Rock Disposal Area Water Treatment at the Jerritt Canyon Mine

Biochemical Reactors (Passive Treatment)

Mark A. Reinsel, Ph.D., P.E. Apex Engineering, PLLC

Presentation Outline

Treatment objectives
 Marlboro Canyon background
 Exploratory excavation
 Trench "rejuvenation"
 Recent developments
 Gracie and Snow Canyon bioreactor designs

Treatment Objectives

- Four RDA sites: Marlboro Canyon, Gracie, Snow Canyon, DASH
- Rejuvenate bioreactor at Marlboro Canyon
 - Construct new bioreactors at Gracie and Snow Canyon
- Reduce sulfate concentrations to 250 mg/L
- Reduce TDS concentrations to 500 mg/L

Original Marlboro Canyon Trench



NOT TO SCALE

Marlboro Canyon Sulfate Concentrations



Marlboro Canyon Work

- 1. Excavate sections of original trench
- Install new water collection system and flow meter
- 3. Select new media mixture
- Replace media in trench, based on findings from excavation
- 5. Monitor water quality in 2014 and beyond

Overview of RDA and Trench



Marlboro Canyon Landscape



Excavation



Excavated Materials



Collection Trench



Collection Trench



Media Mixture

Wood chips: 35% by volume
Sawdust: 35%
Straw: 19%
Limestone: 10%
Manure: 1%

Media Piles



Media and Cover



Media and Sampling Port



Marlboro Canyon 2014 Completion



Design Data

System	[SO₄), mg/L	Flow, gpm	Load, Ibs/day	Trench length, ft
/larlboro Canyon	2,710	5.4	176	1,000
Gracie	8,408	11.5	1,175	2,800
Snow Canyon	4,160	49	2,437	5,800

Recent Developments

Piloting in 2014 was postponed to early 2015
 Financial constraints limited Veris's ability to fund majority of bioreactor projects

- Portions of MC rejuvenation project completed
- More frequent flow and water quality monitoring initiated at all three sites

Lower flow measured at Snow Canyon

Developed O&M manual for Marlboro Canyon

2015 Work

Complete pilot testing: May
Complete MC rejuvenation: July
Construct collection systems and BCRs at Gracie and Snow Canyon: August-Nov.
Evaluate performance at all three sites
Develop long-term maintenance plan

Lessons Learned

Flow appeared to be contained within treatment trench, even above GCL liner
Perform bench testing for optimum media performance

