CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

INSPECTION REPORT

13 November 2013

DISCHARGER: Walker Mine, Abandoned and Unclaimed Private Property

LOCATION & COUNTY: Plumas County

CONTACT(S): Central Valley Water Board, Jeff Huggins

INSPECTION DATE: 5 November 2013

INSPECTED BY: Jeff Huggins, Water Resources Control Engineer

ACCOMPANIED BY: Vino Jain and Ben Lehman, Central Valley Water Board staff

COMMENTS:
On 5 November 2013, Board staff performed the annual fall inspection of Walker Mine (photo 1) in Plumas County as required by the Walker Mine Operations and Maintenance Procedures (June 1997).

AREAS INSPECTED:

Former Concentrator Plant Foundations:
An inspection of the former concentrator plant area was made as shown in photos 2-11 of the attached photo-log. The formation of copper oxides was observed throughout the area on the concrete ruins and in residual mining waste material in and below the concentrator plant foundations. Copper oxides become soluble in water and pose a threat to water quality by means of flushing during winter rains and snowmelt. In general, little vegetation which might help to control erosion of mining waste was observed on the exposed mining waste within and near the concentrator plant ruins.

1921 to 1927 Period Tailings Facility:
Staff also inspected the former 1920s period tailings area located below the Walker Mine and Mill area (see photos 11-18). A settling pond (photos 13-14) collects runoff from the slope below the former mine and mill area. The pond never completely fills, but it is suspected to indirectly discharge to Dolly Creek via a buried drainage structure or through the fill material. The tailings material shown in photos 15-18 is sparsely vegetated and copper oxides were observed in the drainages shown in photos 15-18.

Portal Area:
The drainage channel between the mine portal and the waste dump was open and flowing at about 0.5 gallons per minute. The portal door (photo 19) at the 700 level adit had been tampered with by vandals which made the door difficult to open, but it was still securely locked upon our arrival.

Ventilation Fan:
Staff rented a portable generator for the ventilation fan, which is needed for the underground inspection. This fan provides fresh air through the ventilation duct all the way to the mine seal. Underground ventilation is needed to provide a flow of air to the underground workings of sufficient volume to dilute and remove noxious gases and provide fresh air for staff. The ventilation system was

allowed to run for approximately 1.5-hours before entry was made into the 700 level adit. This arrangement results in fresh air continually being pushed towards the mine seal and perceptible airflow into the inspectors face as you advance into the 700 level adit.

Seal Pressure:
The first task of the inspection was to download the mine seal pressure data from the Telog data recorder (photos 20-21) located 180 feet into the 10-foot diameter corrugated metal pipe section of the adit. The Telog data recorder is connected via a 2,500-foot long electronic cable to a Druck pressure transmitter at the mine seal. Three times per day the data recorder measures (and then averages the daily measurement) and stores an electronic current measurement (mAmps) from the Druck pressure transmitter. This data is converted mathematically by Board staff to feet of head on the mine seal[1]. When downloading the data logger, staff discovered that from August 19th to August 21st, electronic current measurement from the pressure transmitter fell from 6.92 to 4 mAmps, which likely represents a failure of the pressure transmitter. The data also indicated that a maximum head of 141-feet occurred on the mine seal during the period of June 4th through June 14th, 2013.

Corrugated Metal Pipe:
The drainage channel inside the corrugated section of the mine tunnel was working effectively and was not obstructed. No corrosion, significant seepage, deflection, or physical damage was observed in the corrugated metal pipe section of the 700 level adit.

Timbered Section:
The timbered section of the 700 level adit was open and clear. The conditions in this section were wet and the liquid appear to be from the infiltration of shallow groundwater from the hillside directly above the timber supported section (first 900 feet) of the 700 level adit. No major support problems were observed. However, a number of the timber sets, lagging, and blocking are showing signs of significant decay and need to be replaced.

Unsupported Section:
No scaling was necessary in the unsupported section of the 700 level and no signs of recent rockfall were noted. Water seepage observed in the unsupported section of the adit was minimal; however a small pool of water was noted for the first time on the left-hand side of the adit near the 1600 foot station (photo 22).

Mine Seal, Piping and Valves
Conditions at the mine seal are shown in photos 24-28. The pressure gauge read nearly 50 psi, which indicates a head of approximately 115 feet over the mine seal. Water seepage from around the mine seal and pooled water conditions at the base of the mine seal appeared to be unchanged since July of 2010. Seepage appears to come from the crown of the seal and along both sides. Iron precipitate is evident on the face of the mine seal (photo 24) but does not appear to be significantly different than that shown in the *Walker Mine Seal Testing and Evaluation Report* (GEI Consultants, 1 March 2002). The piping and valves were uncovered (photo 26) and inspected. No seepage or significant changes in corrosion were noted. The valves were not tested due to concern that they may not close completely if opened. Samples of the water pooled at the base of the seal (monitoring location #30) were collected for laboratory analysis. Staff then exited the 700 level adit and securely locked the portal door.

[1] (Note: The Druck pressure sensor is scaled to transmit 4 to 20 mAmps which equates to 0 to 300 feet of head).

Central Ore-Body Subsidence Area:
Inspection of the Central ore body area was made later in the afternoon (see photos 28-34). The primary mining related features in this area consist of the subsidence areas caused by sublevel mining below the Central ore body, several small mining waste piles, and a ventilation shaft located near the top of the hill north of the Central ore body. The subsidence areas act as a natural funnel to transmit precipitation to the underground workings, which in turn increases the hydrostatic pressure on the mine seal, which was installed to stop the discharge of acid mine drainage from the Walker Mine. Staff also inspected the concrete lined diversion ditches, constructed on behalf of the Central Valley Water Board in the early 2000's, which are intended to reduce the amount of surface water runoff during snowmelt periods to the subsidence areas. The diversion ditches were relatively clean of debris, but contained no water at the time of our inspection.

In a brief examination of the mining waste piles located near the Central ore body location, some copper oxide formation was observed as shown in photos 32-33. As noted above, copper oxides become soluble in water and pose a threat to water quality by means of flushing during winter rains and snowmelt. Finally, we located an open ventilation shaft near the top of the hill north of the Central ore body. The ventilation shaft appears to drop approximately 50 vertical feet before dipping at an angle of about 30 degrees to the east to some unknown depth. Coordinates for the shaft were recorded and will be mapped for future reference. The open shaft is an obvious safety hazard and should be closed so that it no longer poses a physical hazard.

Walker Mine Tailings Facility:
Board staff also inspected and obtained water samples from in and around the Walker Mine tailings facility (see photos 35-39) located on adjacent public lands administered by the United States Department of Agriculture Forest Service (USFS). Copper oxides continue to be observed on large boulders (photo 36) just above the Dolly Creek diversion head-works located just east of the Walker Mine tailings. The tailings, shown in photos 37-39, are sparsely vegetated and wind-blown erosion of the tailings continues pose a threat to water quality.

Water Quality Monitoring:
Surface water samples were collected from Dolly, Little Grizzly, Nye, and Ward Creeks. Most of the sample locations had sufficient surface water to sample. Laboratory results are pending.

SUMMARY:

A semiannual inspection was made of the Walker Mine site. Surface water sampling was performed and water pressure measurements on the mine seal were obtained. The pressure transmitter for the Walker Mine seal appears to have failed on or about August 19th and a new pressure transmitter needs to be purchased and installed during the spring 2014 inspection.

RECOMMENDATIONS:

An experience underground mine contractor should be hired to inspect the timbered section and the unsupported section of the 700 level adit for signs of ground support deterioration. Furthermore, while the stainless steel piping and valves need to be inspected and physically tested to ensure their operability in accordance with the Board's Operations and Maintenance Plan for the Walker Mine, there is some potential risk that the valves cannot be completely closed after being opened.

JEFF HUGGINS
Water Resources Control Engineer

Photo 1. Walker Mine.


Photo 2. Concentrator plant location. Mining waste is evident in and below the concentrator plant foundations.


Photo 3. Concentrator plant foundations. Formation of copper oxides can be seen in numerous locations within the concrete foundations.


Photo 4. Upper concentrator plant foundations showing formation of copper oxides on the concrete foundations.


Photo 5. Closeup view of the previous photo.


Photo 6. Residual mill tailings containing copper oxides within the mill foundations.

Photo 7. Closeup view of the previous photo showing fine grained mill tailings.

Photo 10. Close-up view of previous photo. Note the absence of vegetative growth in the mining waste.

Photo 8. Showing drainage pathway from the concentrator foundations to the tailings area located below the concentrator foundations.

Photo 11. Looking from the concentrator foundations to the 1921 to 1927 period tailings pond

Photo 9. Mining waste located below the Concentrator foundations.

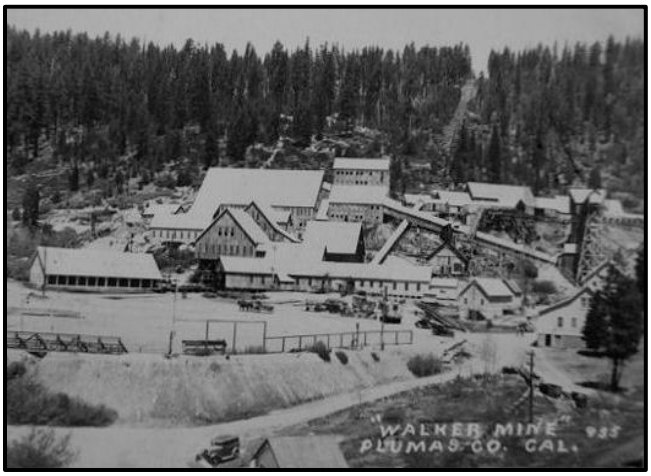

Photo 12. 1920s period tailings impoundment being used as a baseball field in the 1930s.

Photo 13. Settling pond located below the Walker Mine mill location. Settling pond likely discharges to Dolly Creek.

Photo 14. Looking northeast at mining waste piles located below the Walker Mine portal. Runoff from the mining waste piles flows to Dolly Creek.

Photo 15. Looking southeast down gradient towards Dolly Creek. Drainage channel has cut into tailings material from the 1921 to 1927 period tailings pond.

Photo 16. Looking up gradient and east at feeder channel to the drainage channel in previous photo. Drainage channel is cut into fine grained tailings material.

Photo 17. Close-up view of tailings material in feeder channel shown in the previous photo.

Photo 18. Copper oxides are shown (blue-green material) in the fine grained tailings material.

Photo 19. Walker Mine 700 level access adit.

Photo 20. Four 12 volt deep cycle batteries provide power for the Druck pressure transmitter. Telog data logger collects, processes, and stores data.

Photo 21. Telog data recorder shown at right of previous photo. Located near the 700 level portal.

Photo 22. Small pool of water noted for the first time near the 1600 foot station.

Photo 23. Copper oxide on the floor of the 700 level adit next to the ventilation ducting. Location of the photo is about 2000-feet inside the 700 level adit.

Photo 24. Walker Mine concrete seal located 1650-feet inside the 700 level adit.

Photo 25. Covered 4-inch stainless steel valve.

Photo 26. One of the two stainless steel 4-inch valves and pressure gauge at the mine seal.

Photo 27. Pressure gauge showing 50 psi. This equates to 115 feet of head over the mine seal.

Photo 28. Pressure transmitter sensor termination enclosure located near the mine seal.


Photo 28. Central ore body location. Mining waste pile shown in the center of the photo. Subsidence area to the left of the waste pile. Runoff from the waste pile drains to the South Branch of Ward Creek.

Photo 29. One of several subsidence areas in the vicinity of the Central ore body. Subsidence areas resulted from sublevel mining activities (see below).

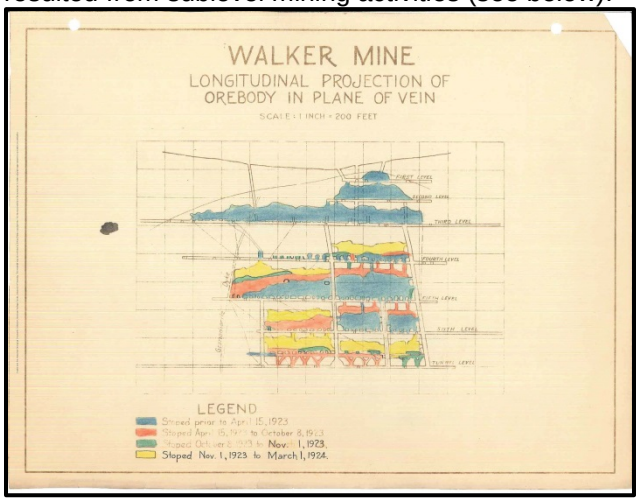

Photo 30. Central ore body, Paul Billingsley, Walker Mine Report March 7, 1924.

Photo 31. Mining waste pile located above the Central ore body location. Waste pile is graded and level and used as building site for mining activities.

Photo 32. Copper oxide formation on the surface of waste rock at the Central ore body location.

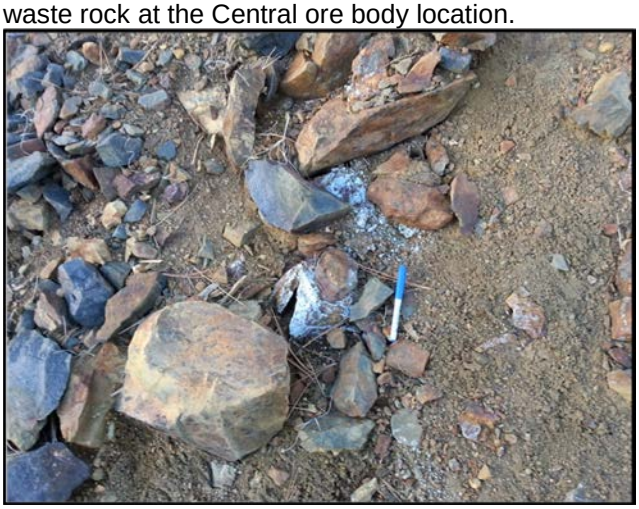

Photo 33. Another example of copper oxide forming on the surface of waste rock at the Central ore body location.

Photo 34. Open ventilation shaft located on the hillside above the Central ore body location.

Photo 35. Dolly Creek diversion head-works located above the Walker Mine tailings facility.

Photo 36. Close-up view of prior photo. Copper oxide can be seen on the large boulders in the center of the photo.

Photo 37. Walker Mine Tailings facility showing scarcity of vegetation to control erosion of the tailings.

Photo 38. Showing wind fences erected as a wind erosion control measure over a portion of the Walker Mine Tailings facility.

Photo 39. Walker Mine Tailings settling pond. No drainage path to the settling pond was observed which would indicate that the water shown is the saturation level in the tailings.