark	TBD Outside Wall	
Slag Pile Cover		\checkmark	\checkmark	\checkmark	



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Section 6: Proposed Final Corrective Measures

Proposed Final Remedy: Institutional Controls		Threshold Criteria			
	Remedy In Place	Protective	Source Controlled	Attain Media Cleanup Standards	
Private Well Abandonment Program	\checkmark	\checkmark	N/A		
Deed Restrictions	\checkmark	\checkmark	1	N/A	

Institutional Controls Implemented By Others

CGWA	\checkmark	\checkmark	1	N/A
COEH Well Restrictions	\checkmark	\checkmark	N/A	
Soil Ordinance	\checkmark	\checkmark	\checkmark	\checkmark



Proposed Final Remedies Meet Site-specific Remedial Action Objectives

- ✓ Minimize long-term stewardship.
 - No active operations.
 - Natural cover and PPC realignment require less maintenance than man-made materials/technologies.
- ✓ Eliminate the need to manage and treat stormwater.
- ✓ Maximize use of sustainable remediation approaches.
 - Natural systems.
 - > No energy requirements.
 - No emissions.
- ✓ Develop and evaluate alternatives that allow continued asset recovery from slag pile.
 - Design will accommodate future recovery.
 - Cover can be modified in future if market conditions change.



Public Involvement Plan

- Meaningful public involvement is an important part of
- Previous activities
 - Beneficiary meetings
 - Groundwater Technical Working Group
 - Public Town Hall Meetings
- Contact Information
- Future Activities



Next Steps

- EPA consideration of Public Comments
- EPA final approval of CMS Report
- Corrective Measures Implementation (CMI)
 - Prepare CMI Work Plan for EPA review & approval
 - CMI
 - Design & construction of Slag Pile Cover
 - Institutional Controls (land-use restrictions)
 - Operation and Maintenance
 - Long-term Performance Monitoring



QUESTIONS AND PUBLIC COMMENT



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