

Eagle Mine Superfund Site Water Treatment Plant: Challenges and Lessons Learned



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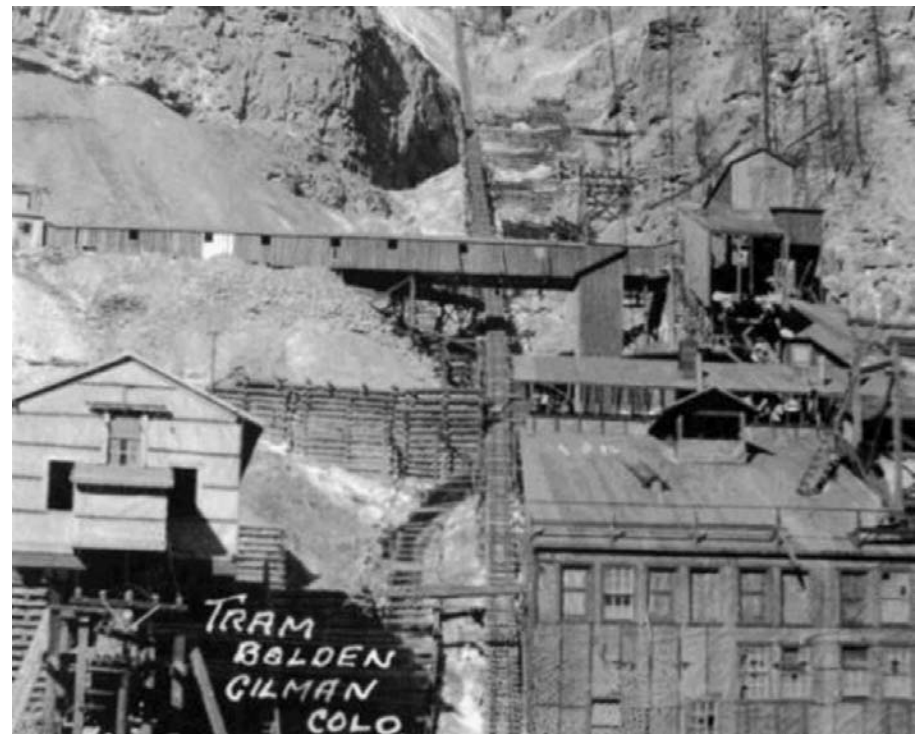
Eagle Mine Superfund Site

- History
- Robust Remedy
- Challenges
- Lessons Learned



1870s - 1984

- Gold and silver mining
- Then lead and zinc mining
- Most mining ends by 1977
- 1983: The mine is sold to Glenn Miller (Battle Mountain Co.). The state of Colorado files a lawsuit against the mine owners and former owners/operators
- 1984: The property is abandoned, the electricity is shut off and the mine workings begin to flood



Regulatory History

- 1983 the State of Colorado filed a "Natural Resource Damage" lawsuit against the former mine operators Gulf+Western
- 1986 site added to the NPL
- 1988 Consent Decree/Remedial Action Plan
- 1990 CD/RAP amended to include construction of WTP
- 1993 – EPA OU1 ROD
- 1996 – USEPA joined State requiring additional clean-up activities
- 1999 – USEPA OU1 ESD
- 2001 Construction Phase Complete
- 2004 – A Developer purchased parts of the Site
- 2009 – Battle North, LLC assumes responsibility for current OU3
- 2017 – USEPA OU1 ROD Amendment
- 2018 – Friendly UAO to PRP
- 2020 – Proposed Consent Decree lodged 9/29/2020

Operable Units

- OU1: Sitewide Surface Water Quality
 - All remedial components targeted at achieving surface water ARARs
 - Ecological risk based
- OU2: Town of Gilman
 - Soils in abandoned town
 - Human health risk based
- OU3: Battle North Redevelopment
 - Soils in Rex Flats, Maloit Park, Old Tailings Pile requiring additional remediation to achieve residential use standards for redevelopment
 - Human health risk based



Roaster Pile #1



**Roaster Pile #1
Prior to Removal
1988**



**Roaster Pile #1
After Restoration
1994**

Roaster Pile #3



**Roaster Pile #3
Before Removal
Circa 1988**



**Roaster Pile #3
After Remediation
1994**

Consolidated Tailings Pile



Maloit Park Wetlands



Water Treatment Plant

- Constructed 1991
- Water is collected from the Eagle Mine, seeps, and groundwater from the consolidated/capped tailings pile
- Conveyed to the Treatment Plant
- Lime Precipitation Process
- On-Site Sludge Disposal
- Currently Operates under a NPDES Permit with the State of CO



Challenges

- Inherited System/Aging Infrastructure
- Dynamic Environment
 - Climate
 - Safety Security
- No Pathway to Walk Away
 - Continuous Water Treatment
 - Continuous Design/Construction
 - Stakeholder Involvement



Water Treatment Plant

- Plant Built in 1991
- Aging Infrastructure
- Deferred Maintenance until Decision to Upgrade Plant
- A lot of “Temporary Fixes” over the years
- Staffing challenges in the Vail Valley
- Have to Comply with Discharge Standards



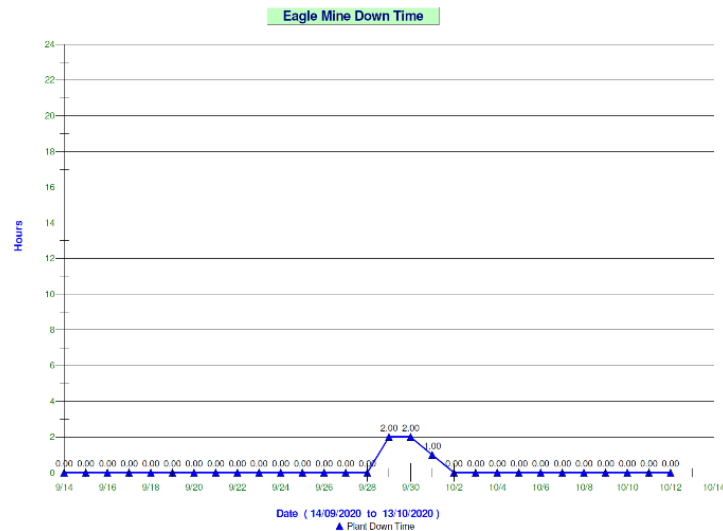
Capital Improvements

- Equalization Pond Liner Replacement
- Outfall Temperature Monitoring
- Acid Room Upgrades
- Influent Pumps VFD Replacement
- New SCADA System
- Upgraded Data Management System
- Lime Silo Remote Level Sensing
- Reaction Tanks Recoating
- Plant Electrical Upgrades



Capital Improvements

- Filter Press Repairs
- Lime Auger motor controls
- Lime Feeder control improvements
- PLC Programming
- Bathroom remodel
- Polymer system upgrade



Dynamic Environmental Conditions

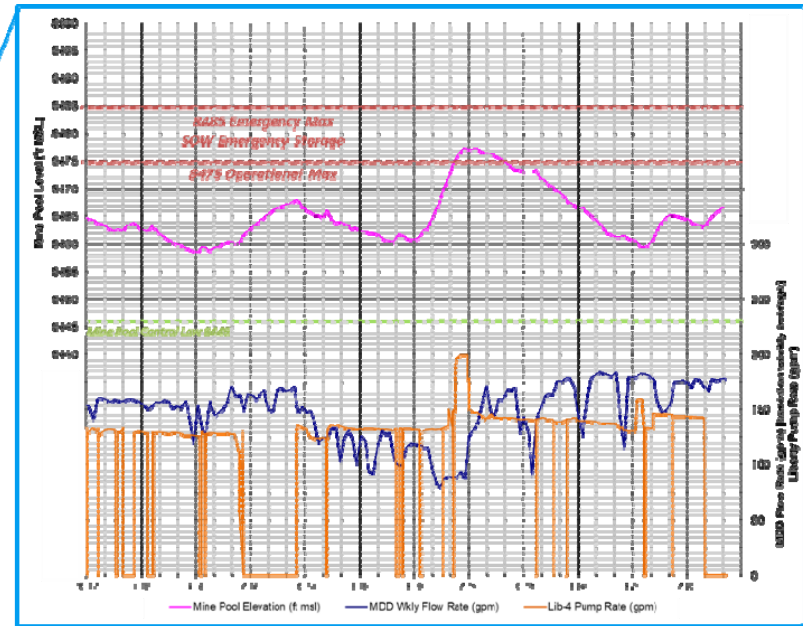
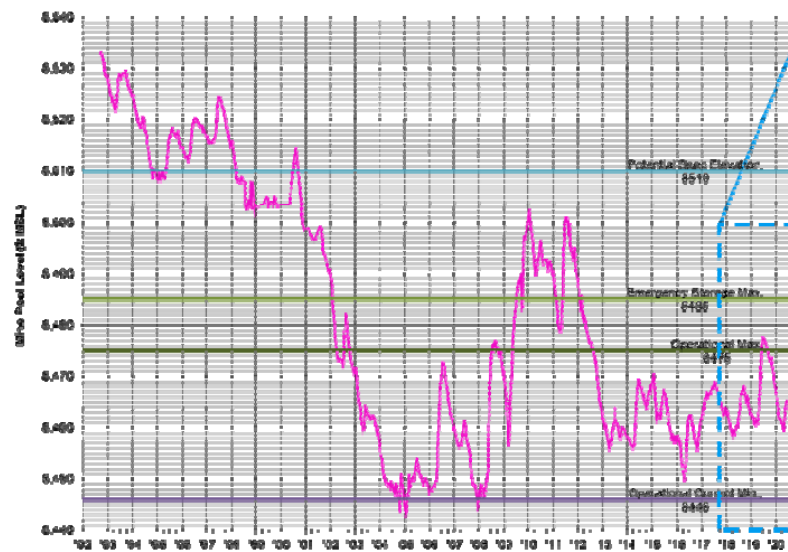


Safety & Security

- Trespassing
- Wildlife
- Harsh Winters
- Remote Monitoring Locations
- Rockfall



Continuous Operations - Mine Pool Elevation



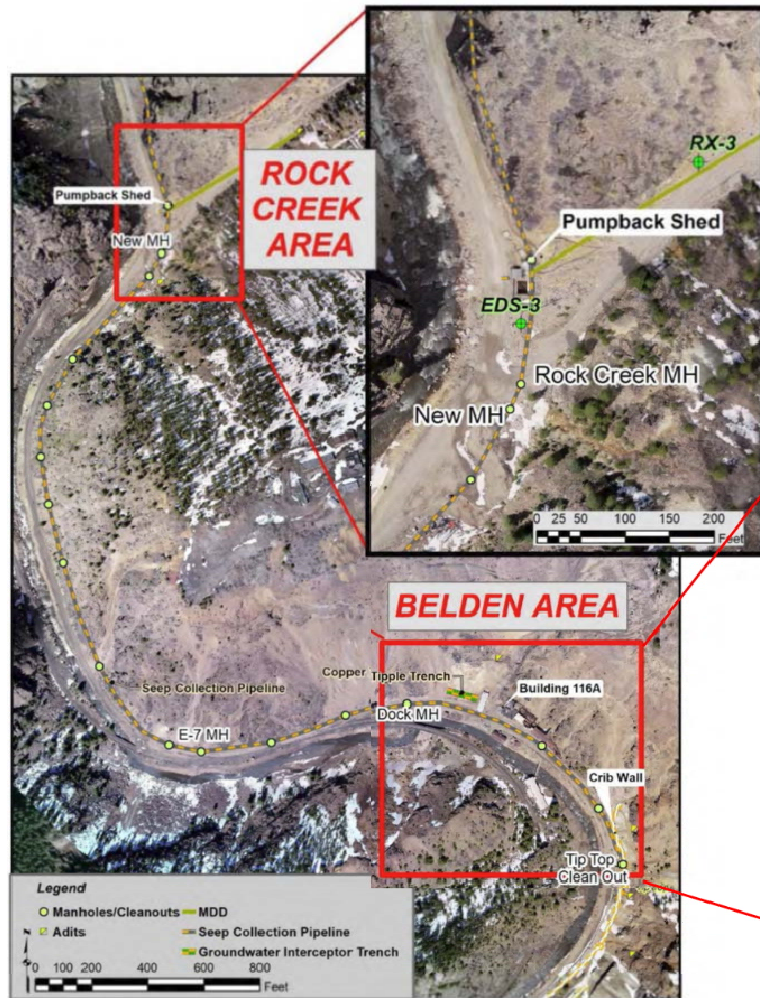
Continuous Design/Construction

Unilateral Administrative Order for RD/RA

- Extend Power 3,500' to Belden Mine
- Install new Pipeline to Belden Mine
- Pump Groundwater at the Mine, Mouth of Rock Creek and from the former Mill during early spring
- Convey pumped water to Treatment Plant
- Monitor for success



UAO Design



Stakeholder Involvement

- Environmental Protection Agency (EPA)
- Colorado Department of Public Health and Environment (CDPHE)
- Eagle River Water and Sanitation District (ERWSD)
- Eagle River Watershed Council (ERWC)
- Riverwatch
- Battle Mountain, LLC
- Other Federal and State Agencies



Stakeholder Engagement

- Monthly Updates to Watershed Council
- Quarterly Stakeholder Meetings
- Release Reporting
- Public Tours
- Middle School Presentations



Lessons Learned

- Be Prepared
 - Preventative Maintenance
 - Critical Spares
 - Trained Crew/Contractors
 - Pandemics do happen
- Be Ingenious
 - New and difficult problems require ingenious solutions
- Be Flexible
 - Adaptability is the Name of the Game



Lesson Learned

- Be Persistent
 - There is No Pathway to Walk Away
 - Plan and Follow Through
- Be Transparent
 - Communication is Critical
 - The Only Way to Build Trust is through Transparency

