CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION

13267 INVESTIGATIVE ORDER No R2-2013-1005

DIRECTING LEHIGH SOUTHWEST CEMENT COMPANY

TO SUBMIT

TECHNICAL AND MONITORING REPORTS PERTAINING TO WATER QUALITY

24001 STEVENS CREEK BOULEVARD, CUPERTINO

SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) finds that:

1) Legal and regulatory authority: This 13267 Investigative Order (Order) conforms to and implements policies and requirements of the Porter-Cologne Water Quality Control Act (Division 7, commencing with California Water Code section 13000) including: section 13267; applicable state and federal regulations; all applicable provisions of statewide Water Quality Control Plans adopted by the State Water Resources Control Board (State Water Board) and the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan and relevant standards, criteria, and advisories adopted by other state and federal agencies.

2) Discharger and facility: Lehigh Southwest Cement Company (hereafter referred to as the Discharger) owns and operates a quarry, cement plant, and other operations related to the manufacture of cement at 24001 Stevens Creek Boulevard in Cupertino, California (hereafter "Permanente Facility"). Lehigh Southwest Cement Company is a subsidiary of its parent company, Lehigh Hanson, Inc., which is part of the Heidelberg Cement Group. The Permanente Facility was formerly operated under ownership of Hanson Permanente Cement, and Kaiser Cement Corporation.

3) Past Enforcement for alleged discharges to surface and groundwater: The Discharger operates the Permanente Facility to produce cement from limestone and other raw materials mined onsite to create a product called "clinker," which is then mixed with other aggregate materials to produce concrete. Other operations at the Permanente Facility include rock excavation, crushing, and transport; waste storage; raw material and water storage; and wastewater treatment. The Regional Water Board has evidence to show that there have been discharges of quarry and process wastewater to both surface and groundwater from the Permanente Facility.

a) On February 18, 2011, the Regional Water Board's Prosecution Team issued a Notice of Violation and 13267 Order requiring the Discharger to submit technical reports providing information about alleged high volume discharges of quarry bottom waters.

b) On April 29, 2011, the Regional Water Board's Prosecution Team issued Complaint No R2-2011-0023 alleging an unauthorized discharge of process water to waters of the State.

c) On June 10, 2011 the Regional Water Board's Prosecution Team issued a 13267 Order requiring the Discharger to submit technical reports related to their discharges of stormwater and industrial process water to Permanente Creek.

d) On January 17, 2013 the Regional Water Board Prosecution Team issued a Notice of Violation for a failure to comply with the requirements of Water Code Section 13260, alleging an inadequate characterization of waste that could affect the quality of waters of the state.

4) Regional Board Permitting process: The June 10, 2011 13267 Order required the Discharger to submit a full Notice of Intent (NOI) to enroll under the General Permit for Aggregate Mining and Sand Washing/Offloading, NPDES No, CAG982001 (Sand and Gravel Permit), and to submit a full Report of Waste Discharge for all discharges to Permanente Creek by July 10, 2012. On June 28, 2011, the Discharger requested an extension for submission of both the NOI and the ROWD. The Assistant Executive Officer of the Regional Water Board extended the deadline to submit the NOI to July 15, 2011, and the ROWD to September 30, 2011.

a) On July 15, 2011 the Discharger submitted an NOI to enroll several discrete discharge points under the Sand and Gravel Permit, including Pond 13B, the Plant Reclaimed Water System, Pond 11, Pond 9, the Dinky Shed Basin, Pond 17, the Rock Sump Overflow, the Reclaim Water System Emergency Discharge Point, and Pond 20.

b) On October 20, 2012, the Discharger submitted a second NOI to enroll Pond 4A under the Sand and Gravel Permit.

c) On November 30, 2011, the Discharger submitted a Report of Waste Discharge (ROWD) to the Regional Board for all discharges from the Permanente Facility to Permanente Creek.

5) Findings based on information contained in Regional Water Board files: The findings of this Order are based on information housed in the Regional Water Board's files. The Regional Water Board has regulated the Permanente Facility since 1974 and maintains information about water quality monitoring reports, permit applications, enforcement actions, and other actions in its files.

6) Previous submittals inadequate: Previous Discharger submittals have not been prepared to acceptable standards. Adequate regulation must be based on adequate science and adequate reporting. To that end, this Order requires reports that meet specified quality requirements. Future submittals will not be accepted—and the

Discharger will be in violation of this Order—if reports do not rise to an acceptable level of accuracy and specificity as required by this Order.

7) Acceptability of Work Product: All work that the Discharger submits pursuant to this Order shall be acceptable to the Water Board Assistant Executive Officer and meet the criteria for all reports required for submission under this Order as detailed below.

8) Other Orders and Requirements of the Regional Board are still in effect: This Order does not supersede, but supplements the Discharger's obligations under prior Orders issued by the Regional Water Quality Control Board. Components of this Order may be superseded by future individual NPDES Permit requirements for the Permanente Facility.

Section A – Deficiencies in Previous Submissions

9) Information Submitted Related to the Outfalls for Permanente Creek Insufficient: Requirement D of the June 2011 13267 Order required Lehigh to "identify all pipes, outfalls, and any other type of conveyance structure that drains into Permanente Creek and its tributaries" by July 10, 2011, later extended to September 30, 2011. A unique document intended to satisfy Requirement D was not submitted. A list of outfalls was provided in the July 15, 2011, Monitoring Plan, and later resubmitted in the October 17 2011 Monitoring Plan.

a) This submission provided aerial photographs and a list of the outfalls, however, this information was not sufficient to meet the requirements of the 13267 Order. The discharger failed to provide a narrative description of the origin of the water, flow path, and all materials and processes with which the water contacts prior to being discharged through the identified outfalls. It also did not provide the frequency and volume of discharge from all conveyances into Permanente Creek. In addition, the Monitoring Plan identified outfalls using a confusing and cryptic identification scheme (p. 5-6, Figures 3-1 through 3-7).

10) Full list of Outfalls to Permanente Creek not provided: Lehigh did not submit a list of all pipes, outfalls, and conveyances as required by Requirement D. On March 26, 2012, US EPA staff discovered a previously undisclosed outfall a few hundred feet downstream of the discharge from Pond 4A. This outfall was not listed on Lehigh's July 10, 2011 submission. This oversight indicates that Lehigh staff did not inspect the Permanente Facility properly and submit information about all outfalls on the property.

11) Water Process Flow Diagram and EPA Form 3510-2C Insufficient: Requirement B of the June 13267 Order required the Discharger to provide a water process flow diagram by July 10, 2011, which was later extended to September 30, 2011. On September 30 the Discharger submitted a water process flow diagram along with the Notice of Intent for coverage under the NPDES General Sand and Gravel Permit. In November, 2011 the Discharger submitted EPA Form 3510-2C as part of

their Report of Waste Discharge for the NPDES Permit, which requires a water balance to be submitted. Regional Water Board staff and U.S. EPA staff have reviewed the report and form and determined that it is insufficient to meet the intent of the requirements of the June 2011 13267 Order.

a) The water usage information relied on for modeling is almost entirely estimated, rather than obtained through measurement. The stormwater modeling results are of questionable value because of unsubstantiated modeling parameters and poor quality water flow data. Modeling results are also inconsistent with site observations of stormwater process water discharges made by Water Board staff during a storm event. A detailed breakdown of the inadequacies with the Water Balance Study is included as Attachment A.

b) Lehigh did not submit a line drawing and water balance as part of their NPDES Report of Waste Discharge. The Line Drawing and Water Balance is required as part of the NPDES permitting process. The submission should be similar to the Figure 2C-1 provided in the EPA instruction sheet.

12) Drainage and Operations Map insufficient: The June 13267 Order required the Discharger to provide a water process flow diagram by July 10, 2011, later extended to September 30, 2011. On September 30 the Discharger submitted a Drainage and Operations Map as part of a larger report. This report included several diagrams (Figures 7-1 through 7-3) that represented drainage and operations at the Permanente Facility. Regional Water Board staff and U.S. EPA staff have reviewed the report and determined that it is insufficient to meet the intent of the requirements of the June 2011 13267 Order. The maps and diagrams in the water balance study are of poor quality, they fail to show all discharge points to the creek, contain other errors, and are inconsistent with report text. A detailed breakdown of the inadequacies with the Water Balance Study is included as Attachment A.

13) Volume of Water Discharged on Property is unclear: The discharger releases stormwater, industrial process water, and stored groundwater from its property to Permanente Creek at five separate locations, possibly more. A continual flow monitoring device records the amount of water discharged from Pond 4A, however no additional information about discharge volume has been collected. Detailed information about the timing and amount of water discharged is necessary to determine the quantity of effluent discharged from the Permanente Facility in order to assess impacts from the Discharger's activities on Permanente Creek.

14) Receiving water monitoring information submitted pursuant to Sand and Gravel General Permit does not meet requirements of the MRP: On July 18, 2011, the Discharger sought coverage under the General Permit for Aggregate Mining and Sand Washing /Offloading, NPDES No. CAG982001(Sand and Gravel Permit). The Discharger submitted supplemental applications to obtain coverage for its outfalls dated July 19, 2011, September 28 and 30, 2011, and October 11, 19 and 25, 2012. On November 21 and November 22, 2011, the Regional Board confirmed that Lehigh has coverage under the Sand and Gravel Permit for a total of 9 discharge points from the

Permanente Facility. Quarterly monitoring samples have been collected and submitted to the Regional Board. Some of these samples have not met the requirements of the Monitoring and Reporting Program (MRP) of the Sand and Gravel Permit., because the discharger failed to take receiving water measurements as required by Table E-5 of the MRP. This Order clarifies requirements for monitoring and reporting and requires the Discharger to submit complete, comprehensive information about its sampling program that ensures it is meeting the requirements of the Sand and Gravel Permit.

15) The proposed background monitoring station does not measure background water quality conditions in Permanente Creek, and is not appropriate for determining NPDES discharge limits: In 2011 the Discharger submitted a proposed monitoring plan for the Permanente facility as part of the Report of Waste Discharge. A background monitoring station is necessary to develop limits under the individual NPDES Permit. This report proposed monitoring background levels in Permanente Creek from the "Kaiser House." This monitoring station is located downstream from the western-most reaches of the Lehigh Property. Water quality testing from this location shows that the water contains high levels of hardness. Hardness factors will impact the allowable discharge limits for metals under the individual NPDES permit. Because water at this location may be impacted by industrial activities occurring on the Discharger's Property, including runoff from the West Material Storage Area, Water Board staff have determined that this location is unacceptable for determining background concentrations. Appropriate background water quality conditions must be determined in order to establish appropriate discharge limits.

16) Data submitted under the 2011 13267 Order Does Not Reflect Normal Rainfall Conditions: The June 2011 13267 Order required the discharger to take discharge samples and grab samples of surface water discharges to Permanente Creek (Requirement H). Lehigh complied with this requirement by submitting Continual Flow monitoring data and monthly sample results for outfall structures on the Permanente property. However, during the winter of 2011/2012, the State of California experienced less rainfall than average.[1] The information collected by Lehigh in 2011 may not accurately reflect the volume or duration of stormwater discharges expected during a normal rainfall year.

17) Identity and Quantity of Hazardous Materials Used at Permanente Facility is Unknown: Regional Board staff has reviewed evidence that shows that metals and hazardous materials associated with Kaiser Aluminum's operations, the historic wet-process cement kilns, and historic World War II munitions manufacture and testing may be buried in the East Material Storage Area, the West Material Storage Area, and other places on the Permanente Site. In order to account for the possible discharge of hazardous materials to surface waters, the June 2011 13267 Order required Lehigh to

[1] According to the National Weather Service, normal rainfall in the Los Altos Hills area is X inches in 1.00 inches in October 2011, 0.61 inches in November 2011, 0.16 inches in December 2011, 1.03 inches in January 2012, 0.76 inches in February 2012, and 1.97 inches in March, 2013, or 5.55 inches total. Los Altos Hills has already received 7.77 inches of rainfall between October 2012 and January,1, 2013.

test for the full suite of constituents listed under the California Toxics Rule (CTR). This requirement was imposed, and will continue to be imposed, because it is unknown what materials were disposed of in unregulated landfills at the Permanente Facility during its 70 year history of use.

18) Data about chronic toxicity of discharges is required: The Sand and Gravel Permit requires the Discharger to perform acute toxicity testing of its discharge twice per year. However, Water Board staff has reviewed evidence in the record, which shows that acute toxicity tests are not sufficient to detect potential impacts to beneficial uses as a result of ongoing operation of the Lehigh facility. Acute toxicity generally tests for impacts to aquatic organisms that occur over a very short time, usually four hours or less. The *2002-2007 Santa Clara Watershed Report* identified chronic toxicity problems in Permanente Creek downstream of the Permanente Facility. Chronic toxicity of water flea and green algae, and acute toxicity of fathead minnow were detected in water samples collected in Permanente Creek downstream of the Discharger's property. Additional chronic toxicity testing is needed to evaluate whether there are any impacts associated with dischargers from the facility and whether control measures may be needed.

Section B – Compliance Problems Related to Creek Restoration

19) Discharges prohibited under the Sand and Gravel Permit: Sand and Gravel Discharge Prohibition III.1 states that, "the discharge shall not contain silt, sand, clay or other earthen materials from any activity in quantities sufficient to cause deleterious bottom deposits, turbidity, or discolorations in surface waters or to unreasonably affect or threaten to affect beneficial uses." Lehigh sought coverage under the Sand and Gravel Permit for the Permanente Facility in 2011, and is subject to this prohibition.

20) Discharges prohibited under CAO 99-081: Cleanup and Abatement Order Prohibition A.1. states that, "The discharge, or creation of potential for discharge, of any earthen materials, fresh concrete, cement, silt, clay, sand, organic material or any other pollutants that will significantly degrade water quality, and adversely affect beneficial uses of waters of the State is prohibited." The Permanente Facility has been subject to the prohibitions of this Order since 1999.

21) Sediment removal ponds for the Permanente Facility are located within the bed and banks of Permanente Creek, and in jurisdictional wetlands that are hydrologically connected to Permanente Creek: In October, 2008 WRA Environmental consultants performed a wetland delineation of the Lehigh property. The study area encompassed 101 acres of land surrounding Permanente Creek and investigated both active treatment ponds and the creek channel. The report concluded that at least 4 treatment ponds on the Lehigh property, including Ponds 13, 14, 21, and 22 were potentially jurisdictional wetlands. On March 2, 2009, the Army Corps of Engineers confirmed that these 4 ponds were indeed jurisdictional wetlands (USACE File No. 2008-00356S).

a) Pond 13 is an in-stream pond constructed between 1983 and 1989 within the bed and banks of Permanente Creek as an open water sedimentation basin in response to complaints by Santa Clara Valley Water District (SCVWD) that discharges of sediment from the Permanente facility were impacting SCVWD's infrastructure. The baseline volume of Pond 13 is approximately 15,950 cubic yards.

b) Pond 14 is an in-stream pond at the south east end of the Permanente property. It is the last sedimentation basin before water is discharged from the property boundary, and is used during major storm events or other emergency situations when additional storage capacity is needed to capture excess sediment. The baseline design capacity of Pond 14 is approximately 9,150 cubic yards.

c) Pond 21 is a concrete structure built in wetlands that functions as an open water sediment basin that captures nuisance water. It has a baseline design capacity of 252 cubic yards.

d) Pond 22 is an in-stream pond constructed as an open water basin connected to the main line of Permanente Creek through a concrete weir. It was constructed in 2000 to increase sediment capture rate and improve sediment removal on the north east end of the property. The baseline design capacity of Pond 22 is 4,190 cubic yards.[2]

22) In-stream treatment Ponds 13, 14, 21, and 22 are waters of the state regulated by the Regional Board: Ponds 13, 14, 21, and 22 are sediment treatment ponds that were constructed in an area that historically supported wetlands and other aquatic resources. They support hydric plant species indicative of wetlands and are all hydrologically connected to Permanente Creek and have the potential to impact the chemical, biological, and physical characteristics of this waterway. Unlike off-line constructed treatment wetlands, such as storage ponds at wastewater treatment plants that are clearly distinguishable from natural wetlands, sediment treatment ponds 13, 14, 21, and 22 at the Permanente Facility have the potential to adversely impact the continuing function of Permanente Creek. Therefore, each of these areas are subject to regulation by the Regional Board as waters of the state.

23) Ponds 13, 14, 21, and 22 and Permanente Creek provide a number of beneficial uses under the Basin Plan: The Basin Plan lists Permanente Creek as having Beneficial Uses of groundwater recharge, cold freshwater habitat, preservation of rare and endangered species, fish spawning, warm freshwater habitat, water contact recreation, non-contact water recreation, and wildlife habitat. The Beneficial Use of "preservation of rare and endangered species" relates to populations of California Red-Legged Frog (*Rana draytonii*; CRLF) population at the site and historic observations of andromous trout (*Oncorhynchus mykiss*; steelhead)[3] at the site. The natural Permanente Creek channel and Ponds 4A, 13, 14, 21, and 22 may be considered suitable habitat for CRLF.[4] Ponds 14 and 22 were determined to be occupied by CRLF

[2] Huffman Broadway Group (HBG), 2008.

[3] Records show photographic evidence of Steelhead observed in Pond 14 as recently as September 5, 1997.

[4] HBG, 2008.

in repeated protocol surveys, and provide breeding habitat for local populations. In 2000 CRLF was detected in Pond 13.[5]

24) Lehigh failed to obtain the proper regulatory permits for ongoing maintenance of the in-stream ponds: On September 19, 2008 Lehigh submitted an application for water quality certification to remove sediment from ponds and culverts at the Permanente facility. Water Board staff reviewed the application, but did not grant water quality certification because the application was deemed insufficient. Water Board Staff responded with an Incomplete Application Letter on October 17, 2008. Lehigh had not provided mitigation for impacts to wetlands that would be impacted in some of the ponds and proposed that the certification should be approved by the water board under a Categorical Exemption from the requirements of the California Environmental Quality Act (CEQA), arguing that the pond cleanout was maintenance for existing facilities, an action by a regulatory agency for the protection of natural resources, and an action by a regulatory agency for the protection of the environment. Water Board staff informed Lehigh that the categorical exemptions did not apply because the proposed sediment removal from the ponds could impact federally and state listed endangered species.[6] In 2009 Lehigh submitted a draft Streambed Alteration Agreement with California Department of Fish and Game (DFG), which proposed a 5-year workplan to remove sediment from Pond 13 annually between May 1 and October 15. On May 13, 2010, the draft Streambed Alteration Agreement was approved by DFG under an Operation of Law (OpLaw), which approves the draft Agreement without agency review but requires that the proposed project be implemented as described in the application materials. The Regional Board was not copied on this application, and did not find out about the OpLaw approval by DFG until work in Pond 13 was completed. In subsequent communications with the Water Board, Lehigh admitted that sediment was removed from Pond 13 in November, 2009, outside of the proposed seasonal work period in the draft Streambed Alteration Agreement. In addition, Lehigh did not notify the Water Board of the draft Streambed Alteration Agreement or the proposed work plan as required by Prohibition A. 2. of CAO 99-018, and did not obtain either 401 Certification or Waste Discharge Requirements for the work performed in November 2009 or in any subsequent year.

25) Water quality impacts to Permanente Creek from ongoing operational use of Ponds 13, 14, 21 and 22 are unknown: Throughout their operational lifespans, Ponds 13, 14, 21, and 22 have collected large amounts of sediment from the Permanente Facility. Between 1985 and 1997 Kaiser Cement would typically clean out sediment from Pond 13, the Permanente Creek bed, and Pond 14 in late summer.[7] Annual permits were acquired from SCVWD and California Department of Fish and Game to clean out sediment from Pond 14 using a Gradall hydraulic excavator, and

[5] *Id*.

[6] Coorespondence Correspondence from SFBWQCB to Lehigh Southwest Cement dated October 17, 2008. Lehigh challenged this determination in coorespondencecorrespondence from Diepenbrock and Harrison dated February 19, 2009.

[7] Correspondence to SCVWD from Kaiser Cement (Lon Rice) dated August 20, 1997.

large amounts of sediment were removed annually. However, due to a lack of targeted water quality sampling or sediment sampling, specific information about the quality of influent and effluent emanating from these ponds, as well as the impacts of ongoing maintenance activities of the ponds is unknown. It is likely that this quantity of sediment flowing in to the ponds has been reduced in recent years as a result of improved stormwater Best Management Practices (BMPs) at the site.[8] However, Water Board staff believe these ponds are still receiving significant amounts of sediment that could impact water quality. The ongoing use of in-stream treatment ponds and ponds in jurisdictional wetlands potentially results in the direct discharge of sediment and other pollutants to Permanente Creek. This could result in adverse impacts to beneficial uses, and would be a violation of the Sand and Gravel Permit. More information is needed to determine what impacts, if any, result from the continued operation of Ponds 13, 14, 21, and 22.

Section C –Selenium Reporting Requirements

26) Regulatory Requirements for TMDL of selenium in Permanente Creek: In 2006, Permanente Creek was added to the 303(d) list as impaired by selenium. Impaired water bodies are those for which water quality standards are not met or expected to be met after implementation of technology based requirements of the federal Clean Water Act (CWA). The CWA requires the San Francisco Bay Regional Water Board to report to the US EPA on the status of water quality in the State (Section 305(b) water quality assessment), and to provide a list of impaired water bodies (Section 303(d) list) as part of its ongoing regulatory requirements for 303(d) listed water bodies.

27) Observed selenium concentrations are above water quality objectives (WQOs) in Permanente Creek: Permanente Creek is listed as impaired for selenium because observed water column concentrations in the Creek were above the applicable National Toxics Rule water quality objective (WQO) for total selenium for chronic protection (5 micrograms/liter µg/L) as 4-day average. The 303(d) listing was based on data collected by the Water Board's Surface Water Ambient Monitoring Program (SWAMP) in 2002/2003 at an upper reach location of the Creek (PER070, which is the East Fork of Permanente Creek at Rancho San Antonio). Reported total selenium concentrations at this location were all above the chronic WQO of 5 µg/L at PER070 (5.8 µg/L, 10.3 µg/L, and 18.7 µg/L respectively). [9]

28) Selenium is toxic and bioaccumulative: Selenium is a bio-accumulative reproductive toxicant. Excessive selenium dietary exposure has been linked to fish and

[8] CAO 99-081 required Kaiser Cement to install several off-stream ponds to reduce the sediment loading in to Permanente Creek. This may have reduced the amount of sediment collected in Pond 14.

[9] Surface Water Ambient Monitoring Program (SWAMP), Water Quality Monitoring and Bioassessment in Nine San Francisco Bay Region Watersheds in 2001-2003: Walker Creek, Lagunitas Creek, San Leandro Creek, Wildcat Creek/San Pablo Creek, Suisun Creek, Arroyo Las Positas, Pescadero Creek/Butano Creek, San Gregorio Creek, Stevens Creek/Permanente Creek, June 2007

bird deformities and deaths. Selenium is more toxic to vertebrates than to plants and invertebrates. Egg-laying vertebrates are most susceptible to selenium toxicity for reproduction.[10]

Selenium occurs in four major forms in a water body, but selenate and selenite are the predominant forms in water column:

- Selenate (Se VI, as SeO_4^{-2}), an analog to sulfate,
- Selenite (Se IV, as SeO_3^{-2}), an analog to sulfite,
- Selenide (Se II), either as organoselenium or as inorganic selenide salts (insoluble), and
- Elemental selenium (Se 0).

High loadings of selenium are normally associated with disposal of coal fly ash, wastewater discharges from agricultural irrigation, mining, and oil refinery operations.[11] Selenium derived from geologic and anthropogenic sources is mostly in dissolved form, occurring mainly as SeO_4^{-2}.[12]

After selenium enters a water body, bioaccumulation can occur through a variety of processes. Dissolved selenium may slowly uptake by aquatic plants or organisms, such as phytoplankton, zooplankton, and insects, or selenium may bind with suspended solids or sediment.[13,14] Any form of selenium taken up by plants and microbes is converted to organic selenium (organo-selenide (Se II). Se II transformation to selenite (Se IV) occurs after the aquatic plants or micro-organisms die or consumed by other organisms.[15] Low levels of selenium in water can bioaccumulate to toxic levels in fish and wildlife via dietary exposure through the food chain.[16] Selenium concentrations in algae, microbes, sediments, or suspended particulates can be 100 – 500 higher than dissolved concentrations in streams and rivers, and as high as 1000 – 10,000 times in more stagnant waters, such as wetlands, estuaries, oceans.[17] Field studies have observed toxic effects on fish and birds when selenium water column concentrations were 1.5 µg/L to 10 µg/L.[18]

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[10] J. Skorupa, S. Morman, and J. Sefchick-Edwards, Guidelines for interpreting selenium exposures of biota associated with nonmarine aquatic habitats, March 1996.
[11] *Id*.
[12] Samuel Louma and Theresa Presser, 2009, Emerging Opportunities in Management of Selenium Contamination, Environ. Sci. Technol. 2009, 43, 8483–8487.
[13] Richard G. Burau, Environmental Chemistry of Selenium, California Agriculture, July-August 1985.
[14] A. Dennis Lemly, Selenium Transport and Bioaccumulation in Aquatic Ecosystems: A Proposal for Water Quality Criteria Based on Hydrological Units, Ecotoxicology and Environmental Safety 42, 150-156 (1999), Environmental Research, Section B, Article ID eesa.1998.1737, January 1998, available online at http://www.idealibrary.com.
[15] Lemly, D.A., 1999, *supra* note 14.
[16] Skorupa et al., 1996, *supra* note 10.
[17] Luoma and Presser, 2009, *supra* note 12.
[18] Skorupa et al., 1996, *supra* note 10.

29) Selenium monitoring data suggests discharges from Lehigh Facility may be a significant source of selenium: Operations at the Permanente Facility contribute to the discharge of selenium to Permanente Creek. The Discharger mines and processes limestone, and disposes of of low grade limestone and overburden materials on the Permanente Facility property. Water and wastewater generated and discharged into Permanente Creek from the Discharger's operations originate from quarry pit dewatering, stormwater runoff from WMSA and EMSA and other production areas including the Rock Plant, Surge Piles, Cement Plant, as well as the discharge of process wastewater from the production of aggregates and cement. Water quality monitoring of Permanente Creek near the Permanente Facility exhibits elevated selenium concentrations.

Discharges from Pond 4A contribute to effluent dominated flows in Permanente Creek. According to Lehigh's 2011 ROWD, discharges from the quarry pit dewatering have a long term average flow rate of 1000 gallons per minute (gpm) or 2.2 cubic feet per second (cfs), and can be as high as 2000 gpm during the wet season. This discharge outfall has the highest flow among all discharge outfalls from the Lehigh property, and represents a significant portion of the overall surface water flows in Permanente Creek.

Historic studies of the Permanente Facility show elevated selenium concentrations in Permanente Creek near the Permanente Facility. The Draft Environmental Impact Report for Lehigh Permanente Quarry Reclamation Plan Amendment (2011) identified that mined limestone at the Permanente Facility leaches selenium into the water that it contacts.[19] In 2009 and 2010, Golder Associates conducted monitoring at two locations on Permanente Creek.[20] At the downstream station, SW-2, which is downstream of the Quarry pit dewatering discharge point, total selenium ranged from 13 – 85.5 µg/L, with an average of 61 µg/L. These concentrations were much higher than those observed at an upstream station, SW-1, and those in an adjacent creek, the Monte Bello Creek station, SW-3, which was used as a clean background reference site for this study. Total selenium concentrations at SW-1 ranged from 2.3 – 9.2 µg/L, and at SW-3, they were around 0.5 µg/L or non-detected at 0.5 µg/L.

Recent water quality monitoring has confirmed the Discharger's contribution to selenium discharges to Permanente Creek. The 2011 13267 Order required Lehigh to conduct water quality monitoring for selenium and other constituents. In response to this requirement, Lehigh collected samples at two locations adjacent to its operations on Permanente Creek, at an upstream station near the historic Kaiser House, and at a downstream station outside its discharge area near the entrance gate of Heaven Cemetery. Selenium monitoring data collected in 2011-2012 at the Pond 4A discharge outfall had an average total selenium concentration of 56 µg/L (34 – 75 µg/L) (Lehigh

[19] Draft Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report (Lehigh EIR), Santa Clara County, Department of Planning & Development Planning Office, December 2011.

[20] Golder Associates Inc., Hydrologic Investigation, Permanente Quarry Reclamation Plan Update, Rev. 1, November 2011.

Sep. Oct. 2011, 2012). WMSA and EMSA runoff concentrations ranged from 8.3 – 38 µg/L.[21]

Table 1. Sampling Locations on Permanente Creek and Total Selenium Concentrations

Station	Description of Station	Average Concentration (range, # samples) (µg/L)	Year of Data Collected	Source of Data
SW-3	Monte Bello Creek station, used as a reference clean background site	**0.32** (<0.5 – 0.54, four samples)	2009 – 2010	Golder Associates (2011)
Upstream near Kaiser House	Near Kaiser House, upstream of all discharge outfalls	**6.5** (4.1 – 12, nine samples, excluding one suspected outlier)	2011 – 2012	Lehigh (Oct. 2011, 2012)
SW-1	Upstream of all discharge outfalls, maybe the same as Kaiser House station	**7.0** (2.3 – 9.2, four samples)	2009 – 2010	Golder Associates (2011)
Pond 4A	Quarry pit discharge outfall	**56** (34 – 75, 12 samples, excluding one suspected outlier)	2011 – 2012	Lehigh (Sep., Oct. 2011, 2012)
SW-2	Downstream of Quarry Pit discharges	**61** (13 – 85.5, four samples)	2009 – 2010	Golder Associates (2011)
Downstrea m near Cemetery	Outside of Lehigh facility, near the gate of Heaven Cemetery	**25** (12 – 41, nine samples)	2011 – 2012	Lehigh (Oct. 2011, 2012)
PER 70	Permanente Creek at Rancho San Antonio Open Space Preserve	**11** (5.8 – 18.7, three samples)	2002 – 2003	SWAMP (2007)
PER 10	Permanente Creek at Charleston Rd. (lower reach)	**2.5** (1.7 – 3.9, three samples)	2002 – 2003	SWAMP (2007)

[21] *Id*.

Available water quality data, collected at different time periods and for different study purposes, suggests a selenium concentration gradient along the Creek that is higher near the Permanente Facility and decreases downstream. It appears that Lehigh's discharges maybe a significant source of selenium to Permanente Creek.

30) A Selenium Impairment Evaluation is needed: More information about selenium concentrations in Permanente Creek is needed in order for the Water Board to fulfill its regulatory requirements. Selenium that is discharged by the Permanente Facility into Permanente Creek is likely transported downstream where, through interaction with sediment and plants, transformation, deposition, uptake, and bio-accumulation of different elemental species of selenium may all occur. This process could result in significant impacts to the beneficial uses of Permanente Creek. Therefore it is important for the Discharger to submit a Selenium Impairment Assessment Study so the potential impacts to beneficial uses are better understood. Any proposed study should include the entire Creek, including reaches of Permanente Creek adjacent to the Permanente Facility and reaches of Permanente Creek downstream of the Permanente Facility and the Discharger's quarry discharge zone.

Section D - Groundwater Investigation Site History Requirements

31) Threats to soil and groundwater: The current and historic waste disposal practices at the Permanente Facility contributed to the disposal of waste contaminated with industrial materials. A review of historic documents revealed that the Former Kaiser Aluminum site was used for disposal of waste generated by both the Kaiser Cement Plant and the Kaiser Aluminum Plant. Specific areas of concern are:

- Dry Canyon Storage Area - storage of mine waste and manufacturing material from the cement plant, including kiln bricks.
- Impoundment Area – disposal of cement fill and other wastes (sludge).
- Upper Level Landfill – disposal of petroleum coke, filter cake, potliner waste, general waste disposal.
- Former Research Building Complex, Aluminum Foil Plant and Miscellaneous Buildings – manufacturing and possible disposal of magnesium, alumina and refractory carbon research waste.

32) Waste associated with heavy industrial activity is known to exist on the site: Several types of waste were ultimately disposed of on the Permanente Facility Types of waste generated and disposed of onsite include cement kiln bricks used to line the kiln and contaminated with chromium disposed of on the adjacent Kaiser Aluminum facility, cement kiln dust generated by kiln contaminated with mercury (and other metals), and solvents and waste oils from machinery.

33) On-site testing indicates contamination above environmental screening levels exists on the Permanente Facility: Water Board staff reviewed the 1992 Woodward-Clyde Data Transmittal Report, the 1993 Emcon Environmental Evaluation Report, and the 1991 Ecology and Environment, Inc. Report. At the time these reports were written, the Site was defined as the Former Kaiser Aluminum property and the

cement plant. These reports concluded that soil and groundwater on the Permanente Facility were contaminated above the Regional Water Board Environmental Screening Levels (ESLs).

Soil Contamination *		
Contaminant	*mg/kg*	*ESL (mg/kg)***
PCB	400	0.74
TPH	58,000	83
As	10	1.6
Hg	346	10
Pb	120	750
Se	17	10
Th	50	16
Cd	104	7.4

* Highest concentrations reported
** Commercial/Industrial ESLs

Groundwater Contamination *		
Contaminant	*ug/L*	*ESL (ug/L) **
Be	47	0.53
Ba	4900	1000
Cd	80	0.25
Cr	1,000	50
Cr-VI	10	11
Co	350	3
Cu	670	3.1
Sb	300	6
Pb	100	2.5
Ni	920	8.2
Hg	1	0.025
Se	50	5
V	1,100	15
Xylenes	12,900	20
Zn	1,500	81
TPH	60,000	100

34) Full extent of environmental impacts from historic disposal practices is unknown: Very little soil and groundwater sampling has occurred on the Permanente Facility, with the exception of some sampling associated with underground storage tanks. The extent and magnitude of contamination on the Discharger's property is unknown. The quantity of contaminated materials disposed of on-site, and the extent of impacts resulting from historic disposal practices is also unknown. The storage of mine waste, including kiln bricks, which may contain high levels of chromium and mercury, may have resulted in the discharge of metals to groundwater and surface water. More information is needed in order to identify sources of waste and develop cleanup strategies as necessary.

NEED FOR ISSUANCE OF 13267 ORDER

35) Technical reports pursuant to Water Code section 13267: This Order requires the Discharger to submit technical reports pursuant to Water Code section 13267. Water Code section 13267 provides that the Water Board may require dischargers, past dischargers, or suspected dischargers to furnish those technical or monitoring reports as the Water Board may specify, provided that 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. In requiring the reports, the Water Board shall provide a written explanation with regard to the need for the reports and identify the evidence that supports requiring the reports.

36) Need for and benefit of technical and monitoring reports: Technical reports and monitoring reports are needed to provide information to the Regional Water Board regarding the following:

a) The nature and extent of discharge at and from the Permanente Facility;
b) The nature and extent of pollution in waters of the state and United States created by the discharges;
c) The threat to public health and the environment posed by the discharges; and
d) Appropriate cleanup and abatement measures, if necessary.

This Order requires technical information and monitoring data necessary to determine the nature and extent of all existing and future water quality impacts stemming from the Discharger's operations. Information required under this Order is necessary establish discharge standards under the NPDES Permit, and to determine the actions necessary to bring the Discharger into compliance with water quality standards. The reports required by this Order will enable the Regional Water Board to determine the extent of the discharges, ascertain if the condition of pollution poses a threat to human health and the environment in the vicinity of the Permanente Facility or downstream, and provide technical information to determine what cleanup and abatement measures and permits are necessary to bring the Permanente Facility into compliance with applicable water quality standards.

The monitoring activities required by this Order impose new regulatory requirements on the Discharger. More extensive water quality monitoring of the Permanente Facility and Permanente Creek are required under this Order, which will impose a significant expense on the Discharger. These reports are necessary to determine what steps may need to be taken to reduce the amount of pollution discharged from the Permanente Facility to waters of the state. No discharger has a vested right to pollute waters of the State of California. The benefits in eventual improved water quality in Permanente Creek outweigh the financial burden borne by the Discharger in performing additional monitoring and/or making improvements to its operations. Based on the nature and possible consequences of the discharges, the burden of providing the required reports bears a reasonable relationship to the need for the reports, the costs, and the benefits to be obtained from the reports.

IT IS HEREBY ORDERED, pursuant to California Water Code section 13267 that the Dischargers shall submit the following technical reports to the Water Board in response to the above findings as follows:

1) Submission of Permanente Facility Key
DEADLINE: March 22, 2013

An inconsistent set of maps and nomenclature has evolved over time to describe the Facility. In order to understand historical practices and efficiently regulate the Permanente Facility, a consistent nomenclature is needed:

a) The Discharger shall submit a **Permanente Facility Key** that facilitates identification of site landmarks, drainage areas, creek reaches, industrial process areas, points of interest, outfalls, sampling locations, drainage pathways, and any other significant feature that have been tracked in the past. This Key should consist of a table, and shall include:

1. Points of interest, such as monitoring locations, outfalls, creek reaches, landmarks, historic and current structures, and industrial areas;
2. Historical "aliases" for each point (outfall, creek reach, physical feature, etc);
3. Date range and documents in which a nomenclature was used.
    - References to figures and tables shall be clearly defined, and the text, figures, and tables shall not contradict each other.
    - All terms (such as "substantial storm", "emergency discharge") shall be quantified and defined.
    - Maps shall include whole site and detail cut-outs and shall be developed in a manner such as to allow for topographic analyses. All relevant features (such as outfalls) shall be depicted and labeled.

b) Future submissions, including technical reports required by this Order should use the nomenclature identified in the Permanente Facility Key to reference points of interest.

SURFACE WATER DISCHARGE TECHNICAL REPORTS

2) Full list of Outfalls
DEADLINE: February 22, 2013

The Discharger shall provide a comprehensive list of all outfalls or discharge points to Permanente Creek originating on the Lehigh Permanente Property. This should include outfalls being sampled under the Sand and Gravel Permit, and any outfalls discharging or potentially discharging water to Permanente Creek. For each outfall, provide the following information:

a) Identify and provide a detailed narrative description of each specific outfall location, as well as land use and industrial activities discharging or potentially discharging to the outfall.

b) Submit a color photograph(s) that provide a fair and accurate representation of each specific outfall to Permanente Creek.

c) Describe the source of water discharging to the outfall; and

d) Provide a drainage map of each outfall.

3) Line Drawing of Flows, Sources of Pollution, and Treatment Technologies
DEADLINE: February 22, 2013

The Discharger shall submit an updated line drawing showing water flow through the facility, as called for by EPA Form 3510-2C, "Wastewater Discharge Information," Item II-A. The line drawing should illustrate the route taken by water throughout the Permanente facility from intake to discharge. The line drawing should show all operations contributing wastewater, including process and production areas, sanitary flows, cooling water, and stormwater runoff. Similar operations may be grouped together into a single unit, and labeled to correspond to the more detailed listing in item II-B. The discharger must use actual measurements whenever available. Line drawings should be similar to Figure 2C-1 which is provided in the form instructions on EPA Form 3510-2C.

4) Updated Drainage and Operations Map
DEADLINE: March 22, 2013

The Discharger shall submit a complete Drainage and Operations Map covering the entire Permanente Facility, which depicts where all water enters and exit each of the drainage and operational areas.

a) The submittal shall be a comprehensive and complete depiction of all plumbing on site, and illustrate:

- Direction of flow, with arrows indicating such;
- Type of water (stormwater, industrial process water, comingled stormwater and industrial process water) and origin;
- Drainage areas, Discharge locations, and manner of discharge.

b) The submittal shall depict the mining and industrial materials, and any other potential pollutant sources and activities within the flow path of each water stream. **Maps should be of sufficient scale so topographic distinctions can be made and should be no less than 1"=100'.**

c) The submittal shall identify any and all infrastructure used at the Facility to manage water flows. This includes routine, occasional, and emergency infrastructure and existing or potential discharge locations in relation to all various operations at the Facility and the topography of the land. Examples of emergency discharge infrastructure include the Primary Lift Station bypass pipe (the subject of Administrative Civil Liability

Complaint No. R2-2011-0023), and the sump pump area at the Rock Plant just above Permanente Creek.

d) The Discharger should use appropriate mapping methods to depict stormwater flow. For example, the Drainage and Operations Map should be created in ArcGIS using Arc Hydro or a similar program designed to accurately map surface water flow and should not be hand-drawn using AutoCAD.

e) The Discharger should submit a Digital Elevation Model (DEM) to the Regional Board in ArcGIS compatible format. If available, the DEM should consist of light detection and ranging data (LIDAR) information collected specifically for the Permanente Facility instead of publically available DEM files.

f) All data files used to create the Drainage and Operations Map, including the base layers, should be submitted to the Water Board in ArcGIS compatible format.

5) Continuous Flow Monitoring Plan
DEADLINE: February 22, 2013

The Discharger shall evaluate each outfall to determine what equipment and structural modifications are needed in order to continuously monitor flow from all outfalls for volume and basic water quality constituents, such as pH, TSS, TDS, and temperature. The Discharger shall submit an implementation schedule for initiating flow monitoring at all discharge locations. Model-based estimates will not be accepted in substitution for continuous flow monitoring equipment.

6) Submission of Background Monitoring Locations Plan and Reporting
DEADLINE: Ongoing, beginning February 22, 2013

Given the problems identified with using the Kaiser House sampling location as a background monitoring station, the Discharger shall take progressive steps to collect information about background water quality during the 2013 rainy season, and develop a workplan to identify an appropriate background monitoring station. The Discharger shall analyze background samples for the same set of constituents being analyzed for the other previously identified monitoring stations on the Permanente Facility. In addition, the Discharger shall analyze the background samples for temperature, hardness, and pH.

a) Late Wet Season Sampling at Kaiser House: To eliminate the influence of overland flow of stormwater from the West Material Storage Area at this location, the Discharger shall perform one **late season water quality sampling** at the Kaiser House location. The Discharger should perform this sampling between March 15, 2013 and May 1, 2013 at least forty-eight hours after the most recent storm event.

b) Background Sampling of Wild Violet Creek: The Discharger shall also perform one round of water quality sample at Wild Violet Creek near its confluence with Permanente Creek. The Discharger should perform this sampling before May 1, 2013.

c) Background Monitoring Location Identification Plan: By **February 11, 2013**, the Discharger shall submit a Background Monitoring Location Identification Plan, acceptable to the Assistant Executive Officer. This plan should propose four (4) or more alternative monitoring locations, within the Permanente Creek watershed as well as within neighboring watersheds, for consideration as background monitoring locations. For each proposed background station, the Discharger shall discuss the following:

- Ease of access;
- Land use (adjacent and upslope of sampling locations);
- Upstream disturbances or activities;
- Geologic formation over which stream flows before reaching sample location;
- Locations of perennial (annual) versus seasonal stream flow and timing of seasonal stream flow; and
- Options currently or historically used for background stations as well as new options.

d) Background Monitoring Requirements: The Discharger shall monitor proposed background stations as follows:

- Prior to approval of the Background Monitoring Location Identification plan, the Discharger shall sample each proposed background location concurrent with other samples being taken.
- In the first quarterly report following approval of the Background Monitoring Location Identification Plan, the Discharger shall begin to sample the approved background monitoring location only in accordance with the proposed plan.

7) Updated Comprehensive Water Quality Monitoring Implementation and Reporting Plan
DEADLINE: January 22, 2013 (commence immediately)

Prior to issuance of an NPDES Permit, the Discharger shall monitor surface water outfalls in accordance with the following:

Table A: Monitoring locations
Table B: Monitoring frequency
Table C: Monitoring constituents.

Table A lists all surface water sampling locations required for the Permanente Facility. in the This table summarizes ongoing sampling at the Permanente Facility, and corrects errors that have been identified in the Discharger's current monitoring program. Monitoring that should occur at the Lehigh Facility. Monitoring that overlaps with outfalls identified in the Sand and Gravel Permit may be appropriately referenced and

does not need to be repeated. If an outfall is not discharging on the sampling day, the Discharger shall document the outfall conditions with a short video.

To avoid confusion, many sampling locations are depicted in the maps contained in Attachment C. **The Regional Board notes that Latitude and Longitude coordinates submitted in the Discharger's NOI for the Sand and Gravel Permit were inaccurate**. Locations depicted on the Attachment C maps are approximate. Any errors should be noted by Lehigh and corrected by submission of accurate coordinate information for sample locations.

The June 2011 Order required full testing of California Toxics Rule (CTR) materials in order to rule out the possibility of discharge of CTR materials to surface waters. Table C requires monitoring of the same suite of constituents. In previous correspondence with the Regional Water Board, the Discharger has verbally requested that the full suite of CTR constituents be condensed to only those materials likely to be found on the Permanente Site. Regional Water Board staff verbally agreed that the list of constituents could be reduced if the discharger had three (3) sampling events that yielded non-detect (ND) for the given constituent. Table B requires the discharger to monitor for the full CTR list bi-annually. The discharger may request a change to modify this requirement, if it can show that three (3) previous monitoring events yielded ND for one or more of the CTR constituents. At least two (2) of these non-detect sampling events must occur during the rainy season.

8) Chronic Toxicity Sampling:
DEADLINE: January 22, 2013 (commence immediately

The Discharger will perform chronic toxicity sampling to determine if its discharges to Permanente Creek are resulting in chronic toxicity to aquatic organisms.

a) Location and Sampling Techniques

- **Freshwater sampling Pond 4A:** The Discharger shall collect 24-hour composite samples of the effluent at monitoring location EFF-001, for critical life stage toxicity testing for the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.01); the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.01); and the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

- **Freshwater sampling, Pond 9, Pond 13, and Pond 14**: The Discharger shall conduct static renewal toxicity tests with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.01); the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.01); and the green alga,

Selenastrum capricornutum (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

- **Sediment sampling, Ponds 13 and 14.** The Discharger should collect sediment samples from Ponds 13 and 14 and perform a sediment toxicity test. This test should be performed in accordance with Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, EPA 600/R-99/064

b) Methodology: Sample collection, handling, and preservation shall be in accordance with USEPA protocols. In addition, bioassays shall be conducted in compliance with the most recently promulgated test methods. Currently, these methods are contained in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms,* currently 4th Edition (EPA-821-R-02-013).

Dilution Series. The Discharger shall conduct tests with a control and five effluent concentrations (including 100% effluent) using a dilution factor > 0.5. The Discharger may control pH using a buffer only after obtaining written approval from the Executive Officer.

c) Frequency: The frequency of routine and accelerated chronic toxicity monitoring shall be performed as specified below:

- Undertake routine monitoring quarterly.
- Accelerate monitoring to monthly after exceeding a three-sample median of 1TUc or a single sample maximum of 2 TUc. The Executive Officer may specify a different frequency for accelerated monitoring based on the TUc results.
- Return to routine monitoring if accelerated monitoring does not exceed either trigger in (2), above.
- If accelerated monitoring confirms consistent toxicity in excess of either trigger in (2), above, continue accelerated monitoring and initiate toxicity reduction evaluation (TRE) procedures in accordance with section B.3, below.
- Return to routine monitoring after implementing appropriate elements of the TRE, and either the toxicity drops below both triggers in (2), above, or, based on the TRE results, the Executive Officer authorizes a return to routine monitoring. Monitoring conducted pursuant to a TRE effort shall satisfy the requirements

.

d) Adjustments: Exceptions may be granted to the Discharger in writing by the Assistant Executive Officer if specific identifiable substances in the discharge can be demonstrated by the Discharger as being rapidly rendered harmless upon discharge to the receiving water, compliance with the chronic toxicity limit may be determined after the test samples are adjusted to remove the influence of those substances. Written

approval from the Assistant Executive Officer must be obtained to authorize such an adjustment.

e) Chronic Toxicity Reporting Requirements

- **Routine Reporting.** Toxicity test results for the current reporting period shall include, at a minimum, for each test:
- Sample date
- Test initiation date
- Test species
- End point values for each dilution (e.g., number of young, growth rate, percent survival)
- No Observable Effect Level (NOEL) values in percent effluent. The NOEL shall equal to the IC25 or EC25 (see Appendix E-1). If the IC25 or EC25 cannot be statistically determined, the NOEL shall equal to the No Observable Effect Concentration (NOEC) derived using hypothesis testing. The NOEC is the maximum percent effluent concentration that causes no observable effect on test organisms based on a critical life stage toxicity test.
- IC15, IC25, IC40, and IC50 values (or EC15, EC25 ... etc.) as percent effluent.
- TUc values (TUc = 100/NOEL).
- Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)
- NOEC and LOEC values for reference toxicant tests.
- IC50 or EC50 values for reference toxicant tests
- Available water quality measurements for each test (pH, dissolved oxygen, temperature, conductivity, hardness, salinity, ammonia)

SELENIUM REPORTING WORK PLAN

9) Development of a Selenium Impact Assessment Work Plan:
DEADLINE: April 22, 2013

The Discharger shall submit a Work Plan, acceptable to the Regional Water Board Assistant Executive Officer, to investigate the observed selenium gradient downstream of the facility and evaluate potential water quality impacts for its selenium discharges. The Selenium Impact Assessment Work Plan shall identify sampling locations (shown on a watershed map), parameters to be monitored, units of parameters, sampling schedules, analytical methods (minimum level, method detection limit, QA/QC procedures, etc.), and contract lab information.

a) Selection of monitoring locations: The study shall include sampling locations along the entire Creek down to San Francisco Bay, and focus on areas in which selenium accumulation or biological uptake is likely to take place.

- **SWAMP Stations:** The sampling locations shall include all sampling stations on the Creek that were used in SWAMP

monitoring on Permanente Creek in 2002-2003 (see Attachment B).

- **Additional locations on tributaries and on Permanente Creek where tributaries join the Creek:** We recommend that the Work Plan also include additional sampling locations on major tributaries as used by SWAMP see Attachment B). the suggested sampling locations are listed in Table C of this Order.
- **Potential North Side WMSA Runoff pathway leading to Permanente Creek:** The Discharger shall identify runoff pathways on the north side of WMSA and a monitoring location immediately downstream where such runoff enters Permanente Creek.
- **Near-shore Location:** The Discharger shall propose a location at the margin of San Francisco Bay, downstream of Permanente Creek, where the Creek enters the Bay or at a location in Shoreline Park where it receives inflow and sediment from the Creek.
- **Background Station:** The work plan shall identify four candidates for a representative background station to establish a reference site of ambient conditions for Permanente Creek. (This requirement is the same as is being required in the NPDES section of this order.) The proposed background station candidates shall be located in an area that is dominated by open space, with minimal anthropogenic disturbance, and containing dense vegetation so that it provides shading for the Creek. For the purpose of this study, this background station should be located on Permanente Creek upstream and outside the Facility property boundary; or on an adjacent creek that has similar elevation, vegetation, shade, flow, slope, bank and sediment condition, geologic rock types, land use type (open space), etc.

b) Sampling frequency and duration: Frequency of sampling is outlined in Table D, Monitoring Parameters and Frequency, Table E, Monitoring Stations and Required Data and described in Sampling Parameters, below. Sampling frequency for elemental dissolved selenium, particulate selenium, total selenium, and basic water quality chemistry should occur every month. Sediment monitoring for selenium, sulfate, grain size, and total organic carbon should be monitored quarterly.

The Water Board will evaluate the first year's data and may adjust the sampling parameters, frequency, location, and study duration after the first year. The monthly and quarterly sampling will be used to identify seasonal variations.

c) Sampling Parameters: The study plan shall include the following parameters, at the location and frequency as specified in the ordered requirements, Tables D and E, below:

- **Selenium Species**: In addition to total and dissolved selenium, it is also important that the Discharger quantify the four major forms of

selenium, ie, elemental selenium (Se 0); selenide (Se II), selenite (Se IV), and selenate (Se IV), in water column (both dissolved and particulate) and in sediment. Selenium in sediment is an important pathway for mircoorganism's uptake of selenium. This information will be used in evaluating selenium fate and transport in the Creek and watershed.

- **Creek flow**: Creek flow is needed for estimating selenium mass loadings and transport.
- **Sediment grain size**: Sediment grain size (fine, sand, gravel, etc) shall be evaluated to examine the relationship between selenium concentration and sediment grain size, and sediment type at different segments of the creek.
- **Total Organic Carbon:** Total organic carbon in sediment may be an important factor for the partitioning and bioavailability of sediment-associated contaminants and therefore shall be monitored.
- **Other water quality parameters:** temperature, dissolved oxygen (DO), conductivity, oxidation reduction potential, alkalinity, total suspended solids (TSS), chlorophyll-α, and hardness shall be monitored. These are very basic water quality parameters to characterize water quality in the Creek. These parameters will also be needed for future selenium fate and transport modeling efforts.
- **Sulfate**: Sulfate in water and sediment shall be monitored because sulfate competes with selenate to alter its toxicity.

10) Selenium Study Implementation and Reports
DEADLINE: 45 Days after Board approval of Selenium Study Work Plan

a) Immediate implementation: The Discharger shall commence implementation of its proposed Selenium Study Work Plan after 45 days of submittal if the Assistant Executive Officer does not comment on it or as directed by the Assistant Executive Officer. Upon final amendment and approval by the Water Board Assistant Executive Officer, The Discharger shall continue implementation of the final approved Selenium Study Work Plan.

b) Status Reports: The Discharger shall submit quarterly sampling data within 30 days after the end of that calendar quarter (e.g., March 31, June 30, September 31, and December 31). The Discharger has the option to submit a first-year annual report, summarizing all the data collected for the first year, and request for changes to sampling frequency, sampling locations, or other adjustment of sampling scheme, based on first year's sampling results. The first annual report is due within 90 days after the first year's data collection.

c) Final Study Report: The Discharger shall submit a final study report, within 90 days of data collection. The report shall include, at a minimum, all data collected under this study, a summary of significant findings, any QA/QC issues, future

monitoring needs, and proposed actions to address selenium impairments associated with the discharges from the quarry areas.

IN-STREAM TREATMENT POND WATER QUALITY ASSESSMENT

11) Water Quality Impact Assessment Study for In-stream treatment ponds: **DEADLINE: April 22, 2013**

The Discharger shall perform water quality sampling to investigate possible water quality impacts from the ongoing use of the instream treatment ponds. The investigation shall evaluate the potential water quality impacts associated with the use of instream ponds on the Permanente Facility, including possible downstream transfer of sediment from instream ponds to Permanente Creek during storm events, and potential in-situ selenium transformation speciation occurring in the in-stream ponds as a result of long-term sediment storage within Permanente Creek. Water Quality sampling shall be conducted as summarized below and Described on Table A:

a) Location 28: Inflow water quality samples collected upstream of Pond 13, near Creek Data Point 37 on the 2008 Wetland Delineation Map submitted by WRA Environmental Consultants.

b) Location 26: a grab sample should be taken in Pond 13 to test for the four major forms of selenium in the water column.

c) Location 25: Outflow data collected downstream of the concrete weir. This is also a required sampling point for receiving water under the Sand and Gravel Permit. Sampling conducted in accordance with that permit does not need to be repeated, but should be reported in the Instream Sediment Treatment Pond Sampling quarterly reports.

d) Location 11: Inflow water quality samples for Pond 21.

e) Location 10: a grab sample should be taken in Pond 21 to test for the four major forms of selenium in the water column

f) Location 9: Outflow water samples from the Pond 21 complex

g) Location 8: Inflow water quality samples collected immediately downstream of the culvert connecting Pond 21 and Pond 22. A separate sampling point is required here because it appears that there may be water quality impacts to Permanente Creek from bridge to the Permanente Facility.

h) Location 7: a grab sample should be taken in Pond 22 to test for the four major forms of selenium in the water column

i) **Location 5:** Outflow samples for Pond 22 where creek is diverted from Pond 22 around Pond 14.

j) **Location 4:** and Inflow samples for pond 14 collected downstream of the concrete weir at the northeast end of Pond 14.

k) **Location 3:** grab sample should be taken in Pond 14 to test for the four major forms of selenium in the water column

l) **Location 2:** Outfall samples for Pond 14 collected downstream of the concrete weir at the bottom of Pond 14 when flowing.

Sample locations are approximated on the maps contained in Attachment C. The Discharger should perform the sampling monthly beginning in February, 2013, for one year. The Discharger shall submit quarterly sampling data within 30 days after the end of that calendar quarter (e.g., March 31, June 30, September 31, and December 31). The Discharger shall to submit an annual report, summarizing all the data collected for the first year. The annual report is due within 90 days after the first year's data collection.

SITE HISTORY

DEADLINE: April 22, 2013.

Submit a site history report that contains the following information:

a) Chronology of waste disposal activities and other events that may have caused, or had the potential to cause, soil and groundwater contamination at the site. This chronology should be supported by all documents that provide information about past (and present) waste disposal or material storage activities that have been conducted at the site;
A list of environmental investigations and reports conducted at the site;

b) A description of all past and current activities having the potential to contaminate soil and groundwater at the site. This shall include a description of the operation, chemicals used, and wastes generated, recycled, stored, and disposed of on and off site. The description shall disclose any hazardous chemicals and wastes and indicate the maximum quantity of each chemical or waste material used, stored, or disposed of on and off site each year of operation. The description shall consider operations at the following locations, and any other locations where potentially contaminating materials may have been used, stored, or disposed:

- Former asphalt plant;
- Research building complex;
- Former aluminum foil plant;
- Former electrical substation;
- Cement wet kiln processing areas;
- Cement plant;
- Dry canyon storage area;

- Upper level landfill;
- Former impoundment;
- Brine Pond;
- West Materials Storage Area;
- East Materials Storage Area;
- "Pearl Harbor"
- Vehicle maintenance areas; and
- Dry well.

c) A map illustrating locations where contaminants may have been used, stored, or discharged;

d) The locations of subsurface utilities lines on the property (e.g., sanitary sewer, storm drain), to the extent that this information is known or reasonably available;

e) Information about any past chemical or waste spills or releases at the property, including type of spill or release, release location, and any remedial action taken. Copies of any supporting documents, such as letters, memos, etc.;

f) Copies of facility operational permits issued by any federal, state, or local regulatory agencies with respect to soil, groundwater and surface water quality;

g) A description of the sources consulted to respond to the above items (e.g., written records, former employees, local agency files); and

h) A statement that the information provided in response to the above items is full, true, and correct, under penalty of perjury.

GROUNDWATER INVESTIGATION

12) Source identification work plan
COMPLIANCE DATE: February 22, 2013

Submit a work plan acceptable to the Assistant Executive Officer to inventory chemicals used on the site (by name and volume) and to identify all potential pollution sources, including chemical storage areas, sumps, underground tanks, utility lines, and related facilities. The work plan should specify investigation methods and a proposed time schedule.

13) Source identification report
COMPLIANCE DATE: August 22, 2013

Submit a technical report acceptable to the Assistant Executive Officer documenting completion of necessary tasks identified in the work plan to identify sources. The technical report should identify confirmed and possible sources of pollution.

GENERAL REPORTING REQUIREMENTS

Certifications for All Plans and Reports: All technical and monitoring plans and reports required in conjunction with this Order are required pursuant to Water Code section 13267 and shall include a statement by the Discharger, or an authorized representative of the Discharger, certifying (under penalty of perjury in conformance with the laws of the State of California) that the work plan and/or report is true, complete, and accurate. Hydrogeologic reports and plans shall be prepared or directly supervised by, and signed and stamped by a Professional Geologist or Professional Civil Engineer registered in California.

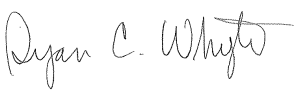
No Limitation of Water Board Authority: This Order in no way limits the authority of this Water Board to institute additional enforcement actions or to require additional investigation and cleanup of the site consistent with the Water Code. This Order may be revised by the Assistant Executive Officer as additional information becomes available.

Enforcement Options for Noncompliance with the Order: Failure to comply with the terms or conditions of this Cleanup and Abatement Order will result in additional enforcement action, which may include the imposition of administrative civil liability pursuant to Water Code sections 13350 and 13268 or referral to the Attorney General of the State of California for such legal action as he or she may deem appropriate.

California Environmental Quality Act compliance: The issuance of this Order is an enforcement action taken by a regulatory agency and is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to section 15321(a) (2), Chapter 3, Title 14 of the California Code of Regulations.

Right to Petition: Any person aggrieved by this action of the San Francisco Bay 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 calendar days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, of 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.



_____

Dyan C. Whyte
Assistant Executive Officer
Prosecution Team Lead

January 22, 2013
Date

TABLES AND ATTACHMENTS

Attachment A: Memoranda from EPA
Attachment B: SWAMP Monitoring Locations
Attachment C: Lehigh Sample Locations Map

Table A: Surface Water Monitoring Locations
Table B: Surface Water Monitoring frequency
Table C: Surface Water Monitoring Constituents
Table D: Selenium Study Work Plan Monitoring Parameters and Frequency
Table E: Monitoring Stations and Required Data

Attachment A: December 2, 2011 Memorandum from EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 9

75 Hawthorne Street
San Francisco, CA 94105-3901

2 December 2011

Memorandum

To: **Greg Gholson, Environmental Scientist**
CWA Compliance Office

From: **Katherine Baylor, Hydrogeologist**
RCRA Corrective Action Office

Subject: **Lehigh Cement Water Balance Study Review**

At your request, I have reviewed the water balance study for Lehigh Cement. The study, titled, "Water Balance and Process Diagram Report, Lehigh Southwest Cement Company, Permanente Plant Site Cupertino, California," was dated 30 September 2011 and was written by Geosyntec Consultants for Lehigh Southwest Cement Company. Listed below are my comments. If you need more information, please contact me at 415-972-3351.

General Comments

1. General: The water balance report is insufficient as written. It contains inconsistencies, is difficult to follow, and has too few graphics and tables to support the text.

2. General: The water use information included in the report is almost entirely estimated. The only definitive water use data is derived from the municipal water supply billing records from San Jose Water Company. Water use within the site is not metered or quantified on a regular basis. On-site water distribution includes both above-ground and subsurface pipelines; few of the pipelines are metered. Efforts should be made to better identify the locations of all water lines on site (surface and subsurface), and document flow rates and water types (e.g., stormwater, reclaim water, municipal water).

3. General (Maps): The site topographic/drainage maps need significant improvement. The map set should include, at a minimum:
a) a topographic map of the entire facility, b) smaller maps (such as 7-1 through 7-3) that show the details of specific areas of the facility. The site-wide topographic map should clearly delineate (box) the locations of the detailed maps, similar to Figure A1 in Appendix A. The detailed maps should include all parts of the facility, including the quarry and Pond 4. All ponds and significant infrastructure elements on each map should be clearly marked and labeled. Directional arrows that show stormwater flow direction should be sufficient in number and location to indicate flow from

slope runoff to drainage conveyances to subsurface vaults, ponds, and impoundments and then to outfalls as appropriate. It may be useful to color-code the drainage areas and directional arrows to better document stormwater flow from the site to the outfalls. The topographic maps in the southern part of the facility should extend to Permanente Creek, which should be marked and labeled. These maps should also include the outfall locations. Although the outfall locations are shown in aerial photographs in Appendix A, they should be integrated with the topographic maps.

4. General: Lehigh may find economic benefits in conducting a more thorough water balance study in order to optimize water resources, potentially reduce the cost of purchased water, and plan for future droughts.

Specific Comments

5. Section 1.4, Data Analysis and Limitations: The report uses recent data (2008-2011) to project future use, while acknowledging that the 2008-2011 time frame was a period of lower site activity due to the economic downturn and reduced commercial need for concrete. California is the second-leading state in the production of portland cement (California Geological Survey, 2009), and future needs are likely to be higher than the 2008-2011 recessionary levels. With the 2010 closure of CEMEX (Santa Cruz County), there may be more need for cement from Lehigh Cupertino in the future. Estimated future use calculations in the report should be revised to project non-recessionary estimates.

6. Sect. 5.5, Rock Plants 1 and 2, Quarry and Primary Crusher: This section indicates that an ultrasonic Doppler flowmeter was used to estimate flow rates for water usage from the 0.5 Mgal tank. Ultrasonic flow meters are commonly used in the wastewater industry, but the technology requires a minimum particulate level to be effective. Water from the 0.5 Mgal tank may be too low in particulates (i.e., too clean) for ultrasonic measurement methods, as suggested by section 5.5 of the report, which indicates that a flow rate for the Quarry line could not be determined. If flow rates related to the 0.5 Mgal tank are a critical part of the water balance study, it may be necessary for Lehigh to install flow meters on a temporary or permanent basis.

7. Sect. 5.5, Rock Plants 1 and 2, Quarry and Primary Crusher: Water usage associated with the 0.5 MGal tank is not well documented. Water flow from the tank is not metered, and water lines from the tank branch off for multiple uses within the facility. Some of the water from the 0.5 Mgal tank eventually discharges to Permanente Creek, but there is insufficient information (and inadequate flow monitoring throughout the Lehigh system) to determine how much municipal water is discharged to Permanente Creek. Additionally, the text description in Section 5.5 is inconsistent with the schematic in Figure 8-1, in that it does not show the branch lines indicated in the text.

8. Section 5.5, Rock Plants 1 and 2, Quarry and Primary Crusher: This section indicates that Quarry office domestic water is consumed via a septic field. This text is potentially inconsistent with Sect. 5.6, Domestic Water, which indicates that water used in the facility's offices and employee workspace is routed to the wastewater treatment plant (WWTP).

9. Sect. 5.8, Quality Control Laboratory: This section indicates that wastewater from the laboratory is discharged to an adjoining septic system. The facility should ensure that the septic system is not used for the discharge of chemicals that may kill off the microorganisms in the septic system. All laboratory waste must be disposed in accordance with local, state, and federal regulations.

10. Sect. 6.2, Water Reclaim Tank A: This section indicates that a subsurface vault near Water Reclaim Tank A has an overflow pipe that discharges reclaim water to Permanente Creek during "substantial storms." A "substantial storm" is not defined in the text, and the frequency (events/year) of such "emergency situations" is also not defined. As part of the facility's overall stormwater management system, the capacity of this (and other) "emergency" bypass structures should be evaluated to determine if they are adequately sized.

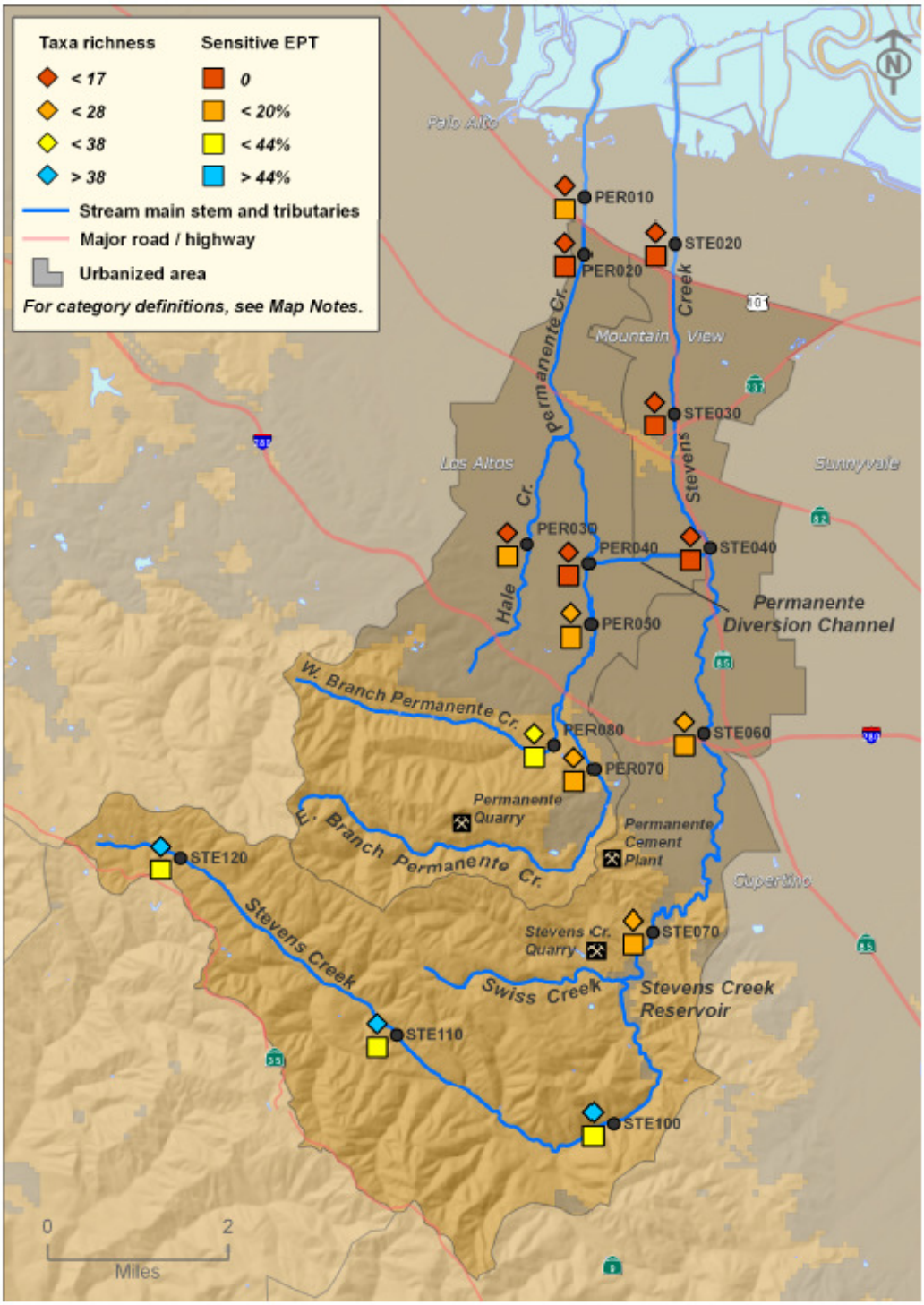
11. Section 7.2.1, TR-55 Stormwater Modeling: This section indicates that TR-55 (Natural Resources Conservation Service public domain watershed hydrology model) was run to simulate runoff volume. The model input parameters and results of the modelling should be summarized and documented in a table and output hydrographs. Input parameters for TR-55 include rainfall distribution type, hydrograph type, the weighted curve number (CN), time of concentration (Tc), acreage of the area and sub-areas, and county-specific rainfall data.

12. Figure 7-2 and 7-3: Stormwater Flow Paths: Some of the directional arrows indicating stormwater flow direction are incorrect, as they show stormwater flowing uphill. These figures should be corrected. It appears this figure was generated in a computer aided design (CAD) program; given the complex topography at the Lehigh site, it may be more appropriate to use a geographic information system (GIS) with topographic tools that can accurately map out stormwater flow directions, or, if available, a CAD program with an integrated digital elevation model (DEM) and software tools to map stormwater flow direction.

13. Figure 6-1, Reclaim Water System and Stormwater Infrastructure: This map (or an additional map if needed) should indicate hardscape (concrete, asphalt) type and extent within the operations area of the facility.

14. Figure 8-1, Water Balance Schematic: This figure is inconsistent with the report text and insufficiently detailed to document water balance for the facility. Sect. 5.5 of the text indicates that Quarry office wastewater is discharged to a septic field, but the septic field is not shown in Figure 8-1. Water lines from the 0.5 Mgal tank branch off into multiple lines with multiple uses which are not shown in Figure 8-1. Showing the water balance graphically is encouraged, but Figure 8-1 is inaccurate and incomplete and should be revised.

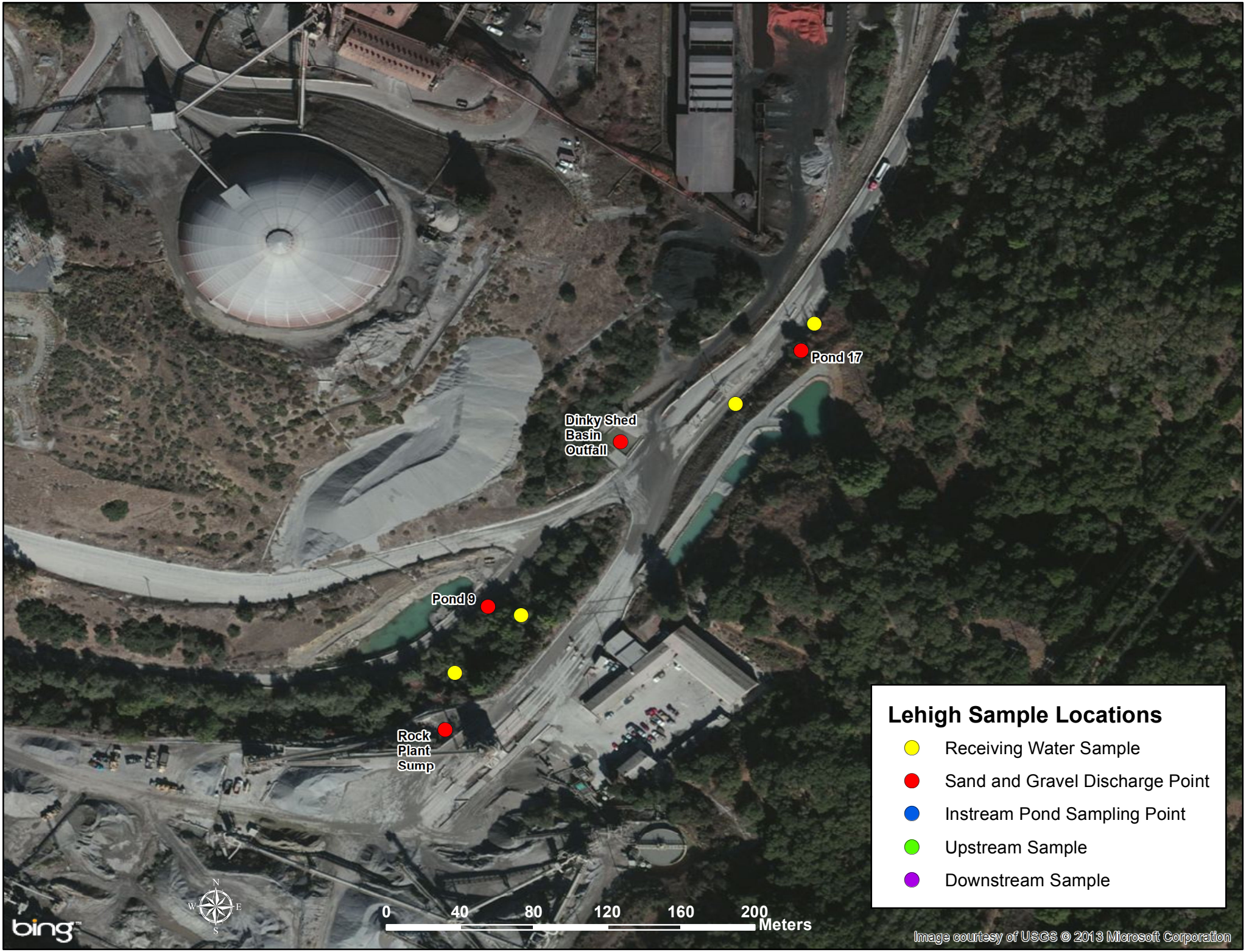
Attachment B: SWAMP Monitoring Locations



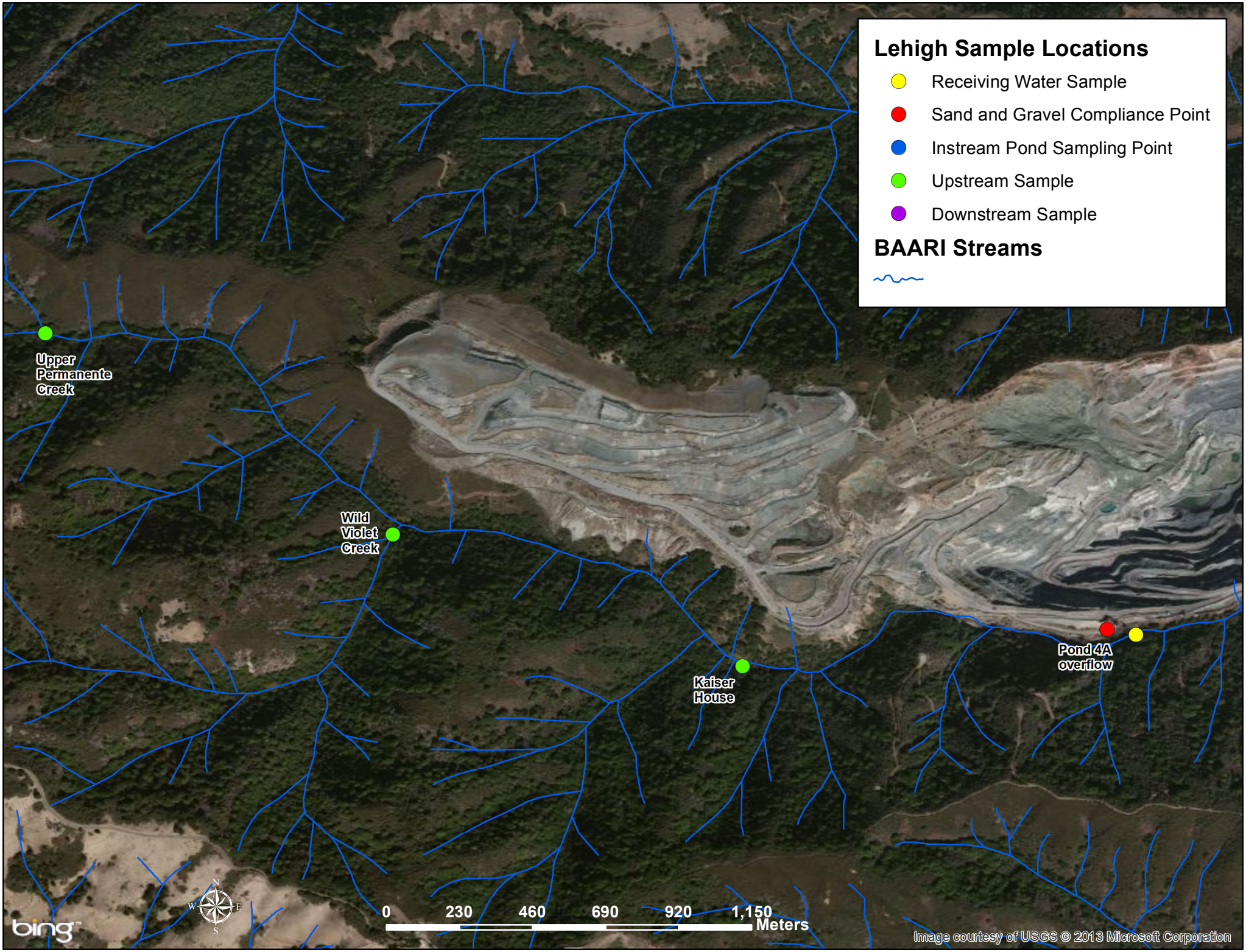
SWAMP Monitoring Locations

Attachment C: Lehigh Sample Location Maps


Downstream Sample Point
Pond 14
Pond 22
Pond 21
Pond 20
Reclaimed Water Emergency Discharge
Lehigh Sample Locations
Receiving Water Sample
Sand and Gravel Discharge Point
Instream Pond Sampling Point
Upstream Sample
Downstream Sample
0 60 120 180 240 300
Meters
N
W
E
S
bing
Image courtesy of USGS © 2013 Microsoft Corporation


Pond 17
Dinky Shed Basin Outfall
Pond 9
Rock Plant Sump
Lehigh Sample Locations
Receiving Water Sample
Sand and Gravel Discharge Point
Instream Pond Sampling Point
Upstream Sample
Downstream Sample
0 40 80 120 160 200
Meters
bing
Image courtesy of USGS © 2013 Microsoft Corporation


Lehigh Sample Locations
Receiving Water Sample
Current Sand and Gravel Compliance Point
Instream Pond Sampling Point
Upstream Sample
Downstream Sample
Pond 13B
Sample Point
Pond 13
N
W
E
S
0
20
40
60
80
100
Meters
bing
© 2013 Microsoft Corporation


Lehigh Sample Locations
Receiving Water Sample
Sand and Gravel Compliance Point
Instream Pond Sampling Point
Upstream Sample
Downstream Sample
BAARI Streams
Upper Permanente Creek
Wild Violet Creek
Kaiser House
Pond 4A overflow
0 230 460 690 920 1,150
Meters
bing
Image courtesy of USGS © 2013 Microsoft Corporation

Tables

Table A – Surface Water Monitoring Locations

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
1	Downstream sample location	Entire Site	50 feet downstream from the outfall for Pond 30 (current monitoring location in Gates of Heaven cemetery)	I	Grab Sample	Downstream sample required under Sand and Gravel Permit	**Existing;** required under Sand and Gravel Permit (current sampling location not appropriate)
2	Pond 14 outfall	Entire site	Outfall from Pond 14 weir to (when flowing)	O	Grab Sample	Discharge water quality from Pond 14	**New;** Required under Order (In-stream treatment pond assessment)
3	Pond 14	Entire site	Water from Pond 14 itself	S	Grab Sample, Grab Sample, test for four major forms of selenium, in water column Chronic Toxicity Sample	Water quality of Pond 14, chronic toxicity of Pond 14	**New;** Required for Chronic toxicity sampling and Instream treatment pond sample
4	Pond 14 Infall	Entire site	Water flowing in to culvert between Pond 22 and Pond 14	S	Grab Sample	Water quality sample of Pond 14	**New;** Required under Order (In-stream
5	SL-26/Pond 22 outfall	Entire site	Bottom of stairs where creek is diverted from Pond	S	Grab sample	Discharge Water Quality from Pond 22	**New;** Required under Order

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
			22 around Pond 14				(In-stream treatment pond assessment)
6	SL-30-PD Pond 30 outfall – SW4(in NPDES ROWD)	Waste impoundment	East Materials Storage Area outfall	O	Grab Sample	Stormwater quality from EMSA	**Existing**; required by Industrial Stormwater permit
7	Pond 22	Entire site	Sample from within Pond 22	I	Grab Sample, test for four major forms of selenium, in water column	Determine water quality impacts of in-stream ponds	**New;** Required under Order (In-stream treatment pond assessment)
8	Pond 22 Inflow	Reflects flow from all parts of facility upstream of influence of Ponds 19, 20, 21 and East Materials Storage Area[22]	Permanente Creek after RR culvert (under road bridge)	S	Grab Sample	Water quality of water flowing to Pond 22	**New;** Required under Order (In-stream treatment pond assessment)
9	Pond 21 outfall	Truck Wash	Discharge from Ponds 19, 20, and 21 Complex to Permanente Creek	S	Grab Sample (when flowing)	Discharge Water Quality of Pond 22	**New;** Required under Order (In-stream

[22] EPA staff observed different color in water before culvert and after culvert; therefore, it is possible a hidden pipe joins creek as it flows through culvert

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
							treatment pond assessment)
10	Pond 21	Truck Wash	Sample from Pond 21	I	Grab Sample, test for four major forms of selenium, in water column	Determine water quality impacts of in-stream ponds	**New;** Required under Order (In-stream treatment pond assessment)
11	Pond 20 discharge point Outfall 005 (in NPDES ROWD) Pond 21 Inflow	Truck Wash	Outfall from Pond 20/Inflow for Pond 21	S	Grab Sample	Inflow sample for Pond 21	**Existing**
12	RWQCB I3 (Per June 2011 13267 Order)	Laboratory parking lot	Corrugated pipe from Laboratory building parking lot (S bank)	O	Grab Sample	Stormwater quality from laboratory parking lot	**Existing**; required by industrial stormwater permit
13	Downstream receiving water Emergency Bypass	Cement Plant	50 ft. downstream of Emergency Bypass discharge	S	Grab Sample	Receiving water quality downstream of emergency bypass	**Existing;** required by Table E-5 in Sand and Gravel MRP
14	Emergency Bypass RWQCB H(per June 2011 13267	Reclaimed water system, cement plant, raw materials storage area (Truck Wash,	Reclaim water system bypass outfall pipe	O	Grab Sample (when Flowing)	Discharge water quality from Pond 11 bypass stormwater and process water	

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
	Order) Discharge Point 008(in NPDES ROWD)	Cement Plant Process and Cooling Water)[23]					
15	Downstream Receiving Water Pond 17	Rock Plant	50 ft. downstream of Pond 17 discharge	S	Grab Sample	Receiving water quality downstream of Pond 17	**Existing;** required by Table E-5 in Sand and Gravel MRP
16	Permanente Creek adjacent to Reclaim Water Tank A	Pond 17 discharges Possibly raw materials storage and possible historic wet cement waste pond, "Pearl Harbor"	In creek sample above RW bypass and below "Raw Materials Storage Area"	S[1]	Grab Sample from Creek	Receiving Water quality for Pond 17 Discharge, detection of pollution from overflow of Reclaim Tank A/Pearl Harbor	**Existing;** discharge point under Sand and Gravel permit
17	Pond 17 Outfall SL-17A-PD (for Stormwater Permit compliance) Outfall 004	Rock Plant, Haul roads	Outfall from Pond 17	0	Grab Sample	Pond 17 discharges	**Existing;** discharge point under Sand and Gravel permit

[23] May also include reclaimed water from Rock Plant if Rock Plant is operating

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
	(in NPDES ROWD)						
18	Downstream Receiving Water Dinky Shed Overflow	Rock Plant Haul roads	50 ft. downstream of Dinky Shed Basin overflow (when discharging	S	Grab Sample	Receiving water quality downstream of Dinky Shed	**Existing;** required by Table E-5 in Sand and Gravel MRP
19	Dinky Shed Basin Overflow (S&G NOI) Outfall 006 (in NPDES ROWD)	Rock Plant, Haul roads	Dinky Shed Basin low point overflow (if discharging)	0	Grab Sample (when flowing) Discharge water quality if Dinky Shed sump not functioning	Dinky shed basin	**Existing;** listed discharge point under Sand and Gravel NOI
20	Downstream Receiving Water Pond 9	Rock Plant Haul roads	50 ft. downstream of Pond 9	S	Grab Sample	Receiving water quality downstream of Pond 9	**Existing;** required by Table E-5 in Sand and Gravel MRP
21	Downstream Receiving Water Rock Sump Overflow	Rock Plant	50 ft. downstream of Rock Sump overflow (when discharging	S	Grab Sample	Receiving water quality downstream of Rock Sump	**Existing;** required by Table E-5 in Sand and Gravel MRP
22	Rock Sump Overflow NPDES ROWD	Rock Plant	Sample from Rock Sump area if sump not working	O	Grab Sample (if necessary)	Water quality from rock sump	**Existing**; listed in Sand and Gravel NOI
23	Pond 9 Outfall	Rock Plant, Haul roads	Outfall from Pond 9	0[1]	Grab Sample Chronic Toxicity	Discharge water quality from Pond	**New and Existing**; listed in Sand

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
					Sample		and Gravel NOI, chronic toxicity sampling required
24	Pond 13 Receiving Water	Crusher	Permanente Creek 50 ft. downstream of Pond 13	S	Grab sample	Receiving water quality from Pond 13 discharges	**Existing;** required by Table E-5 in Sand and Gravel MRP
25	Pond 13 outflow	Crusher	Downstream if Concrete weir of Pond	S	Grab Sample	Water quality sample of Pond 13 discharges	**New;** Required under Order (In-stream treatment pond assessment)
26	Pond 13	Crusher	Sample from Pond 13 directly	O	Grab Sample; test for test for four major forms of selenium, in water column Chronic Toxicity Sample	Determine water quality impacts of in-stream ponds	**New;** Required under Order (In-stream treatment pond assessment)
27	SW-3 (in NPDES ROWD)	Pond 13B Area	Sample outfall from Pond 13A to 13B	O	Grab Sample	Inflow water quality for Pond 13 and receiving water quality for Pond 13 discharges for Sand and Gravel Permit	**Existing;** discharge point under Sand and Gravel permit
28	Inflow to Pond 13	Inflow to Pond 13	Sample inflow to Pond 13	S	Grab Sample	Background water quality of Permanente Creek	**New;** Required under Order

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
						before entering Pond 13	(In-stream treatment pond assessment)
29	Mystery pipe	"Mystery Pipe" discovered by EPA downstream of Pond 4A discharge	Previously undisclosed pipe in the vicinity of Pond 4 discharge	O	Grab Sample (when flowing)	Water quality of unknown discharge	**New**
30	Receiving Water Quality for Pond 4A discharges	Quarry	50 ft. downstream of Pond 4A	S	Grab Sample	Receiving water quality from quarry	**Existing;** required by Table E-5 in Sand and Gravel MRP
31	SL-4A3-PD (for Stormwater Permit compliance) Outfall 001 (in NPDES ROWD)	Quarry Bottom and stormwater from WMSA	Pond 4 discharge	O	Grab Sample Chronic Toxicity Sample	Water quality of quarry discharge	**Existing;** discharge point under Sand and Gravel permit
32	Kaiser House	Historic quarry and slag	"Kaiser House" instream	S	Grab Sample Receiving water quality for Pond 4a for Sand and Gravel Permit	Alternative for Background Sample	**New**
33	New sampling	None	Wild Violet Creek upstream from	S	Grab Sample	Alternative Background	**New**

Location number	Alias or Regulatory Compliance Requirement	Zone/Area of influence	Sample Point description	Outfall (O) or In-stream (S)	Method of Sampling	Purpose of water quality measurement	New or existing regulatory requirement?
	point		confluence with Permanente Creek			Sample	
34	New sampling pong	None	Headwaters of Permanente Creek	S	Grab sample	Alternative Background Sample	**New**

Table B – Surface Water Monitoring frequency

Constituents	Monthly	Bi-annually once dry season, once wet season (first hour of first storm) for year-round outfalls	Storm-dependent flow[24]
Metals	**x**		**x**
Conventional pollutants: BOD, COD, TOC, Oil and Grease, TSS, ammonia, temperature, pH, total nitrogen, total phosphorus, sulfate	**x**		**x**
Full CTR list		**x**	

[24] Storm-dependent flow sampling: grab sample in first hour of discharge followed by a 24-hour composite; limited to operating hours and storms after three working days of no stormwater discharge.

TABLE C – Surface Water Monitoring Constituents

METALS

CTR No	Pollutant/Parameter	Analytical Method[25]	Minimum Levels[26] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
1	Antimony	2042						5		05	5	05		
2	Arsenic	2063				20		2	10	2	2	1		
3	Beryllium							05	2	05	1			
4	Cadmium	200 or 213						05		025	05			
5a	Chromium (III)	SM 3500												
5b	Chromium (VI)	SM 3500				10	5							
	Chromium (total)[27]	SM 3500					50	2	10	05	1			
6	Copper	2009						5		05	2			
7	Lead	2009								05				
8	Mercury	1631 (note)[28]												
9	Nickel	2492						5	20	1	5			
10	Selenium	2008 or SM 3114B or C								2		1		
11	Silver	2722						1		025				
12	Thallium	2792								1				
13	Zinc	200 or 289					20		20	1	10			
14	Cyanide	SM 4500 CN^- C or I				5								
	Aluminum													
	Iron													
	Manganese													

[25] The suggested method is the USEPA Method unless otherwise specified (SM = Standard Methods). The Discharger may use another USEPA-approved or recognized method if that method has a level of quantification below the applicable water quality objective. Where no method is suggested, the Discharger has the discretion to use any standard method.

[26] Minimum levels are from the *State Implementation Policy* .They are the concentration of the lowest calibration standard for that technique based on a survey of contract laboratories. Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (ie, USEPA 2009); Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; DCP = Direct Current Plasma.

[27] Analysis for total chromium may be substituted for analysis of chromium (III) and chromium (VI) if the concentration measured is below the lowest hexavalent chromium criterion (11 ug/l).

[28] The Discharger shall use ultra-clean sampling (USEPA Method 1669) and ultra-clean analytical methods (USEPA Method 1631) for mercury monitoring. The minimum level for mercury is 2 ng/l (or 0002 ug/l).

OTHER (NON-METAL) CTR CONSTITUENTS

CTR No	Pollutant/Parameter	Analytical Method[29]	Minimum Levels[30] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICPMS	SPGFAA	HYDRIDE	CVAA	DCP
17	Acrolein	603	20	5										
18	Acrylonitrile	603	20	2										
19	Benzene	602	05	2										
33	Ethylbenzene	602	05	2										
39	Toluene	602	05	2										
20	Bromoform	601	05	2										
21	Carbon Tetrachloride	601	05											
22	Chlorobenzene	601	05	2										
23	Chlorodibromomethane	601	05	2										
24	Chloroethane	601	05	2										
25	2-Chloroethylvinyl Ether	601	1	1										
26	Chloroform	601	05	2										
75	1,2-Dichlorobenzene	601	05	2										
76	1,3-Dichlorobenzene	601	05	2										
77	1,4-Dichlorobenzene	601	05	2										
27	Dichlorobromomethane	601	05											
28	1,1-Dichloroethane	601	05	1										
29	1,2-Dichloroethane	601	05											
30	1,1-Dichloroethylene or 1,1-Dichloroethene	601	05											
31	1,2-Dichloropropane	601	05											
32	1,3-Dichloropropylene or 1,3-Dichloropropene	601	05											
34	Methyl Bromide or Bromomethane	601	10	2										
35	Methyl Chloride or Chloromethane	601	05	2										
36	Methylene Chloride or Dichlorormethane	601	05	2										
37	1,1,2,2-Tetrachloroethane	601	05											
38	Tetrachloroethylene	601	05											

[29] The suggested method is the USEPA Method unless otherwise specified (SM = Standard Methods). The Discharger may use another USEPA-approved or recognized method if that method has a level of quantification below the applicable water quality objective. Where no method is suggested, the Discharger has the discretion to use any standard method.

[30] Minimum levels are from the *State Implementation Policy* .They are the concentration of the lowest calibration standard for that technique based on a survey of contract laboratories. Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (ie, USEPA 2009); Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; DCP = Direct Current Plasma.

OTHER (NON-METAL) CTR CONSTITUENTS

CTR No	Pollutant/Parameter	Analytical Method[29]	Minimum Levels[30] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
40	1,2-Trans-Dichloroethylene	601	05	1										
41	1,1,1-Trichloroethane	601	05	2										
42	1,1,2-Trichloroethane	601	05											
43	Trichloroethene	601	05	2										
44	Vinyl Chloride	601	05											
45	2-Chlorophenol	604	2	5										
46	2,4-Dichlorophenol	604	1	5										
47	2,4-Dimethylphenol	604	1	2										
48	2-Methyl-4,6-Dinitrophenol or Dinitro-2-methylphenol	604	10	5										
49	2,4-Dinitrophenol	604	5	5										
50	2-Nitrophenol	604		10										
51	4-Nitrophenol	604	5	10										
52	3-Methyl-4-Chlorophenol	604	5	1										
53	Pentachlorophenol	604	1											
54	Phenol	604	1	1										
55	2,4,6-Trichlorophenol	604	10	10										
56	Acenaphthene	610 HPLC	1	1	05									
57	Acenaphthylene	610 HPLC		10	02									
58	Anthracene	610 HPLC		10	2									
60	Benzo(a)Anthracene or 1,2 Benzanthracene	610 HPLC		5										
61	Benzo(a)Pyrene	610 HPLC			2									
62	Benzo(b)Fluoranthene or 3,4 Benzofluoranthene	610 HPLC		10	10									
63	Benzo(ghi)Perylene	610 HPLC		5	01									
64	Benzo(k)Fluoranthene	610 HPLC			2									
74	Dibenzo(a,h)Anthracene	610 HPLC			01									
86	Fluoranthene	610 HPLC	10	1	005									
87	Fluorene	610 HPLC		10	01									
92	Indeno(1,2,3-cd) Pyrene	610 HPLC			005									
100	Pyrene	610 HPLC		10	005									
119-125	PCBs: Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260	608	05											
68	Bis(2-Ethylhexyl)Phthalate	606 or 625	10	5										

Table D – Selenium Study Work Plan Monitoring Parameters and Frequency

Matrix	Constituents group	Parameters	Units	Minimum Sampling Frequency [(1)(2)]
Water column	Basic water quality/chemistry constituents	Total organic carbon Temperature pH DO and DO saturation hardness TSS Chlorophyll-α Sulfate Oxidation reduction potential Alkalinity	mg/L Degree C Standard Unit mg/L, % mg/L as $CaCO_3$ mg/L mg/L mg/L millivolts (mV) milliequivalent per liter (mEq/L)	Monthly for all 30-day continuous monitoring once every quarter for temperature, pH, and DO at selected stations
Water column	Dissolved selenium	Se VI Se IV Se II Total dissolved Se	µg/L	Monthly
	Particulate selenium	Se VI Se IV Se II Elemental Se Total particulate Se	µg/L	Monthly
	Total Selenium	Total organic Se Total inorganic Se Total Se	µg/L	Monthly
Water	Flow	River flow	Cubic feet per second (cfs)	Monthly
Sediment	Selenium Sulfate	Total Se Se VI Se IV Se II Elemental Se Total organic Se Total inorganic Se Sulfate	µg/g dry weight (dw) and µg/g wet weight (ww)	Quarterly
	Grain size	All parameters required to characterize sediment	As appropriate	Quarterly
	Total organic carbon	Total organic carbon	% carbon	Quarterly

Table D notes:

(1) Sampling for all parameters shall occur on the same dates at all locations

(2) One of the sampling events shall occur during the wettest month of the year, after a major rain event One of the dry season sampling shall occur during the driest month of the year

Table E – Monitoring Stations and Required Data

Station	Description	Location	Lat/ Long	Water Column monitoring	Sedi-ment	BMI	Flow	Continuous monitoring for selected parameters
Near-shore Station	(1)	Discharger to propose	propose	Yes plus salinity	Yes	--	--	--
PER010	Charleston Rd	3742118	-122086 73	Yes	Yes	--	Yes	Yes
PER020	Crittendon Middle School	3741206	-122086 63	Yes	--	--	Yes	--
New Station on Permanente Cr*	Downstream of confluence of Hale and Permanente Cr	propose	propose	--	--	--	Yes	--
New Station on Hale Cr *	Hale Cr near Permanente Cr (closer to confluence than PER030)	propose	propose	Yes	--	--	Yes	--
PER040	Permanente Cr near Diversion Channel	3736245	-122086 56	Yes	Yes		Yes	--
New station on Diversion Channel *	Near Permanente Creek	propose	propose	--	--	--	Yes (2)	--
PER050	Loyola Corners	3735264	-122086 17	Yes	--	--	Yes	--
PER070	Rancho San Antonio	3732941	-122085 86	Yes	Yes	--	Yes	Yes
PER080	West Permanente Cr	3733335	-122093 81	Yes	--	--	Yes	--
Pond 14	(3)	propose	propose	Yes	Yes	--	Yes	--
Pond 13	(3)	propose	propose	Yes	Yes	--	Yes	Yes
Background	(4)	propose	propose	Yes	Yes	Yes	Yes	--
Additional stations on creek	(5)	propose	propose	Yes	--	--	Yes	--
Wetland/pond stations*	(6)	propose	propose	Yes	Yes	--	--	--

* Water Board staff recommends that the monitoring plan includes these locations to identify loadings from tributaries as compared to upstream loadings on Permanente Creek.

Table E notes:

(1) Near-shore Location This can be a location in the bay where creek enters the bay; or a location in Shoreline Park, if water body receives flow/sediment from the creek;

(2) For diversion to Stevens Creek, when diversion occurs, monitor flows on the diversion channel near Permanente Creek, if safe to do so;
(3) See "Sampling Locations" above for background station selection requirements;
(4) See "Sampling Locations" above for additional stations on Creek;
(5) If there are wetlands or water ponds that are fed by Permanente Creek, we recommend establish sampling locations in these wetlands/ponds for water and sediment

See the figure below for SWAMP sampling stations (SWAMP 2007).