

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2012-0010-01

WASTE DISCHARGE REQUIREMENTS
FOR
HOMESTAKE MINING COMPANY OF CALIFORNIA

FOR
CLOSURE AND POST-CLOSURE MAINTENANCE OF
McLAUGHLIN MINE
LAKE, NAPA AND YOLO COUNTIES

The Central Valley Regional Water Quality Control Board (“Central Valley Water Board” or “Board”) finds that:

1. Homestake Mining Company of California (hereafter “Discharger”) owns and operates McLaughlin Mine, a former gold mine (the “Facility”). The Facility was previously regulated by Waste Discharge Requirements (“WDRs”) Order R5-01-168 in conformance with Mining Waste Management Regulations found in California Code of Regulations, title 27 (“Title 27”). The Discharger submitted a Report of Waste Discharge on 9 March 2011 requesting revised WDRs for Closure and post-Closure Maintenance.
2. The Facility is now part of the Donald and Sylvia McLaughlin Natural Reserve (the “Reserve”), a relatively contiguous block of 6,430 acres. The Reserve is owned jointly by the Discharger and the University of California, Davis. The Discharger will continue to own and be responsible for the approximately 1,200 acres disturbed by mining within the Reserve. UC Davis is responsible for managing the remaining portion of the Reserve.
3. The mine site is located at the junction of Lake, Napa and Yolo Counties, as shown on Attachment A, a part of this Order. Waste rock and mill tailings waste containment facilities including the former mine pits are located in Sections 20, 29, 35 and 36 T12N, R5W; Sections 1, 2, 11 and 12 T11N, R5W; and Section 6 T11N, R6W.
4. Active mining and milling of ore ceased in 2002. Most of the mine infrastructure has been removed and the surrounding surface areas graded to approximate a natural surface, re-soiled and planted with native vegetation. The former office and shop complex near the Tailings Impoundment Facility (“TIF”) remains intact for use by the Homestake closure/site maintenance and UC Davis staffs. These WDRs address the Closure and post-Closure Maintenance of the following mine waste containment facilities: North and South mine pits (“MPs”), East and West Waste Rock Facilities (“WRFs”), and the TIF, as shown in Attachments B and C, a part of this Order. Table I summarizes the waste containment units:

TABLE I
Mine Waste Containment Unit Description

Unit	Title 27 Class	Volume	Description of Liner and Cover Components	Status
East Waste Rock Facility	Group B	13 Million Tons (MT) of waste rock on 62 acres	5-feet of non-acid forming clayey waste on prepared sub-grade and spine drains. Leachate is pumped to South MP. The final cover consists of ten to fifteen-feet of clay overlain by five to ten-feet of vegetated soil cover.	Filled and closed.
West Waste Rock Facility	Group B	80 MT of waste rock on 350 acres	5-feet of non-acid forming clayey waste on prepared sub-grade and spine drains. Leachate is pumped to South MP. The final cover consists of ten to fifteen-feet of clay overlain by five to ten-feet of vegetated soil cover.	Filled and closed.
North Mine Pit	Group B	14.6 MT including 4.6 MT tons in the WRF, 5.4 MT below 1700 ft and 4.6 MT as fill.	Unlined, base of waste is below the water table, any leachate is contained within the mine pit lake. The WRF final waste rock cover consists of fifteen-feet of non-acid generating clay overlain by five-feet of vegetated soil cover. Waste rock used as fill is not covered.	Filled and closed.
South Mine Pit	Group B	7 MT, including 3.3 MT in the WRF, 3.5 MT in below 1700 ft and 0.2 MT as fill	Unlined, base of waste is below the water table, any leachate is contained within the mine pit lake. The South MP WRF final waste rock cover consists of fifteen-feet of non-acid generating clay overlain by five-feet of vegetated soil cover. Waste rock used as fill is not covered.	Filled and closed.
Tailings Impoundment Facility	Group B	38 Million tons of mill tailings on 400 acres.	Unlined, 155 foot high clay cored impoundment dam keyed into bedrock, drainage blanket downstream of dam core. Cover shall consist of 320 acres with 1 to 2 feet of soil and a fluctuating pond up to 80 acres.	Filled and closing.

5. Davis Creek Reservoir, a flood control reservoir constructed and used by the mine operation also remains. The reservoir is not a waste containment unit and therefore, is not addressed by these WDRs.

WASTE AND SITE CLASSIFICATION

6. The Discharger discharged mine waste rock to the MPs and the WRFs, and discharged mill tailings to the TIF. On 6 May 1996, the Board issued Order 94-315, in which tailings waste from the mill and waste rock from the mine were classified as Group B mining wastes as currently defined in Section 22480(b)(2)(B) of Title 27. The waste rock and tailings contain non-hazardous concentrations of soluble pollutants including: TDS, sulfate, sodium, arsenic, nickel, boron, copper and zinc. The concentrations of these soluble pollutants exceed water quality objectives and could cause degradation of waters of the state. These WDRs continue that classification.
7. The Discharger filed an application with the California Department of Health Services ("DHS") to determine whether the tailings were or were not hazardous waste. On 27 March 1984, DHS classified the waste tailings as non-hazardous waste.
8. Leachate is collected at the base of the WRFs and pumped to the MPs for disposal. WRF leachate contains concentrations greater than background of TDS, sulfate, arsenic, copper, iron, nickel and zinc. The concentrations of these soluble pollutants exceed water quality objectives and could cause pollution of waters of the state. These WDRs classify the WRF leachate a Group B mining waste.
9. The North and South MPs are filling with inflowing groundwater, storm water and leachate from the WRFs. Besides the leachate constituents from the WRF leachate described in Finding 8, the pit water leaches soluble constituents (metals and salts) from mine wall rocks and waste rock stored in the pits.
10. The North and South MPs, the East and West WRFs and the TIF were constructed without liners and Leachate Collection and Removal Systems ("LCRSs"). Section 22470(c) of Title 27 provides that the Central Valley Water Board may grant exemptions from the requirements to construct liners and LCRSs at mining waste management units if a mining waste management unit meets specific criteria. Section 22470(c) states in part:

“(c) Exemptions Based On No/Little/Poor G.W. -The RWQCB can exempt a Group A or B (see s22480 of this article) Mining Unit from certain provisions of this article if a comprehensive hydrogeologic investigation demonstrates that:

- (1) there are only very minor amounts of groundwater underlying the area; or*
- (2) the discharge is in compliance with the applicable water quality control plan; and*
- (3) either natural conditions or containment structures will prevent lateral hydraulic interconnection with natural geologic materials containing ground water suitable for agricultural, domestic, or municipal beneficial uses. There is no detectable vertical hydraulic interconnection*

between the natural geologic materials underlying the Unit and natural geologic materials containing such ground water. If the above demonstration is acceptable to the RWQCB, the discharger can be exempted from requirements for liners and leachate collection and removal systems (see §22490 of this article). However, the discharger shall comply with the requirements of this article relative to siting, precipitation and drainage controls, and surface water quality monitoring. Closure and post-closure maintenance periods shall be designed to protect surface water quality. Ground water monitoring, and unsaturated zone monitoring as feasible, shall be conducted during the active life, closure, and post-closure maintenance period to verify that the Unit is not affecting ground water suitable for agricultural, domestic, or municipal beneficial uses.”

The Board previously granted exemptions for the MPs, for the East and West WRFs, and for the TIF from the requirements for liners and LCRSs under California Code of Regulations, title 23, chapter 15, section 2570(c). Chapter 15 was the predecessor to Title 27; Section 22470(c) contains identical language.

11. The mine pits are located in the inactive Stony Creek fault zone, a part of the Northern Coast Range Geologic Province. Principal rock types include Jurassic ophiolite structurally overlain by Jurassic/Cretaceous marine sedimentary rocks. The limited groundwater in the region is controlled by fracture flow. Measured hydraulic conductivity in wells screened below 70 feet at the TIF averages approximately 2×10^{-7} cm/sec.
12. The nearest known potentially active fault is approximately 2.5 miles east of the tailings disposal facility and approximately 0.5 miles west of the West WRFs. The maximum credible acceleration for the TIF is 0.7g.
13. Land uses within 1,000 feet of the facility are habitat reserve, recreation, research and stock grazing.
14. The facility receives an average of 33.5 inches of precipitation per year as measured at the TIF. The mean pan evaporation is 48 inches per year as estimated from measurements at the Lake Berryessa and Clear Lake Stations.
15. The 100-year, 24-hour precipitation event is estimated to be 7.67 inches, based on Department of Water Resources' bulletin entitled *Rainfall Depth-Duration-Frequency for California*, revised November 1982, updated August 1986.
16. The WRFs and the MPs are not within a 100-year flood plain based on calculations presented in a private report entitled: "McLaughlin Project-Proposed Gold Mine and Mineral Extraction: Environmental Report," 1982. The TIF is located within a small broad valley, tributary to Hunting Creek. The TIF is protected from flood damage with a storm water interception ditch system designed to handle the 1000-year, 24-hour flood event.

SURFACE AND GROUND WATER CONDITIONS

17. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised September 2009 (the "Basin Plan"), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. The designated beneficial uses of groundwater beneath the facility are municipal and domestic supply, agricultural supply, industrial service supply and industrial process supply. The mine is located in mountainous terrain, the MPs straddle the crest of a ridge, the WRFs are located on the western slopes and the TIF occupies a small drainage five miles to the northwest. Surface drainage from the TIF, the WRFs and western parts of the MPs is to the west toward Hunting Creek in the Upper Putah Creek Hydrologic Area (512.30). Hunting Creek drains south to Putah Creek and Lake Berryessa. Surface drainage from areas east of the mine pits is toward Davis Creek in the Rumsey Hydrologic Area (513.31). Davis Creek drains to Cache Creek below Clear Lake. All surface drainage is in the Sacramento River Basin.
18. Shallow groundwater occurs in alluvial deposits, volcanics and other fractured surficial deposits. At depth little groundwater is present with localized pockets of relatively high permeability material surrounded by impermeable material. Groundwater levels in near surface units generally follow the topography with recharge occurring along topographic highs and discharge occurring within stream valleys. Groundwater elevations range from 1140 feet MSL to 2280 feet MSL. Shallow groundwater is unconfined, and deep groundwater is highly confined. Depth to shallow groundwater may fluctuate seasonally as much as 25 feet.
19. Groundwater flow is controlled by the fracture system and otherwise generally conforms to local topography. Groundwater flow directions and gradients are highly variable.
20. The Discharger determined through a comprehensive hydrogeologic investigation that there are only very minor amounts of groundwater and the chemical quality of ground and surface waters in the immediate vicinity of the MPs, East and West WRFs, and the TIF is generally poor. Little ground water has been found underlying the waste rock and tailings areas due to the low permeability of the bedrock. In the mine pit area, a deeper aquifer occurs primarily in fractured basalt dikes which are limited to the immediate vicinity of the mine pit. This deep aquifer is of poor quality due to its geothermal nature. In this aquifer, TDS ranges from 1,000 to 5,000 mg/l. Sulfate averages about 400 mg/l and chloride ranges from 20 to 1,600 mg/l. Boron averages about 100 mg/l near the south end of the mine pit and about 3 mg/l near the north end.
21. There is one groundwater well used to supply the sanitary system. The local groundwater is not suitable for drinking water supply. There are no other active municipal, domestic, industrial, and/or agricultural groundwater supply wells within one mile of the site. There are no residences within 1000 feet of the facility.

GROUNDWATER, UNSATURATED ZONE, AND SURFACE WATER MONITORING

22. The groundwater monitoring system includes eleven monitoring wells: for the mine pit area S-01 and S-02B; for the waste rock facilities S-05 and S-06; and for the tailings impoundment facility N-1, N-2A, N-5, N-8A N-8B, N-8C and N-12.
23. The Discharger's detection monitoring program for groundwater at the Unit(s) satisfies the requirements contained in Title 27.
24. Water quality in surface water bodies draining the mine area is sampled at the following locations: HC-09, HC-10, and KC-03. Springs or seeps down gradient of the mine area are sampled at the following locations: 1420BS, 1550KS, 1560KS, 1600 SEEP, 1400KA (adit), 1550KA (adit), 1680DS, and 1590DS.
25. The Discharger's detection monitoring program for surface water satisfies the requirements contained in Title 27.

DESIGN OF WASTE MANAGEMENT UNIT(S)

26. Title 27, section 22510(j) requires that: *"new and existing Group A and B waste piles shall be closed in accordance with the provisions of Section 21090(a-c)"*. Section 21090(a-c) specifies the Closure and Post-Closure Maintenance Requirements of Solid Waste Landfills.
27. Title 27, section 20080(b) allows the Board to consider approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27, section 20080(c)(1) and (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27, section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. In connection with these provisions, the Discharger must demonstrate that the proposed engineered alternative cover system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27, section 20080(b)(2).

East and West Waste Rock Facilities

28. The Discharger constructed the East and West WRFs to contain waste rock generated by mining. The West WRF contains approximately 80-million tons of waste rock on 350 acres. The East WRF contains approximately 13-million tons of waste rock on 62 acres.
29. McLaughlin Mine Waste consists of both acid forming and non-acid forming rock types. The Discharger has minimized the potential for production of acid mining drainage ("AMD") by encapsulating acid forming waste within non-acid forming waste.
30. The waste rock cells at the East and West WRFs were constructed by clearing and grubbing an area; constructing a base layer of not less than five feet of non-acid forming clayey waste; and placing acid-forming waste rock in 50-foot lifts. Between lifts, acid-forming waste layers

are separated by compacted (haul truck wheel rolled) clayey non-acid producing waste layers not less than five feet thick. Outer surfaces are covered with a minimum of twenty feet of final cover consisting of not less than ten feet and in most cases fifteen feet of low permeability clay overlain by five to ten feet of vegetated soil.

31. Overall slopes ratios are 3 horizontal (h):1 vertical (v) (bench faces are 2.5(h):1(v)) with 150 foot wide benches at 100-foot vertical intervals. The waste rock disposal facilities are designed to withstand the seismic loads resulting from the Maximum Probable Earthquake (Title 27, Section 20370(a)).
32. Rock under-drains were constructed at low points in the original topography and at known natural seeps. The under drain system collects leachate and spring water and the system discharges to sumps for pump-back to the South MP Lake. This system prevents leachate discharge to Hunting Creek. Collection sumps S-11 and S-12 are located at the West WRF; collection sump S-13 is located at East WRF. This collection and pump back system will need to be operated as long as leachate is generated from the East and West WRFs.
33. Collection sump S-11 collects leachate in a 150,500 gallon tank with secondary containment capacity of 205,150 gallons and a pump-back capacity of 600 gpm. Sump S-12 has a 66,100 gallon tank with a secondary containment capacity of 88,880 gallons and a pump capacity of 680 gpm. S-13 has a 40,000 gallon tank and a pump capacity of 750 gpm.
34. The East and West WRFs have recurring small scale slope failures and erosion problems associated with heavy rain events, apparently due to constructed methods and the fine grained nature of cover soils. This will require periodic maintenance. The maintenance of the waste rock facilities will require regular monitoring and upkeep of the slope.
35. Closure of the East and West WRFs was not pre-approved as an engineered alternative by the Board. Subsequently, in compliance with the requirements of WDRs Order No. 5-01-168, the Discharger submitted a report (August 2002) assessing the permeability of the waste rock covers. Based on testing of the in-place covers, the report concluded that cover thickness exceeded and hydraulic conductivity is equivalent or lower than the Title 27 prescriptive standard cover for a Group B mining waste.
36. Cover slopes have a maximum slope ratio of 2.5(h):1(v) and passed seismic stability analysis in compliance with Title 27, sections 21090(a) and 21750(f)(5). However, the distances between benches, 100 vertical feet, exceeds the prescriptive standard 50 vertical feet. Title 27, section 21090(a) states: *"the RWQCB can allow any alternative final cover design that it finds will continue to isolate the waste in the Unit from precipitation and irrigation waters at least as well as would a final cover built in accordance with applicable prescriptive standards"*. Therefore, because the Discharger's analysis concludes that continued maintenance of the final covers at East and West WRFs will isolate the wastes from precipitation at least as well as a prescriptive cover, these units meet the requirements for an engineered alternative to the final cover requirements of Title 27, section 21090(a).

North and South Mine Pits

37. The McLaughlin Mine excavated gold ore from two adjacent open mine pits, the South Pit and the North MP. The South MP and North MP were mined to floor elevations of approximately 1270 feet above mean sea level ("MSL") and 1480 feet MSL respectively. The South MP Lake and North MP Lake have approximate surface footprints of 52 acres and 12 acres respectively. Pit high walls remain as they were originally excavated, the geologic strong east highwall averages 45 degree slopes, the weaker west highwall was constructed with a flatter slope averaging 25 degrees. The mine pit walls will weather over time and may undergo mass wasting. Any effects of mass wasting will be contained within the MPs.
38. Subsequent to active mining, dewatering wells were removed and the mine pits filled with water forming the North MP and South MP Lakes. The pre-mining groundwater elevation in the area of the mine pits was approximately 1800 feet MSL. Without active management, static water level in the mine pits would presumably return to the pre-mining static groundwater level.
39. The Discharger submitted the following reports concerning water balance and water level management of the mine pit lakes: "McLaughlin Mine Pit Lake Water Balance and Water Quality Work Plan" 2006, "Update to the Pit Water Management Plan" 2008 and "Evaluation of North Pit Water Level and Discharge Conditions" 2010. These WDRs are based on information in the three reports and on supporting information submitted in response to staff inquiries.
40. Storm water is diverted away from the mine pits by a system of drainage channels. The storm water control system is designed to convey runoff from a 100-year, 24-hour storm event. Water flows reporting to the mine pit lakes include direct precipitation, pit wall runoff, groundwater inflow and leachate pumped to the South MP, from the East and West WRFs.
41. Water quality in the mine pits is generally poor. The September 2010 sampling event detected the following concentrations: TDS – 10,000 mg/L, Sulfate – 9200 mg/L, Zinc – 2200 ug/L and Nickel – 17,000 ug/L. The South MP has higher concentrations of copper, chloride, lead and manganese than the North MP. The North MP has stronger vertical stratification with very low oxygen concentrations at depth, lower pH and warmer temperatures. These differences suggest that North MP chemistry may be influenced by interaction with geothermal springs at depth.
42. The mine pits are connected to local groundwater flow and act as local groundwater sinks. If water levels in the mine pits are maintained below local static groundwater elevation, pit water likely will not discharge to groundwater. The Discharger will manage water levels to maintain the pits as hydraulic sinks. This maintenance of pit water level will likely continue for a significant period of time.
43. There is a potential for surface water discharge through the northwest side of North MP Lake. The bedrock low point occurs on the northwest of perimeter of North MP. The bedrock low point is penetrated by an abandoned culvert with a trench bottom elevation of approximately 1718 feet MSL. Therefore, under current conditions if the pit lake water elevations exceed

1718 feet for a sustained period of time, a surface water discharge could occur. The Discharger has sealed the culvert and proposes to construct a cut-off trench that will raise the current North MP bedrock lip (pit low point) from its approximate current elevation of 1718 feet MSL to an elevation of 1730 feet MSL.

44. The mine pit lakes are very large and there is a potential for a large scale discharge event that may be impossible to contain without providing substantial available capacity. Therefore, these WDRs require the Discharger to maintain ten-feet of freeboard in the North MP. These WDRs require North MP Lake water levels shall not exceed elevation 1708 feet MSL. If the Discharger demonstrates that the proposed cutoff trench and sealed culvert will not leak under prolonged saturation, staff may propose an amendment to the WDRs to revise the maximum mine pit water level.
45. The Discharger uses enhanced evaporation to control lake levels in North MP, which causes the South MP lake levels to be higher. The low point that divides the two mine pits is at an elevation of 1730 feet MSL. If the South Pit Lake water level exceeds 1730 feet MSL, it potentially could flood the North Pit Lake and result in a surface water discharge. Therefore, these WDRs require that the South MP Lake levels shall not exceed 1726 feet MSL to prevent any overflow of pit water from the South MP to the North MP.

Waste Rock Units in the Mine Pits

46. Mine waste rock was placed in the North and South MPs in engineered containment units and as fill in the construction of ramps and other structures. The North MP contains approximately 14.6 MT and the South MP contains approximately 7 MT of waste rock. Backfill slopes are 2.5(h):1(v) or less.
47. Previous Board-issued Orders classified McLaughlin Mine waste rock as Group B mining waste (Finding No. 6) and exempted the MPs from requirements for liners and LCRSs (Finding No. 10).
48. McLaughlin Mine waste rock consists of both acid forming and non-acid forming types. Below elevation 1700 feet MSL, acid forming and non-acid forming wastes were emplaced randomly because they will remain underwater and will not be exposed to oxidation that produces Acid Mine Drainage (AMD). Above 1700 feet MSL, the Discharger protected against AMD by encapsulating acid forming waste within non-acid forming waste. The encapsulation process consists of placing fifty-foot thick lifts of acid forming waste separated by five foot thick layers of compacted non-acid forming clayey waste. The waste cells were covered with a twenty foot thick final cover composed of not less than fifteen feet of non-acid generating clay overlain by five feet of soil. In the North MP 5.4 MT were placed below 1700 feet, 4.6 MT were encapsulated above 1700 feet and 4.6 MT of non-acid generating waste were used to construct mining related structures; in South MP 3.5 MT were placed below 1700 feet, 3.3 MT were encapsulated above 1700 feet and 0.2 MT non-acid generating waste were used to construct mining related structures.

49. Under-drains were not installed for the mine pit back fills, waste cells are located so that leachate drains into and is contained by the pit lakes.
50. Closure of the North and South MP waste rock cells was not pre-approved as an engineered alternative by the Board. Subsequently, in compliance with the requirements of WDRs Order No. 5-01-168, the Discharger submitted a report (August 2002) assessing the permeability of the covers at all the waste rock containment units. Based on testing of the in-place covers, the report concluded that cover thickness exceeded and hydraulic conductivity is equivalent or lower than the Title 27 prescriptive standard cover for a Group B mining waste.

Tailings Impoundment Facility

51. The TIF consists of a 155-foot high earthfill dam that blocks a small dry valley. The impoundment contains 38 million tons of tailings on approximately 400 acres. The maximum depth of tailings is approximately 145 feet. The dam is constructed with a clay core that is keyed into bedrock and a sand seepage collection blanket downstream of the clay core. Two drainage systems at the base of the dam collect seepage from the chimney drain, the blanket drain and from springs in the dam foundation. Collected liquids are pumped back to the TIF.
52. Perimeter diversion channels isolate the TIF from storm water run on. Groundwater monitoring wells are located downgradient from the embankment to detect seepage. To date, the approved monitoring program has not detected evidence of a release from the TIF to groundwater or surface water.
53. The TIF embankment dam is regulated by the California Department of Water Resources, Division of Safety of Dams ("DSD"). DSD reviews and accepts dam design and construction documents and inspects all dam structures periodically. DSD has certified the TIF dam is designed and constructed in a manner that protects downstream life and property.
54. The tailings are silt-sized rock particles discharged as a slurry from spigots at the perimeter of the TIF. The discharge technique resulted in coarser material at the perimeter and finer tailings near the center of the TIF.
55. In 1983, before the start of active mining, the Discharger submitted the initial Reclamation Plan that included closure of the TIF. The plan for the TIF anticipated grading the top deck to drain; breaching the dam to allow storm water runoff; installing a soil cover consisting of a capillary barrier, two feet of crushed waste rock and one to two feet of soil; and establish a vegetation cover. The Reclamation Plan was reviewed by the Board and approved by Lake County.
56. The TIF ceased operations in July 2002, when ore processing was complete. Before the end of operations, in October 2001, the Discharger submitted the "*Homestake Mining Company, McLaughlin Mine, Closure Plan*" proposing a revised closure plan. The Discharger justified a revised approach to closure because actual physical conditions of the tailings are different than assumed conditions in the preliminary plan. The revised plan proposed to cover the TIF with nominal six-inch soil cover emplaced by hydraulic methods (no compaction and no coverage control), allow natural re-vegetation, leave a leachate pond and promise to maintain the dam.

57. The Discharger has demonstrated that the initial Reclamation and Closure Plan for the TIF is infeasible because the physical conditions of the tailings do not provide a stable surface to construct a final cover and the preliminary plan creates a drainage structure that could allow a tailings release in case of a seismic event. Because natural springs discharge into the base of the tailings impoundment the tailings will never de-water sufficiently to support a conventional cover. Staff rejected the Discharger's original revised plan because it did not adequately protect water quality and asked for a feasibility study to evaluate closure alternatives.
58. Between 2002 and 2008 the Discharger completed a number of investigations to determine the best methods for closing the TIF. The *"Feasibility Study of Closure Alternatives for McLaughlin Mine Tailings Impoundment"* (2007) concluded that the best alternative consists of a vegetated soil cover over areas underlain by thin tailings deposits, and a permanent/seasonal water pool over areas underlain by thicker tailings (the middle of the impoundment). The covered areas will utilize an interconnecting system of berms to retain fresh storm water and develop local marsh – upland plant communities. The embankment dam will be maintained and run-on storm water will be diverted around the TIF with a system of ditches.
59. Under Title 27, section 20080(b), if a prescriptive standard is infeasible, an engineered alternative may be approved provided: 1) it is consistent with the specific performance goal addressed by the particular prescriptive standard; and 2) it affords equivalent protection against water impairment.
60. The closure Performance Standard for mining units (Title 27, § 22510(a).) is the units "...shall be closed so that they no longer pose a threat to water quality." The prescriptive standard for closure for tailings facility is described in Title 27, section 22510(l) which includes a low-permeable cover described in Title 27, sections 21090(a) – (c) and drainage of the tailing as required in Title 27, section 21400(a). A prescriptive standard closure is not possible at this site, and the discharger proposes to contain solid and liquid wastes by maintaining the embankment dam and retaining leachate and contact water within the footprint of the TIF. This has been the approach throughout the active life of the project and the Discharger proposes to maintain this system throughout closure. Monitoring over the life of the project demonstrates that the TIF does not discharge to groundwater. The Discharger believes that so long as the structural integrity of the dam and the run-on interception and removal system are maintained the proposed closure system will protect water quality and achieve closure Performance Standard.
61. In October 2008, the Discharger submitted the *"Final Closure and Postclosure Maintenance Plan for McLaughlin Mine Tailings Impoundment Facility."* These WDRs are based on that plan and on supporting documents covering maintenance of the Mine Pit Lakes and the Waste Rock Facilities. The proposed final TIF closure will consist of placing a soil cover over areas with thin tailings deposits, approximately 320 acres. The remaining 80 acres of tailings, near the center of the impoundment and containing the thickest tailings, will not be covered, but will remain a low area with an internal pond. The internal pond will expand and contract seasonally and in response to long term weather patterns. The revised plan leaves the TIF embankment dam intact without a breach, and internal drainage. The cover will consist of one to two feet of compacted soil with a system of low earthen berms to catch and hold fresh storm water and to

support native vegetation. The internal pond will be fed by storm water and leachate released by dewatering tailings. The upland covered parts of the tailings will evolve into a mixed wetlands/grasslands environment. The Discharger has demonstrated that the TIF can be maintained as a zero-discharge facility.

62. Planned improvements to the perimeter storm water diversion channel are designed for a 1,000-year, 24-hour storm.
63. Water quality in the internal pond is poor, the September 2009 sampling event detected the following concentrations: TDS - 7600 mg/L, Sulfate - 7500 mg/L, Arsenic - 320 ug/L and Copper - 130 ug/L. Over time water quality is expected to degrade through the process of evapo-concentration, one investigation projected TDS concentrations to increase to the saturation level (approximately 130,000 ppm).
64. This closure plan is viable only if the TIF embankment dam and run-on interception and removal system are maintained indefinitely.
65. The California Department of Fish and Game staff reviewed the revised closure plan and corresponding CEQA documents and stated in an email that *"the Project...is an improvement over the 1983 Plan and 2001 closure proposal from the perspective of wildlife habit, and will lead to an increase in biodiversity at the site. Additionally, the long-term monitoring of biological resources and water quality in place at the site will reduce risks to the health of wildlife utilizing the TIF."*
66. Closure of the TIF will occur in phases due to its large size, the naturally slow dewatering and consolidation process and relatively large volume of impounded water. Placement of the soil cover can occur only during dry weather after the tailings have been exposed and dried for several weeks (most years a few weeks in late summer). The time required to complete closure will depend on tailings de-watering and weather conditions. The Discharger anticipates it will be complete within 10 to 15 years.
67. Construction will proceed only after all applicable construction quality assurance plans have been approved by the Executive Officer.

FINANCIAL ASSURANCES

68. The Discharger submitted Financial Assurance Estimates in 2011 to cover: the TMF closure costs (\$21,088,206); TMF Postclosure Operation and Maintenance for 40 years (\$16,552,582); East and West Waste Rock Facilities Postclosure Operation; and Maintenance for 40 years (\$7,415,690); and North and South MP and Pit WRFs Operation and Maintenance (\$5,921,480). The 2011 total for the site is \$50,977,958. The Operation and Maintenance estimates include costs for unusual but foreseeable events, including reasonably foreseeable releases. The cost estimates are based on 2011 prevailing labor rates and Caltrans equipment rates. The 40-year postclosure period is used to in effect provide annual maintenance in perpetuity (net interest on the total amount will cover annual maintenance costs). Staff concurs that the estimates are complete, conservative and professional and represent reasonable

estimates of likely actual closure and postclosure maintenance costs to comply with this Order. The Financial Assurance estimates do not cover reclamation tasks pursuant to the Surface Mining and Reclamation Act of 1975 (SMARA) and the State Mining and Geology Board Regulations (California Code of Requirements (CCR) Title 14, Division 2, Chapter 8, Subchapter 1).

CEQA AND OTHER CONSIDERATIONS

69. The Lake County Community Development Department adopted a Mitigated Negative Declaration of environmental impact and approved the use permit modification and the TIF Reclamation Plan Amendment on 22 April 2010. The Board considered the negative declaration and incorporated mitigation measures from the negative declaration into these waste discharge requirements.

70. Water Code section 13267 states, in part:

(a) A regional board, in establishing or reviewing any water quality control plan or waste discharge requirements, or in connection with any action relating to any plan or requirement authorized by this division, may investigate the quality of any waters of the state within its region.

(b)(1) In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, ... shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order and the attached Monitoring and Reporting Program are necessary to assure compliance with these waste discharge requirements, and to assure that the discharges will comply with the Basin Plan. The Discharger owns and operates the facility, and is responsible for the discharges of waste at the facility subject to this Order and is, therefore, subject to requirements imposed pursuant to Water Code section 13267.

PROCEDURAL REQUIREMENTS

71. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

72. The Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

73. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Water Code sections 13263 and 13267, that Order No. 5-01-168 is rescinded, and that the Homestake Mining Company of California, its agents, successors, and assigns, shall comply with the following:

A. PROHIBITIONS

1. This facility is closed; the discharge of any mining waste, hazardous waste, designated waste, municipal waste or inert waste at the Facility, other than pump-back liquids specifically permitted by this Order and potential reclamation activities involving grading and stabilization of mine waste rock for the purposes of complying with SMARA, is prohibited. For the purposes of this Order, the terms 'hazardous waste' and 'designated waste' are as defined in Title 27.
2. The discharge of solid waste or liquid waste to surface waters or surface water drainage courses is prohibited.
3. The discharge of wastes outside of a waste management unit or portions of a waste management unit specifically designed for their containment is prohibited.

B. DISCHARGE SPECIFICATIONS

General Specifications

1. Pump-back liquids shall only be discharged into, and shall be confined to, the waste management units ("WMUs") specifically permitted for their containment.
2. Pump-back system pipes, valves and pumps shall be inspected and maintained regularly. Leaks or other identified issues shall be repaired or replaced in a timely manner.
3. Surface roads will be watered as needed to control or reduce dust.
4. The Discharger shall maintain site security through out the closure period. Perimeter fences, locked gates and signs shall be maintained to exclude public entry to the site. Locks, gates, signs and fences shall be inspected quarterly; damaged security features shall be repaired or replaced immediately.
5. Signs shall be repaired or replaced as needed to maintain their visibility. Vegetation that encroaches on or obscures signs shall be cut back or removed.

Protection from Storm Events

6. Waste management units shall be designed, constructed, operated and maintained to prevent inundation or washout due to flooding events with a 100-year return period.

7. Precipitation and drainage control systems shall be designed, constructed and maintained to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 1,000-year, 24-hour precipitation conditions.
8. Annually, prior to the anticipated rainy season, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the site.

Mine Pit Lakes

9. The Mine Pit Lakes and related containment structures shall be maintained to prevent, to the greatest extent possible, inundation, erosion, slope failure, washout, and overtopping under 1,000-year, 24-hour precipitation conditions, and shall be designed to contain the 100-year wet season precipitation.
10. Leachate generation by a WMU shall not exceed 85% of the design capacity of the collection sump. If leachate generation exceeds this value and/or if the depth of the fluid in a sump exceeds the maximum needed for safe pump operation, then the Discharger shall notify the Regional Board in writing within **seven days**. Notification shall include a timetable for a remedial action to repair the containment structures or other action necessary to prevent release of leachate.

C. RECEIVING WATER LIMITATIONS

Water Quality Protection Standards

The concentrations of Constituents of Concern in waters passing through the Points of Compliance shall not exceed the Concentration Limits established pursuant to Monitoring and Reporting Program R5-2012-0010, which is attached to and made part of this Order.

D. FINANCIAL ASSURANCE

1. The Discharger shall establish an irrevocable Letter of Credit in the amount of \$50,978,000, with the Central Valley Water Board as the named beneficiary, for TIF closure costs, for postclosure maintenance costs and corrective action costs for reasonably foreseeable releases at the TIF, the East and West Waste Rock Facilities, and the North and South Mine Pits for actions required herein. The issuing institution shall become liable under the terms of the Letter of Credit if the Executive Officer determines that the Discharger has failed or is failing to perform closure or postclosure maintenance or corrective action activities as guaranteed by the mechanism in a timely manner. Prior to any exercise of remedies, Regional Board staff will provide the Discharger with written notice of the Discharger's noncompliance with any provisions of these WDRs. The Discharger may cancel the letter of Credit only if alternate financial assurance is substituted as specified in Title 27, section 22227, or if the Discharger is released by the Central Valley Water Board from the requirement to maintain financial assurances.

2. **By April 30 each year**, the Discharger shall submit a report of financial assurances and shall annually adjust the financial assurances amount to account for inflation and any changes in facility design, construction, or operation.

E. PROVISIONS

1. The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.
2. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order and of the Water Code.
3. The Discharger shall comply with the Standard Provisions and Reporting Requirements for Mining Wastes, dated February 2009, which are hereby incorporated into this Order. The Standard Provisions and Reporting Requirements contain important provisions and requirements with which the Discharger must comply. A violation of any of the Standard Provisions and Reporting Requirements is a violation of these waste discharge requirements.
4. The Discharger shall comply with Monitoring and Reporting Program R5-2012-0010, which is attached to and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities and precipitation and drainage controls and monitoring groundwater, the unsaturated zone, and surface waters throughout the active life of the waste management units and the post-closure maintenance period. A violation of Monitoring and Reporting Program R5-2012-0010 is a violation of these waste discharge requirements.
5. Existing sampling points at leachate sumps S-11, S-12 and S-13 are difficult to sample and present health and safety concerns to personnel collecting samples. Therefore, the Discharger shall propose and develop if necessary alternative locations to collect grab samples of pump-back waters from the West Waste Rock Facility and the East Waste Rock Facility.
6. The Discharger shall maintain legible records of the volume of pump-back water discharged to the North MP, South MP and TIF Pond and the manner and location of the discharge. Such records shall be maintained at the Facility. These records shall be available for review by representatives of the Board and of the State Water Resources Control Board; the flow data shall be summarized and reported to the Central Valley Water Board in compliance with the Monitoring and Reporting Program.
7. Water Levels in the North MP Lake shall be maintained below 1720 feet MSL, Water Levels in the South MP Lake shall be maintained below 1731 feet MSL and South MP shall not overflow into North MP Lake. (Findings Nos. 43, 44 and 45).
8. The Discharger shall conduct annual water quality trend analysis for the TIF pond, the North MP and the South MP in compliance with Monitoring and Reporting Program R5-2012-0010.

If trend analysis indicate that water quality is likely to exceed Group B Mining Waste criteria within three years, the Discharger shall submit, within 180 days, an evaluation of corrective actions to prevent concentrations from exceed Group B Mining Waste criteria. Any corrective action plan shall include an implementation schedule for proposed corrective actions and propose additional monitoring to evaluate success of the corrective actions.

9. The Discharger shall complete closure of the TIF by **31 December 2021**. The Discharger shall undertake to complete between 32 to 62 acres of soil cover per year depending on weather condition. If closure becomes infeasible by 31 December 2021, the Discharger shall submit a report at least one year in advance of the closure date that describes the reason the closure cannot be completed and measures to close the unit as soon as possible. The report shall be submitted to the Executive Officer for concurrence.
10. Prior to starting TIF closure construction the Discharger shall submit detailed final closure documents and drawings for staff review and approval.
11. Until the TIF is closed, the Discharger shall submit annually by **30 July** a TIF Closure Progress Report. The report shall track closure progress; the location and extent of planned soil cover construction for the upcoming construction season. If the extent of proposed closure is less than 32 acres or the average annual closure completed to date is less than 32 acres, the Discharger shall identify the specific conditions preventing achievement of closure goals.
12. TIF areas previously covered with soil shall be inspected annually. If necessary supplemental erosion controls shall be implemented in previously covered areas to prevent exposed tailings. Supplemental erosion controls may include: 1) planting vegetation in areas where natural re-vegetation has not been successful; 2) installation of additional berms, water bars and/or drainage swales; and 3) installation of additional rip-rap or erosion matting.
13. During active construction, the Discharger shall submit weekly progress reports.
14. The Discharger shall inspect the TIF soil cover semi-annually for signs of settlement, subsidence, erosion, cracking, thin vegetation cover or other indications that the integrity or effectiveness has been impacted. Any issues requiring corrective action shall be reported to staff **within 7 days** and repaired as soon as feasible (before the next rainy season).
15. The Discharger shall inspect the TIF interior berms semi-annually for excessive settlement and erosion. Differential settlement greater than 15% of berm height or erosion that threatens the future usefulness of the berms is defined as excessive. Soil will be added to berms that settle excessively. Berm inlets and outlets shall be inspected to ensure they are functioning and draining properly.
16. Stormwater diversion channels shall be inspected semi-annually and following heavy precipitation events (greater than 1 inch of rainfall in 24-hours). Inspections shall note evidence of damage, excessive erosion, settlement, and obstruction by debris. Issues detected in the dry season shall be corrected before the rainy season. During the rainy

season, damaged or obstructed drainage ditches shall be repaired as soon as practical, if possible before the next storm event. Repairs that cannot be completed within two weeks shall be documented and a report explaining why they cannot be repaired. This report shall be submitted to the Regional Water Board **within 72 hours** of identifying damaged or obstructed drainage ditch.

17. The Discharger shall provide the Regional Board a copy of the annual inspection report submitted to the Division of Safety of Dams (DSOD). The Discharger shall take appropriate actions to remedy damage as required by the DSOD.
18. The Discharger shall provide proof to the Regional Board **within sixty days after adoption of this Order** that the deed to the property or properties containing the Waste Rock Facilities, Mine Pits and Tailings Impoundment Facility, or some other instrument that is normally examined during title search, has been modified to include, in perpetuity, a notation to any potential purchaser of the property stating that:
 - a. the parcel has been used for disposal of solid and liquid mining wastes;
 - b. land use options for the parcel are restricted in accordance with the post-closure land uses set forth in the post-closure plan and in WDRs for the mine site and mine waste management units; and
 - c. in the event that the Discharger defaults on carrying out either the post-closure maintenance plan or any corrective action needed to address a release, then the responsibility for carrying out such work falls to the property owner.
7. The Central Valley Water Board will review this Order periodically and may revise requirements when necessary.

F. REPORTING REQUIREMENTS

1. The Discharger shall comply with the reporting requirements specified in this Order, in Monitoring and Reporting Program Order R5-2012-0010 and in the Standard Provisions and Reporting Requirements for Mining Wastes, dated February 2009.
2. The Discharger shall complete the tasks outlined in these WDRs and the attached Monitoring and Reporting Program R5-2012-0010 in accordance with the following time schedule:
 - a. By **1 May each year until complete**, the Discharger shall submit documents and drawings for the coming closure construction season at the TIF. The submittal should include construction goals, time lines and a quality assurance plan.
 - b. By **1 June 2012** shall submit Propose alternative locations to collect representative

samples of pump-back waters from the East and West Waste Rock Facilities (Provision E.5).

- c. **By 30 July each year** submit update and status review of the TIF Closure.
 - d. **By 30 April each year**, submit the annual review and update of the status of financial assurances.
 - e. **By 1 January 2022**, complete closure of the TIF.
 - f. **By 60 days after completion of TIF closure construction**, submit a final TIF Closure Report including as-built drawings and an evaluation of cover integrity.
3. In the event of any change in ownership of the Facility, the Discharger shall notify the succeeding owner or operator in writing of the existence of this Order. A copy of that notification shall be sent immediately to the Central Valley Water Board. To assume ownership as Discharger under this Order, the succeeding owner must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision VIII.A.5 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. Transfer shall be approved or disapproved by the Executive Officer.
 4. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel. All other site operating records required by this Order may be maintained offsite, but must be available to Central Valley Water Board staff within 48 hours of being requested.
 5. The Discharger shall immediately notify the Central Valley Water Board of any flooding, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
 6. For the purpose of resolving any disputes arising from or related to the Water Code, any regulations promulgated thereunder, these WDRs, or any other orders governing this site, the Discharger, its parents and subsidiaries, and their respective past, present, and future officers, directors, employees, agents, shareholders, predecessors, successors, assigns, and affiliated entities, consent to jurisdiction of the Courts of the State of California.

7. As required by the California Business and Professions Code sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional or their subordinate and signed by the registered professional.
8. All reports must be submitted to the Central Valley Water Board. Electronic copies of all reports and analytical results are to be submitted over the Internet to the State Water Board Geographic Environmental Information Management System database (GeoTracker) at <http://geotracker.swrcb.ca.gov>. Electronic copies are due to GeoTracker concurrent with the corresponding hard copy. Electronic submittals shall comply with GeoTracker standards and procedures as specified on the State Water Board's web site.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order or with the WDRs may result in the assessment of Administrative Civil Liability of up to \$10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, Pamela C. Creedon, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 2 February 2012.

Original signed by

PAMELA C. CREEDON, Executive Officer

Attachments