

Red and Bonita / Gold King Operational Plan – Draft 5/22/2015

Pre-Field Season

1. Water Monitoring Planning

- a. START will plan to sample 4 mines plus Cement Creek at CC-18 (downstream of American Tunnel) before any work begins and after bulkhead installation (as late in the season as practical) and prepare a SAP
- b. START will prepare a request for analysis for submittal to [REDACTED] at EPA and provide estimated sampling/sample delivery dates (early to mid-July and late September?)

2. Water Treatment

a. R&B Pond Expansion

- i. START will prepare a design sketch to guide pond expansion
- ii. START will estimate material requirements for pond liner replacement
- iii. START will estimate soil generation quantities and berm installation soil requirements
- iv. ERRS will order geotextile liner
- v. ERRS will plan pond expansion construction, including removal and disposal of 2014 solids into temporary repository
 1. 15' excavation at north end of ponds
 2. Level base to extent practical (can't go below water table or through bedrock)
 3. Increase height of south and west berms to 6' above base
 4. Increase height of internal berms to 5.5' above base with 5' wide overflow weirs that are only 5' above base at one end of each cell (see plans)
- vi. ERRS will plan for water diversion into the pond, including the ability to direct water to either of the upper 2 cells
 1. Provide a means of reducing the velocity of pond inflow such as diffusers or baffles
 2. Provide headgates as needed to allow flow to traditional flow path when ponds are not in use

b. Water Treatment

- i. START will estimate caustic (25% NaOH) and flocculant requirements
 1. R&B
 2. GK
- ii. START will propose injection equipment
- iii. ERRS and/or START will procure injection equipment? (flocculant feeder/caustic pumps)
- iv. ERRS will procure caustic and flocculant
- v. ERRS will plan to safely secure caustic containers and provide secondary containment for containers, patch kits for any leaks, and overpack
- vi. ERRS will provide the pond discharge equipment (pumps, outlet flotation buoys, support structures)
- vii. ERRS will provide a filter bag/manifold system with at least 3 filter bags

- viii. ERRS will plan for equipment to transport high-liquid-content solids from Cells 2, 3, and 4 to Cell 1 as needed to maintain pond capacity for subsequent solids settling
3. R&B Bulkhead
 - a. ERRS will assign tasking for R&B in-mine solids cleanout work (ERRS or subcontractor)
 - b. ERRS will procure a bulkhead contractor to perform R&B in-mine work
 - i. SOW from DRMS
 - ii. Site walks?
 - iii. Estimated start in early August
 - c. ERRS will plan any R&B portal or road improvements needed to allow bulkhead construction
 - d. In-mine HASP prepared by ERRS, DRMS, and/or subcontractor
 4. Gold King Adit Opening
 - a. ERRS will plan road upgrade/reconstruction and estimate required materials, equipment and personnel
 - b. ERRS will determine which work will be performed by ERRs personnel and which by subcontractor
 - c. ERRS will procure subcontractor to do in-mine work
 - d. ERRS will plan to have equipment and personnel to support portal reconstruction efforts
 - e. ERRS will plan and estimate materials quantities for water conveyance system to R&B ponds for treatment
 - i. ERRS will prepare an aerial photo map showing route
 - ii. Land ownership issues?
 - iii. ERRS will procure piping supplies and plan pipe installation, including layout, assembly, pipe protection/slope security, and system test
 - f. In-mine HASP prepared by ERRS, DRMS, and/or subcontractor

Mobilization

1. ERRS will mobilize personnel, equipment, and materials to the site
 - a. excavation/transport equipment
 - b. road upgrade/reconstruction equipment
 - c. pond construction materials (geotextile liner, hay bales, fasteners, etc.)
 - d. materials to support bulkhead construction (see bulkhead SOW from DRMS)
 - e. water treatment materials (flocculant, caustic, flocculant feeder)
 - f. Support facilities for bulkhead construction
 - g. Portal attendant for bulkhead construction
 - h. Portal improvements?
 - i. Equipment to mobilize solids within R&B tunnel
2. START will mobilize personnel and equipment to the site
 - a. 2-3 people for 2-3 days, 2 people afterward
 - b. START-supplied water treatment equipment , peristaltic pumps)
 - c. pH meter
 - d. Sampling supplies for 30 water samples including quality control, field filtering equipment, Scribe/COC ability, GPS, shipping supplies
 - e. Flow measurement equipment (temporary flumes, level, flow meter)

- f. START needs to sample water prior to any actions that would disturb water quality at R&B or Gold King

Daily Operations

1. ERRS will perform daily H&S meetings and ensure efforts of ERRS, START, and subcontractors are coordinated
2. 8 am start of work unless otherwise notified

Pond Upgrades

1. ERRS will remove 2014 solids from existing ponds (may be in conjunction with liner removal/pond upgrade installation)
2. ERRS will pull back liner material from north end of pond and from south and east berms
3. ERRS will excavate the pond base to 15' north of the current pond base and 2H:1V slopes at the north end and sides of the pond
4. ERRS will build up the outer berms to be 6' above the elevation of the pond base
5. ERRS will install a 5.5' high inter-cell berm at the former north end of the pond system (the newly excavated area will be a new cell)
6. ERRS will build up the inter-cell berms to a level of 5.5' above the pond base with a 5' wide spillway at 5' above the pond base to allow flow to subsequent cell (see plan for location of spillway)
 - a. The existing inter-cell berms may be either 1) reconstructed or 2) left in place, built up with secured hay bales or coir logs or other stable material, and covered with geotextile to achieve the 5.5' inter-pond berm height
7. START will measure elevations of the pond base and berm heights to ensure they are level and the correct dimensions to the extent practical
8. The pond base will not be extended below the water table or through bedrock
9. ERRS will install piping to carry water from where it flows to the base of the waste rock pile under the road to both cells 1 and 2 of the pond system, including headgates, piping, and diffusers/baffles to reduce the velocity of flow into each pond
 - a. 18" pipe is suggested due to potentially high solids content of water
10. ERRS will place water treatment chemicals (NaOH at top of hill, flocculant in level spot at base of hill)
 - a. NaOH totes/drums will be safely secured and surrounded by secondary containment
11. ERRS will provide power for water treatment pumps (NaOH at top of hill, flocculant at bottom of hill, discharge pump in Cell 4)
12. ERRS will provide a tote of clean water??

Solids Removal from R&B Adit

1. Water treatment setup prior to entry
2. Each day, ERRS or the contractor who enters mine will measure air quality (or START to provide air monitoring equipment/personnel?) and ventilation will be provided if needed
3. ERRS will have a fan and generator available if needed to ventilate mine (ventilation bags should still be in place)

- a. Generator should be placed away from mine entrance to reduce potential for drawing fumes into the mine
- 4. ERRS or contractor loosens solids material and directs towards portal
- 5. ERRS person as portal attendant and to watch flow of solids through portal pond
 - a. Stop work when solids back up in portal pond or base of hill
 - b. Possible need for ERRS person to keep water and solids flowing through the portal pond
- 6. START monitors pH and adjusts caustic injection rate
- 7. START monitors Brenflocc addition system and watches flow of solids to pond
- 8. START and ERRS monitor flow of water through treatment ponds
 - a. Ensure water in 4th cell is clear prior to discharge toward Cement Creek
 - b. If water is not clear but ponds are full, direct discharge toward filter bag system
 - c. Monitor discharge toward Cement Creek
 - i. Stop solids generation activities in mine if discharges contain significant quantities of solids

Bulkhead Construction

- 1. ERRS will contract for installation of a cofferdam.
- 2. Subcontractor will perform work in accordance with SOW prepared by DRMS
 - a. Subcontractor will install a concrete piping system to the bulkhead location.
 - b. Subcontractor will prepare the bulkhead location for installation of the bulkhead.
 - c. Subcontractor will build framework for the bulkhead and formwork for concrete pour.
 - d. Subcontractor will pour concrete as a continuous, single pour.
 - e. START or ERRS will arrange for concrete testing and provide test results when available
 - i. Concrete tester will be on-site for workability tests (air entrapment/ slump test)
 - ii. Concrete tester will collect concrete for strength testing cylinders.
 - iii. START will work with the concrete tester to conduct testing in accordance with the plans and specifications.
- 3. ERRS will provide portal attendants
- 4. ERRS will ensure safe access to mine sites

Gold King Water Conveyance System

- 1. ERRS will assemble and protect the water conveyance system
 - a. Pipe layout
 - b. Assembly
 - c. Pipe protection/slope security
- 2. System Test (START and ERRS)
- 3. ERRS will construct the backup water conveyance system
 - a. Add bypass around flume for if needed
 - b.

Gold King Adit Excavation

- 1. ERRS subcontractor will coordinate work
- 2. ERRS personnel available with excavator, soil transport personnel and equipment?

Gold King Rehab (TBD)

Gold King Site Stabilization

1.

Demobilization