CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2017-0077-01

WASTE DISCHARGE REQUIREMENTS

FOR

LEHIGH SOUTHWEST CEMENT COMPANY
CALAVERAS CEMENT COMPANY
CALAVERAS CEMENT PLANT
CALAVERAS COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. Lehigh Southwest Cement Company and Calaveras Cement Company (hereafter jointly Discharger or Lehigh), owns and operates the Calaveras Cement Plant (hereafter Calaveras Cement or facility or site) about 2.5 miles south of San Andreas, CA. The Discharger's property is located in the northern parts of Sections 29, 30, 31 and 32, and southern parts of Sections 19 and 20, T4N, R12E, MDB&M. The facility is a Group B mining waste management site regulated under authority given in Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) and the Mining Waste Management Regulations in California Code of Regulations, title 27, section 22470 et seq. (Title 27).

2. Mining activities at the facility were originally regulated by National Pollutant Discharge Elimination System Order No. CA0003891 which regulated the discharge of cooling waters into the Calaveritas Creek. This order was rescinded in 1979 after the Discharger made a material change in the disposal method with the reuse of cooling water. Since mining and processing activities ceased in 1982, the Board has updated Waste Discharge Requirements (WDRs) for closure of this site on three separate occasions: WDRs Orders No. 87-213, 97-011, and 98-095 reflect those periodic updates. This Order supersedes all prior WDRs Orders.

3. The following documents are attached to this Order and hereby incorporated into and made a part of this Order by reference:

   a. Attachment A – Site Location Map
   b. Attachment B – Site Map
   c. Attachment C – CKD-1 Groundwater Contours and Groundwater and Surface Water Monitoring Network
   d. Attachment D – CKD-3 Groundwater Contours and Groundwater and Surface Water Monitoring Network
   e. Attachment E – CKD-3 Cross Section
   f. Attachment F – CKD-3 Preliminary Closure Design: Regrade and Cover with Subsurface Drainage

4. The following acronyms are used throughout this Order:

CKD	Cement Kiln Dust
COC	Constituents of Concern
COD	Chemical Oxygen Demand
EC	Electric Conductivity
EFS	Engineering Feasibility Study for Corrective Action
LCRS	Leachate Collection and Removal System
TDS	Total Dissolved Solids
MCL	Maximum Contaminant Level
MRP	Monitoring and Reporting Program
MU	Mining Unit
ROWD	Report of Waste Discharge
TDS	Total Dissolved Solids
WDR	Waste Discharge Requirements
WQPS	Water Quality Protection Standards

5. The facility is located on a 250-acre property at the cross-section of the Pool Station Road and the Cement Plant Road 2.5 miles south of San Andreas as shown on Attachment A. As shown in Attachment B, the facility is comprised of Assessor's Parcel Numbers (APN) 44-001-011, 44-001-012, 44-001-024, 44-001-046, 44-001-47, 44-008-004, 44-008-008, 44-008-009, 44-008-010, 44-008-011, 44-008-024, 44-008-025, 44-008-026, 44-008-027, 44-008-028, 44-008-031, 44-008-032, 44-008-042, 044-008-059, 44-008-064, and 44-008-065.

6. The facility opened in 1926 as the Calaveras Cement Company. It quarried limestone from the Quarry Pit and produced cement for over 50 years. While the facility was in operation from 1926 to 1982, cement kiln dust (CKD) and waste rock were discharged to three cement kiln dust piles (CKD-1, CKD-2, CKD-3) and two waste rock piles (West Rock Storage Area & East Rock Storage Area) shown on Attachments A and B. Cement production ceased in 1983. Manufacturing facilities have since been decommissioned and demolished.

7. These WDRs address the Closure and post-Closure Maintenance of the following mine waste containment facilities (mining units):

   a. Cement Kiln Dust Pile 1 (CKD-1) shown on Attachments B and C is a Group B mining unit (MU) that was closed pursuant Title 27 requirements in 1998.

   b. Cement Kiln Dust Pile 3 (CKD-3) shown on Attachments B-F is a Group B MU that is currently in corrective action due to the hexavalent chromium and other constituents of concern identified in surface water and groundwater downgradient of the CKD pile. The Discharger has proposed closure with a low permeability cover and a leachate collection and removal system (LCRS) as shown on Attachment F.

   c. The former Quarry Pit shown on Attachments A and B is filled with groundwater and has been used for transfer of leachate from CKD-1. Water pumped from the CKD-1

LCRS had been measured as essentially zero through November 2016 after changes and improvements were made to the CKD-1 LCRS during summer 2016. Between mid-December 2016 and mid-March 2017, approximately 300,000 gallons of water per month had been pumped.

d. The West Waste Storage Area and the East Waste Storage Area as shown on Attachments A and B are waste rock stockpiles, and are both classified as Group C mining waste.

e. The Calaveras Materials Inc., an aggregate processing facility, is an active subsidiary of Lehigh Southwest Cement Company currently mining rock in the West Rock Storage area as shown on Attachment B.

Constituents of concern within CKD-1 and CKD-3 include high pH, high electrical conductivity (EC), total dissolved solids (TDS), chemical oxygen demand (COD), aluminum, copper, total and hexavalent chromium, lead, molybdenum, manganese, and mercury.

8. On 16 December 2016, the Discharger submitted an updated Report of Waste Discharge (ROWD), which has been used in revising this Order. The ROWD and supporting documents contain proposed facility changes including:
   a. Conceptual plan and cost estimates for closure of CKD-3;
   b. Continued removal of leachate from CKD-1 and transfer to the Quarry Pit[1];
   c. Future removal of leachate from CKD-3and transfer to the Quarry Pit[2];
   d. Implementation of post-closure maintenance of the site;
   e. Plans for continued waste rock reuse for aggregate production.

9. This Order implements the applicable regulations for discharges of solid waste to land through Prohibitions, Specifications, Provisions, and Monitoring and Reporting requirements. Prohibitions, Specifications, and Provisions are listed in Sections A through H of these WDRs below, and in the Standard Provisions and Reporting Requirements (SPRRs), dated April 2016 included as Attachment G. Monitoring and Reporting requirements are included in the Monitoring and Reporting Program (MRP) R5-2017-0077-01 and in the SPRRs. In general, requirements that are either in regulation or otherwise apply to all facilities regulated under Title 27 are considered to be “standard” and are therefore in the SPRRs. Any site-specific changes to a requirement in the SPRRs are included in the applicable section (A through H) of these WDRs, and requirements in the WDRs supersede the requirement in the SPRRs.

[1] Following tentative WDR review, Lehigh agreed to discontinue transfer and develop an alternate leachate disposal method in 180 days from adoption of this Order.

[2] Lehigh agreed to develop an alternate leachate disposal method as a part of CKD-3 design plan.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

10. The facility consists of five MUs classified as containing either a Group B or Group C mining waste. The mining wastes have been classified as Group B or Group C mining wastes based on an assessment of the potential risk of water quality degradation posed by each waste and in accordance with Title 27, § 22480, which states, in part:

Group B *– mining waste of Group B is either:*

a. mining wastes that consist of or contain hazardous wastes, that qualify for a variance under Chapter 11 of Division 4.5, of Title 22 of this code, provided that the [regional water quality control board] finds that such mining wastes pose a low risk to water quality; or

b. mining wastes that consist of or contain nonhazardous soluble pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state; or

Group C *– mining wastes from Group C are wastes from which any discharge would be in compliance with the applicable water quality control plan, including water quality objectives other than turbidity.*

Group B mining waste can be discharged only at Group B Mining Units which comply with Title 27 Mining Waste Management Regulations and have been approved by the Regional Board for containment of the particular kind of waste to be discharged.

11. The existing MUs authorized by this Order are described as follows:

MU (Size)	Title 27 Waste Classification – Description and COC	Liner/LCRS[1] Components	Status
CKD-1 (16 acres)	Group B solid waste: 472,000 cubic yards of highly alkaline cement kiln dust Group B liquid waste – leachate Constituents of concern: – pH – TDS – EC – COD – Aluminum – Total chromium – Hexavalent chromium – Copper – Lead – Molybdenum – Manganese – Mercury	Final Cover: – One-foot thick vegetative cover – One-foot thick compacted layer with a permeability $1x10^{-6}$ cm/s or less – Two-foot thick compacted soil foundation layer LCRS: – Leachate collection trench at the base of the landfill – Primary leachate sump Base Liner System: – 2 feet of compacted CKD	Closed in 1998.

MU (Size)	Title 27 Waste Classification – Description and COC	Liner/LCRS[1] Components	Status
CKD-3 (8 acres)	Group B solid waste: Estimated 430,000 cubic yards of highly alkaline cement kiln dust Group B Liquid waste – leachate: Constituents of concern: – pH – TDS – EC – COD – Aluminum – Total chromium – Hexavalent chromium – Molybdenum	Final Cover (proposed): – High Density Polyethylene (HDPE) or linear low density polyethylene (LLDPE) combined with additional cover, drainage layer (if required), and a vegetative soil layer. LCRS (proposed): – Leachate collection trenches – Pumps Base Liner System: – None	Corrective Action: Conceptual closure plan – Regrade, cover with low permeability cover – install LCRS
East Rock Storage Area (18 acres) (previously considered to be a part of CKD-3)	Group C solid waste: Waste rock, mostly limestone and dolostone Constituents of concern: – turbidity	Final Cover and Base Liner System: – Not required	Inactive: – Future mining for aggregate
West Rock Storage Area (50 acres)	Group C solid waste: Waste rock, mostly limestone and dolostone Constituents of concern: – turbidity	Final Cover and Base Liner System: – Not required	Active: – Current mining for aggregate production by Calaveras Materials Inc.

12. Since the previous WDRs were adopted, the Discharger has completed the following activities at the site:

    a. Removed CKD from CKD-2 and relocated it to CKD-1.
    b. Closed CKD-1 pursuant Title 27 requirements in 1998.
    c. Demolished cement plant buildings and removed waste piles.
    d. Installed two groundwater monitoring wells (MW-7 and MW-8) and several piezometers (PZ-1 to PZ-7) at CKD-3 as shown on Attachment D.
    e. Graded CKD-3 top-deck to prevent ponding.
    f. Constructed a perimeter drainage channel along the east side of CKD-3.
    g. Completed CKD-3 investigations and prepared a conceptual plan for CKD-3 closure.
    h. Continued to reuse waste rock for aggregate.

CKD-1 and CKD-3

13. WDRs Order No. 98-095 classified cement kiln dust left behind by cement production as Group B mining waste. These WDRs continue that classification.

14. The Discharger used a wet production process wherein a mixture of 85% limestone plus shale, sand, and iron ore was crushed and reduced in size by a wet grinding process, then delivered to kilns where the water was evaporated and calcination occurred. This process produced cement clinker, which was then ground to very fine powdered cement. A portion of the kiln dust collected by electrostatic precipitators was recycled into the kilns during operations. Highly alkaline dust collected from the final stage precipitator was removed and stockpiled on the property.

15. CKD consists of a mixture of unreacted raw feed, clinker dust, and ash. Chemically, it consists mainly of calcium carbonate, calcium oxide, silicon dioxide, and other metal-oxides. Its chemically dehydrated nature, resulting from exposure to high kiln temperatures, can cause CKD to have a high tendency to absorb water. The CKD in both CKD-1 and CKD-3 units has been in place for many decades and has been hydrated during that period. Hydration drives the chemical reaction to “harden” cement, and thus the CKD now resembles concrete more than cement. This also makes the material less chemically reactive.

16. During early production, CKD generated onsite was stockpiled at CKD-1 and CKD-2. During reclamation and closure, approximately 72,000 cubic yards of CKD from the former CKD-2 location (see Attachment A) were transferred into CKD-1, as required by WDR Order No. 87-213. CKD-2 was restored and regraded to natural contours. After reclamation, an existing spring-fed stream was reestablished through the CKD-2 location. CKD-1 was closed in accordance with Title 27 requirements in 1998.

17. Closure of the CKD-1 Group B Mining Unit in 1998 served as a corrective action under Article 5 of Chapter 15 (Chapter 15 was a predecessor to Title 27). Groundwater monitoring data at the time Order No. 98-095 was prepared indicated that CKD-1 waste pile had impacted the groundwater by elevating the concentrations of pH, TDS, and several dissolved metals. COC included aluminum (52,000 µg/l), cadmium (32.4 µg/l), chromium (150 µg/l), lead (up to 43.2 µg/l), mercury (3.5 µg/l), and nickel (223 µg/l). Closure of CKD-1 as corrective action was successful and resulted in decrease of concentrations of these COC closer to or below water quality protection standards (WQPS) in groundwater monitoring wells.

18. Significant amounts of CKD were also discharged at CKD-3. A 3-D model presented in the 30 June 2016 *Engineering Feasibility Study for C*orrective Action (EFS) estimates that there are approximately 430,000 cubic yards of CKD in CKD-3. CKD in CKD-3 is a fairly contiguous unit of white to light gray, non-plastic fine grained sediment with relatively high pH (10-12 standard pH units). In some locations, the unit contains some fine to coarse sub angular gravel in a fine grained matrix.

19. Over 10 years ago, CKD-3 was graded and covered with soil to prevent direct exposure and erosion of the CKD. Stormwater best management practices have been maintained to minimize surface water impacts. As shown on Attachment B, CKD is limited to an area of approximately 8 acres in the central and southern portions of CKD-3 top-deck and the lower area upslope from the containment berm; the rest of what was previously considered CKD-3 has been designated in the ROWD as the East Rock Storage Area.

20. EFS investigations of leaching of hexavalent chromium from CKD confirmed that CKD in CKD-3 is the source of hexavalent chromium in the downgradient detection groundwater monitoring well MW-8. Groundwater in MW-8 is also impacted by pH, EC, TDS, COD, and total chromium and molybdenum.

21. This WDRs Order classifies CKD leachate generated by CKD MUs as **Group B** liquid waste based on historical concentrations of COC in groundwater monitoring well MW-4 prior to CKD-1 closure (see Attachment C for MW-4 well location). Monitoring and Reporting Program accompanying WDRs Order No. 98-095 listed groundwater monitoring well MW-4, located at the toe of CKD-1, as a leachate sampling location until the groundwater quality in MW-4 met the established water quality protection standards. Concentrations of COCs representative of the composition of leachate from CKD are based on historical MW-4 data from 1990 to 1998 as follows: pH ranged from 11 to 12; EC from 8,000 to 25,000 µmhos/cm; COD from 100 to 400 mg/l; aluminum from 18,000 to 53,000 µg/g; total chromium from 20 to 150 µg/g; and copper from 20 to 120 µg/g.

Quarry Pit

22. Calaveras Cement mined limestone from the Quarry Pit to a depth of about 230 feet. After mining ceased, the quarry filled up with groundwater. Estimated storage volume of the Pit is 1,775 acre feet. WDRs Order No. 98-095 allowed leachate from CKD-1 to be transferred and discharged into the Pit. The Discharger proposed in the ROWD to continue to transfer mine waste impacted leachate from MU CKD-1 into the Quarry Pit and to start the transfer of mine waste impacted leachate from MU CKD-3 into the Quarry Pit after closure.

23. After changes and improvements were made to the CKD-1 LCRS during summer 2016, water pumped from the CKD-1 LCRS had been measured as essentially zero through November 2016. During an excessively wet winter between mid-December 2016 and mid-March 2017, approximately 300,000 gallons of water per month had been pumped to the Quarry pit. The Discharger believes this increase is due to the location of the unlined leachate trench near the Calaveritas Creek. The Discharger proposes to correct this issue by separating creek flow from the LCRS trench and requested to develop an appropriate CKD-1 leachate management strategy to be submitted for Board approval within 180 days after adoption of this Order.

24. The Quarry Pit is the former limestone quarry that is filled with groundwater. This groundwater is a water of the State of which the beneficial uses include municipal and domestic water supply agricultural supply, industrial service supply, and industrial

process supply. Thereby, this Order prohibits the discharge of leachate into the Quarry Pit to protect the beneficial uses of groundwater.

25. The Quarry Pit is located in a limestone quarry and contains water that has been in continuous contact with exposed limestone on the pit walls and floor. Limestone influenced waters typically exhibit a near neutral to alkaline pH and slightly elevated TDS and EC levels due to the calcium carbonate nature of the rock. This water quality is unlikely to have adverse environmental impacts because the water quality of the Quarry Pit is demonstrative of the natural contact of water with native, in- place limestone.

    Quarry Pit water quality data show EC and TDS values resemble groundwater WQPS. The average post-CKD-1 closure values of EC and TDS for the Quarry Pit are shown in the table below. Surface water WQPS, and groundwater WQPS for CKD-1 and CKD-3 are provided for comparison.

Average Quarry Pit Water Quality Compared to Surface Water and Groundwater WQPS

Constituent	Units	Quarry Pit 1999-2016 Average (SW-3)	Surface water WQPS (SW-1)	CKD-1 Groundwater WQPS	CKD-3 Groundwater WQPS
EC	µmhos/cm	787	373	679	700
TDS	mg/l	583	213	559	255

Waste Rock Storage Areas

26. During active mining operations, waste rock was discharged into the East and West Rock Storage Areas (see Attachment B). Between 1992 and 2007, waste rock was re-mined for saleable aggregate materials from the East Rock Storage Area forming a large excavation pit on the east side of CKD-3. Oversize materials were sorted and pushed to the side. Useable material was processed by sorting and washing on the top of CKD-3. Approximately 200,000 tons of waste rock was removed from East Rock Storage Area during this period.

27. Current aggregate operations conducted by Calaveras Materials Inc., a subsidiary of Lehigh Southwest Cement Company, is mining and processing waste rock in the West Rock Storage Area for saleable materials (see Attachment B). The Discharger plans to continue this operation and move it to the East Waste Rock Storage Area after the West Waste Rock Storage Area is mined out. This order acknowledges the Discharger's plans to continue to mine and process waste rock at the site.

28. This WDR Order concurs with the Discharger's Mining Waste Characterization Report for Calaveras Materials Inc. Aggregate Mining Operation included in the ROWD which proposes Group C classification for waste rock in the East and West Rock Storage Areas and haul-back cement processed at the aggregate mining operation. The results of the acid-base accounting analysis (ABA) indicated that the acid neutralization potential of limestone waste rock samples far exceeds the acid generation potential. The concentrations of total and leachable metals in waste rock remained below regulatory

thresholds and in most cases below water quality objectives. Dissolved barium and chromium concentrations were slightly above the primary MCL for drinking water for the two haul-back cement samples. The report suggests that the haul-back cement pile is temporary and unlikely to cause degradation to waters of the state.

SITE DESCRIPTION

29. The site is located in the foothills west of the high mountains of the Sierra Nevada and east of the Central Valley. Surface waters from the facility drain to the Calaveritas Creek and the South Fork of the Calaveras River which flows to the Calaveras River thence to the San Joaquin River.

30. Land uses within one mile of the facility include agricultural preserve, rural residential, single and multiple family residential, general commercial, light industrial, and general industrial.

31. According to public resources available from the Calaveras County and United States Geological Survey, there are no municipal, domestic, industrial, or agricultural groundwater supply wells within one mile of the facility.

32. The geology of the area is structurally complex and is situated in the westerly portion of the Foothills Fault System, which is characterized by strong strike-faulting and shearing which has resulted in a series of prominent northwestward trending ridges underlain by metamorphic rocks that are folded and faulted. In addition, numerous granitic intrusions have occurred. The eastern portion of the valley is underlain by Paleozoic sedimentary rocks, and greenschist rocks. Primary lithologies in the site vicinity include Paleozoic metasedimentary rocks including quartzite, pelitic schist, limestone, and dolostone, as well as the Calaveras Complex consisting mainly of interbedded limestone, recrystallized limestone and dolostone. Foliation of the bedrock is generally oriented in a northwest-southeast direction with nearly vertical bedding, as are the major faults in the area. The bases of the valleys are covered by alluvial sediments situated on bedrock. The bedrock is characterized by a weathered zone which can extend to depths of 20 to 50 feet or more below the original metamorphic contact with alluvial sediment. The alluvial sediments in the facility vicinity tend to be shallow.

33. The facility receives an average of 28.5 inches of precipitation per year as determined from the isohyetal map of 30-year (1981-2010) average rainfall information obtained from Prism Climate Group, Oregon State University. The 100-year wet season was calculated to be 59.98 inches based on data from the historical records obtained from the Department of Water Resources DWR for the San Andreas 2S Station (B20 7702 00) located approximately 1.8 miles from the Site. The mean pan evaporation is 55.9 inches per year as measured at the Plymouth Station (Station ID 227).

34. The site lies partially within a 100-year flood plain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Community-Panel Number 06009C040W. The lowermost edges of CKD-1 and CKD-3 are located adjacent to and may slightly encroach upon the 100 year floodplain of Calaveritas Creek.

SURFACE WATER AND GROUNDWATER CONDITIONS

35. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition,* revised April 2016 (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.

36. Surface water drainage from the site is to Calaveritas Creek thence to the South Fork Calaveras River which drains to the Calaveras River which is a tributary to the San Joaquin River and the Sacramento-San Joaquin Delta.

37. The Basin Plan does not specifically identify designated beneficial uses for the Calaveritas Creek and the South Fork Calaveras River, but it does identify the existing beneficial uses for the Calaveras River from the source to the New Hogan Reservoir, which also apply to all upstream tributaries (Basin Plan, page II-2.00). These existing beneficial uses are Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Migration of Aquatic Organisms, Warm; Spawning, Reproduction, and/or Early Development; and Wildlife Habitat. The beneficial uses of the Sacramento-San Joaquin Delta are: Municipal and Domestic Supply; Agricultural Supply; Industrial Process Supply; Industrial Service Supply; Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wildlife Habitat; and Navigation.

38. At CKD-1, the first encountered groundwater occurs at approximately 80 feet below the surface at the upslope boundary of the unit and at approximately 10 feet below the surface at the toe of the unit. Groundwater elevation measurements from the piezometers and wells and the groundwater contours shown on Attachment C indicate the groundwater gradient in the vicinity is generally to the northwest toward the Kentucky House Reservoir. The estimated average groundwater gradient is 0.02 feet per foot. Groundwater elevation data show that the base of the waste material is not in contact with groundwater beneath CKD-1.

39. The canyon where CKD-3 is located forms a small groundwater sub-basin with a drainage area of approximately 130 acres. The valley does not appear to be hydraulically connected to areas east, west, and north of CKD-3. Depths to groundwater range between 4.4 feet below ground surface along the southern toe of CKD-3 to 91.6 feet below ground surface on top of CKD-3. Groundwater is monitored in a number of wells and piezometers which are screened in alluvium, CKD, or underlying bedrock, depending on their location in relation to the unit. As shown on attachment D, groundwater elevation measurements from the piezometers and wells in the vicinity of CKD-3 indicate the groundwater gradient in the vicinity is generally to the south. The estimated average groundwater gradient is 0.11 feet per foot following topography.

    The Discharger states that groundwater downgradient of CKD-3 exists in two chemically different aquifers. A shallow aquifer, approximately 20 feet deep and apparently ending just downgradient from MW-8, shows influence from CKD-3. Sample results from a

discrete hydro-punch sample identified a deeper water bearing zone below 20 feet, which apparently extends down the CKD-3 valley shows no sign of impact from CKD-3.

Attachment E shows that groundwater is present in CKD-3. There is evidence of a seepage area at the southern toe of CKD-3. The small amount of seepage flows into the unnamed drainage channel in the canyon in which CKD-3 is situated.

40. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.

GROUNDWATER AND SURFACE WATER MONITORING

41. The existing groundwater monitoring network for CKD-1 consists of upgradient background monitoring well MW-9, detection/corrective action monitoring wells MW-4 and MW-6, and groundwater elevation monitoring well MW-2 as shown on Attachment C and detailed in MRP R5-2017-0077. MW-4 and MW-6 are located directly downgradient of the unit. MW-4 monitors the first encountered groundwater, and MW-6 monitors a deeper water bearing zone. This existing groundwater monitoring network at CKD-1 is not sufficient to monitor the groundwater flow, direction, and water quality. This Order requires the Discharger to add a minimum of one additional groundwater monitoring well to the CKD-1 Mining Unit.

42. The existing groundwater monitoring network for CKD-3 consists of upgradient background monitoring well MW-7, a downgradient detection/corrective action monitoring well MW-8, and seven piezometers to monitor groundwater elevations (PZ-1 to PZ-7) as shown on Attachment D and detailed in MRP R5-2017-0077.

43. Surface water monitoring at the Site occurs at the following locations, as shown on Attachments B-D and detailed in MRP R5-2017-0077:

    a. SW-1 is located in Calaveritas Creek upstream from CKD-1 and upstream of where the un-named drainage below CKD-3 would join with Calaveritas Creek. SW-1 is representative of background water quality conditions for Calaveritas Creek.

    b. SW-2 is located downstream from CKD-1 in Calaveritas Creek.

    c. SW-3 is the Quarry Pit water.

    d. SW-4 is located in the retention pond on the surface of the lower deck of CKD-3.

    e. SW-5 is located in the upstream portion of the runoff diversion ditch around the northeast of CKD-3 and represents background surface water conditions for CKD-3.

    f. SW-6 is located in the Calaveritas Creek upstream from CKD-1 and downstream of the location where the unnamed drainage would flow into Calaveritas Creek.

44. The Discharger submitted Water Quality Protection Standards (WQPS) reports on 31 July 2000, 31 March 2005, and 15 September 2006, proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in

accordance with Title 27. The WQPS report proposed to use intrawell data analysis to calculate tolerance limits for the monitored constituents. The WQPS and approved data evaluation methods are included in MRP R5-2017-0077.

GROUNDWATER DEGRADATION AND CORRECTIVE ACTION

CKD-1

45. Closure of the CKD-1 Group B Mining Unit in 1998 served as a corrective action under Article 5 of Chapter 15. Chapter 15 was the predecessor to Title 27. Groundwater monitoring data at the time Order No. 98-095 was prepared indicated that CKD-1 waste pile has impacted the groundwater by elevating the concentrations of pH, TDS, and several dissolved metals. Constituents of concern included aluminum (52,000 µg/l), cadmium (32.4 µg/l), chromium (150 µg/l), lead (up to 43.2 µg/l), mercury (3.5 µg/l), and nickel (223 µg/l). Closure of CKD-1 resulted in gradual decrease of the concentrations of these COCs in groundwater monitoring wells.

46. In 2015, following the review of MRP reports, staff requested an investigation into the causes of increasing volumes of leachate removed from CKD-1 and the exceedances of several COCs in compliance groundwater monitoring wells MW-4 and MW-6. The Discharger's CKD-1 investigation report submitted on 2 February 2016 did not find conclusive evidence for a potential release from the unit, but found evidence for partial erosion of the cover system and problems with the integrity of LCRS. The Discharger repaired the erosion of the cover, investigated the integrity of LCRS and proposed and completed modifications to LCRS. The Discharger discontinued pumping from secondary sump to the main collection sump and reconfigured and replaced the flow measurement and recording system.

47. However, as shown by the 2016 Annual Monitoring Report, the exceedances of several COCs in the compliance groundwater monitoring wells continue to exceed their respective WQPS. These include TDS, EC, COD, total and hexavalent chromium, and copper.

CKD-3

48. At the time Order No. 98-095 was prepared, the Discharger was investigating the nature, volume, and extent of the material in CKD-3. After initial investigations, two groundwater monitoring wells and seven piezometers were installed at the unit as shown in Attachment D. Dissolved molybdenum and hexavalent chromium analyses were added to the monitoring parameters list for surface and groundwater on 2 January 2001.

49. After the 2014 monitoring report review which indicated CKD-3 may have impacted groundwater and surface water downgradient from the unit, staff requested that the Discharger evaluate and interpret monitoring data to ascertain whether they show a measurably significant evidence of a potential release.

50. On 16 December 2014, the Discharger submitted notification of a measurably significant evidence of a release from CKD-3 observed in the monitoring data. TDS, pH, aluminum, total chromium, hexavalent chromium, and molybdenum concentrations in groundwater in compliance well MW-8 exceeded WQPS. Historical MRP surface water monitoring data indicated periodic WQPS exceedances at SW-6 for EC, TDS, molybdenum, and manganese.

    The Discharger submitted a partial *Amended Report of Waste Discharge* on 17 February 2015 and an *Engineering Feasibility Study* (EFS) *for Corrective Action* on 30 June 2016. The EFS was amended on 28 September 2016. Staff concurred with the conceptual closure plan for CKD-3 on 6 October 2016 and requested submittal of detailed closure technical design plans and construction quality assurance (CQA) plans in compliance with Title 27 siting and construction requirements for Group B waste. The design plans for CKD-3 are due within 180 days of adoption of these WDRs.

51. The Discharger is proposing to close CKD-3 with a low permeability cover system as shown in Attachment F. Currently, it is projected that the low-permeability cover will consist of an impermeable geomembrane such as high density polyethylene (HDPE) or linear low density polyethylene (LLDPE) and a soil and/or rock cover layer. Additional analyses will be completed to determine the type and thickness of additional cover components such as a bedding layer, drainage layer (if required), and vegetative soil layer.

52. The proposed CKD-3 LCRS will consist of a collection trench along the lower deck of CKD-3 to allow interception of seepage. The leachate shall be pumped to appropriate container(s) and either disposed offsite, or treated on-site and discharged to land under an appropriate discharge to land permit or general order. As included in the Prohibitions Section, this Order prohibits the discharge of leachate or any waste to the Quarry Pit.

53. Proposed calculations to support the final design will include completion of the Revised Universal Soil Loss Equation to verify that cover erosion is not excessive, slope stability analyses to confirm that the proposed grades are stable under static and dynamic loading, and completion of hydraulic calculations for surface water controls to verify they can convey the minimum design storm of a 100-year, 24 hour storm.

CLOSURE AND POST-CLOSURE MAINTENANCE OF MINING UNITS

54. The Discharger included preliminary closure of CKD-3 and post-closure monitoring and maintenance for CKD-1 and CKD-3 information in the December 2016 ROWD. Conceptual design for closure of CDK-3 is outlined in the Groundwater and Corrective Action section.

55. Post-closure maintenance plans for CKD-1 and CKD-3 include inspection and monitoring activities for 30 years after the closure of entire site or until the site is no longer a threat to water quality.

FINANCIAL ASSURANCES

56. California Code of Regulations Title 27, section 22510 requires the discharger to provide for adequate funding to pay for the costs of closure and post closure maintenance as required by this article. The discharger shall provide assurance of financial responsibility, acceptable to the regional water quality control board, pursuant to Chapter 6 of this title, and the regional water quality control board shall periodically review financial assurances and shall modify them as necessary. The Discharger's 16 December 2016 ROWD included a CKD-3 Preliminary Closure and Post Closure Maintenance Plans for CKD-1 and CKD-3 (PC/PCMP) for closure and post closure maintenance for CKD-1, CKD-3, and the Quarry Pit. The PC/PCMP includes a cost estimate for CKD-3 closure in the amount of **$1,125,687 in 2016 dollars** and the post-closure costs for 30 years in the amount of **$2,440,339 in 2016 dollars**. As of 2016, the balance of the closure fund was **$3,566,026**. Staff concurs with these closure and post-closure cost estimates for CKD-1 and CKD-3. Future financial assurances need to include all mining units. This Order requires that the Discharger maintain financial assurance with the Central Valley Water Board in at least the amount of the closure cost estimate.

CEQA AND OTHER CONSIDERATIONS

57. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code section 21000, et seq., and the CEQA guidelines, in accordance with Title 14, section 15301.

58. This order implements:

- *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*.
- The prescriptive standards and performance goals of California Code of Regulations, Title 27, Mining Waste Management Regulations, section 22470 et seq.

59. Based on the threat and complexity of the discharge, the facility is determined to be classified **2B** as defined below:

Category 2 threat to water quality, defined as, "Those discharges of waste that could impair the designated beneficial uses of the receiving water, cause short-term violations of water quality objectives, cause secondary drinking water standards to be violated, or cause a nuisance."

Category B complexity, defined as, "Any discharger not included in Category A that has physical, chemical, or biological treatment systems (except for septic systems with subsurface disposal), or any Class 2 or Class 3 waste management units."

60. Water Code section 13267(b) provides that: "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, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state 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 reports and the benefits to be obtained from the reports."

61. The technical reports required by this Order and the attached "Monitoring and Reporting Program R5-2017-0077" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

62. The Central Valley Water 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.

63. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

64. 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 that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final 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.

IT IS HEREBY ORDERED, pursuant to California Water Code sections 13263 and 13267, that **WDRs Order No. 98-095** is rescinded except for purposes of enforcement, and that Lehigh Southwest Cement Company and Calaveras Cement Company, their agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of hazardous waste, designated waste, and mining waste is prohibited other than as described in these WDRs. For the purposes of this Order, the terms hazardous waste, designated waste, and mining waste are as defined in California Code of Regulations Title 27.

2. Other than materials from the sand and gravel or asphalt concrete operations to be recycled at the Calaveras Materials Inc., the discharge or deposit of waste from any other sources is prohibited. Processing[3] recycled materials such as cured concrete or asphalt pavement, which can be used to produce saleable materials, is consistent with the existing activities at the site, and is acceptable.

3. Discharge of processing water and separated solids produced at the Calaveras Materials Inc. to surface water or surface water drainage courses is prohibited.

4. The discharge or transfer of leachate, or any liquid or solid waste to the Quarry Pit is prohibited.

5. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Standard Provisions and Reporting Requirements dated April 2016 (SPRRs).

B. DISCHARGE SPECIFICATIONS

1. The discharge shall not cause a condition of pollution or nuisance as defined by Water Code section 13050.

2. The discharge shall not cause degradation of any water supply.

3. The Discharger shall use best management practices for management of process water and temporary discharges of materials to be recycled at the Calaveras Materials Inc. to prevent surface water and groundwater degradation.

4. The Discharger shall maintain site security throughout 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. The Discharger shall comply with all Standard Discharge Specifications listed in Section *D of the SPRRs dated April 2016.*

C. FACILITY SPECIFICATIONS

1. Annually, prior to the anticipated rainy season but no later than **15 October**, any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed and reported in compliance with MRP R5-2017-0077.

2. The Discharger shall expand their existing Storm Water Pollution Prevention Plan and Monitoring Program and Reporting Requirements in accordance with State Water Board

[3] Processing includes receiving, storage, and the physical manipulation required to manufacture saleable products. Physical manipulation may include crushing, washing to remove fines, and screening. Processing also includes accepting uncured Portland cement or concrete, or washout from uncured Portland cement or concrete handling equipment (includes mixer trucks, pumps, concrete molds, etc.).

Order No. 2014-0057-DWQ (Industrial General Permit) or most recent general industrial storm water permit) to cover the entire site, or retain all storm water on-site.

3. The Discharger shall comply with all Standard Discharge Specifications listed in Section E of the SPRRs dated April 2016.

CKD-1 and CKD-3

4. The Discharger will develop an appropriate CKD-1 leachate management strategy to be submitted for Board approval within 180 days after adoption of this Order. In the interim period for 180 days after these WDRs are adopted, the Discharger will be required to monitor the level of leachate in the CKD-1 LCRS, but will not be required to pump or transfer the accumulated leachate into containers for disposal.

5. CKD-3 shall be closed per Title 27 requirements after all applicable construction quality assurance plans have been approved by Executive Officer.

6. The Discharger will develop an appropriate CKD-3 leachate management strategy as a part of CKD-3 closure design plans to be submitted for Board approval within 180 days after adoption of this order.

D. DESIGN AND CONSTRUCTION SPECIFICATIONS

1. Mining units shall be designed and constructed pursuant Title 27, Section 22470 et seq. requirements.

2. Containment structures and precipitation and drainage control systems shall be constructed and maintained to prevent, to the greatest extent possible, inundation, erosion, slope failure, and washout under 100-year, 24-hour precipitation conditions.

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

4. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over their operating life.

5. Materials used to construct LCRSs shall have appropriate physical and chemical properties to ensure the required transmission of leachate.

6. The LCRSs shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by the Mining Unit. The LCRS extraction system shall be capable of removing this volume of leachate.

7. The depth of the fluid in any LCRS sump shall be kept at the minimum needed for safe pump operation without excessive pump cycling that could damage the pump.

8. The Discharger shall submit a design report including plans, specifications, and a construction quality assurance plan for review and approval prior to construction work related to the MU containment and cover systems.

9. The Discharger shall submit a final report documenting construction work related to the MU containment systems and cover for review and approval.

10. The Discharger shall comply with all Standard Design and Construction Specifications listed in Section F of the SPRRs dated April 2016.

11. The Discharger shall comply with all Storm Water Provisions listed in Section L of the SPRRs dated April 2016.

E. CLOSURE AND POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. The eight-acre MU CKD-3 closure design shall consist of a low permeability cover, LCRS, and stormwater controls. The unit shall be graded and closed pursuant to Title 27 requirements. Prior to construction, the Discharger shall submit Design Report with construction drawings and specifications. All applicable construction quality assurance plans shall be approved in writing by the Executive Officer.

2. The Discharger shall comply with all Closure and Post-Closure Maintenance Specifications listed in Section G of the SPRRs dated April 2016.

F. FINANCIAL ASSURANCE

1. By **1 June 2018**, pursuant to Title 27, the Discharger shall establish an irrevocable acceptable financial mechanism as specified in Title 27, Section 22228 in the amount of **$3,566,026** in **2016 dollars** for **closure and post-closure fund** with the Central Valley Water Board named as beneficiary. The issuing institution shall become liable under the terms of the financial mechanism if the Executive Officer determines that the Discharger has failed or is failing to perform closure or post-closure maintenance or corrective action activities as guaranteed by the mechanism in a timely manner. Prior to any exercise of remedies, Central Valley Water Board staff will provide the Discharger with written notice of the Discharger's noncompliance with any provisions of these WDRs.

2. By **1 June** of each year, the Discharger shall submit a report to the Central Valley Water Board that reports the balance of both the closure and corrective action funds or the amounts of the Guarantees and the adjustments to account for inflation.

3. The Discharger shall comply with all Standard Financial Assurance Specifications listed in Section H of the SPRRs dated April 2016.

G. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program (MRP) R5-2017-0077, and the Standard Monitoring Specifications listed in Section I of the SPRRs dated April 2016.

2. The Discharger shall, for any mining unit in a corrective action monitoring program, comply with the corrective action monitoring program provisions of Title 27, MRP R5-2017-0077, and the Standard Monitoring Specifications listed in Section I of SPRRs dated April 2016.

3. The Discharger shall comply with the Water Quality Protection Standards for surface water and groundwater as specified in this Order, MRP R5-2017-0077, and the SPRRs dated April 2016.

4. The concentrations of the constituents of concern in waters passing the Point of Compliance (defined pursuant to Title 27, section 20164 as a vertical surface located at the hydraulically downgradient limit of the mining unit that extends through the uppermost aquifer underlying the unit) shall not exceed the concentration limits established pursuant to MRP R5-2017-0077.

5. For each monitoring event, the Discharger shall determine whether the mining unit is in compliance with the Water Quality Protection Standards using procedures specified in MRP R5-2017-0077 and the Standard Monitoring Specifications in Section I of the SPRRs dated April 2016.

6. The Discharger shall comply with all Standard Monitoring Specifications and Response to a Release specifications listed in Sections I and J of the SPRRs dated April 2016.

H. PROVISIONS

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated April 2016, which are attached hereto and made part of this Order by reference. 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.

2. Pursuant to Water Code section 13267, the Discharger shall comply with Monitoring and Reporting Program R5-2017-0077, which is attached to and made part of this Order. A violation of Monitoring and Reporting Program R5-2017-0077 is a violation of these waste discharge requirements.

3. 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.

4. The Discharger shall maintain legible records of the volume of leachate discharged into the Quarry Pit. These records shall be available for review by representatives of the Central Valley Water Board and of the State Water Resources Control Board, and copies of these records shall be sent to the Central Valley Water Board upon request.

5. The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.

6. 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.

7. In the event of any change in control or ownership of the facility or disposal areas, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation as Discharger under this Order, the succeeding owner or operator 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 General Provision K.2.e in the Standard Provisions and Reporting Requirements 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 California Water Code. Transfer shall be approved or disapproved by the Executive Officer.

8. The Discharger shall provide proof to the Central Valley Water Board **within sixty days after completing final closure** that the deed to the facility property, 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 wastes.
    b. Land use options for the parcel are restricted in accordance with post-closure land uses set forth in any post-closure plan (if applicable).
    c. In the event that the Discharger defaults on carrying out either any corrective action needed to address a release, groundwater monitoring, or any post-closure maintenance (if applicable), then the responsibility for carrying out such work falls to the property owner.

9. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections

6735, 7835, and 7835.1. As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

10. The following reports and work plans shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared by a California-registered civil engineer or certified engineering geologist:

Task	Compliance Date
A. Updated Sample Collection and Analyses Plan Submit an updated Sample Collection and Analyses Plan for groundwater, surface water, and leachate water quality monitoring and reporting.	**31 August 2017**
B. Workplan for an Additional Groundwater Monitoring Well and an Additional Surface Water Sampling Point Submit a work plan to install an additional detection groundwater monitoring well at CDK-1. The workplan shall also identify an additional surface water monitoring point in the drainage west and downstream of the Calaveras Material Inc. settling pond.	**31 August 2017**
C. CKD-3 Design Report with Construction Drawings and Specifications and Construction Quality Assurance Plans Submit a design report with construction drawings and specifications and construction quality assurance plan for review and approval (see all Construction Specifications in Section D, above and Section F of the SPRRs.). The report shall include a proposal for construction of a new compliance groundwater monitoring well. The Discharger will submit updates 60 and 120 days after the adoption of this Order.	**Within 180 days after the adoption of this Order**
D. CKD-1 Leachate Management Plan Submit the results of CKD-1 investigations and an alternate leachate management plan.	**Within 180 days after the adoption of this order**

Task	Compliance Date
E. Complete Closure of MU CKD-3 and Submit Final Closure Construction Quality Assurance Report Complete closure of CKD-3 and submit a construction quality assurance (CQA) report for review and approval upon completion demonstrating construction was conducted in accordance with approved construction plans (see Standard Construction Specifications in Section F of the SPRRs).	**31 December 2020**
F. Final Closure and Post-Closure Maintenance Plan Submit an Updated Final Closure and Post-Closure Maintenance Plan including inspection, maintenance, and monitoring of the facility during the post-closure maintenance period, a post-closure maintenance cost estimate for the entire facility including Calaveras Materials Inc., and proof of the post-closure fund mechanism with the Central Valley Water Board listed as a beneficiary as detailed in Financial Assurances F.1. The plan will be implemented for a period of 30 years or until the waste no longer poses a threat to water quality.	**31 March 2021**

11. The Central Valley Water Board will review this Order periodically and may revise requirements when necessary.

12. This Order shall take effect upon the date of adoption.

13. The Discharger shall comply with all General Provision listed in Section K of the SPRRs dated April 2016.

I, PATRICK PULUPA, Executive Officer, do hereby certify that this Order is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 9 June 2017, and amended by Order R5-2019-0011 on 8 February 2019.

ORIGINAL SIGNED BY

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PATRICK PULUPA, Executive Officer

NV/BS