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January 30, 2014

VIA U.S. MAIL AND ELECTRONIC MAIL

Ms. Dyan Whyte
Assistant Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Re: *Fourth Quarter Report – June 27, 2013 Amended Water Code section 13267 Order, Order No. R2-2013-1005-A1, Directives 8.f and g .- Chronic Toxicity*

Dear Ms. Whyte:

Enclosed, in accordance with the Regional Water Quality Control Board, San Francisco Bay Region's, ("Regional Water Board") June 27, 2013 amended Water Code section 13267 Order, Order No. R2-2013-1005-A1, ("Order"), Lehigh Southwest Cement Company ("Lehigh") provides and encloses the 4th Quarter Monitoring Report pursuant to Directive 8.f. of that Order and the Pond 9 Toxicity Reduction Evaluation Work Plan for *Ceriodaphnia dubia* pursuant to Directive 8.g. of that Order.

4th Quarter Chronic Toxicity Testing

Chronic whole effluent toxicity (WET) testing in the 4th quarter of 2013 indicated <1 TUc for *Selenastrum capricornutum* and *Pimephales promelas* at all locations. Chronic WET testing with *Ceriodaphnia dubia* indicated < 1 TUc at Pond 4A, Pond 13, and Pond 14, and 1.2 TUc toward *Ceriodaphnia dubia* reproduction in Pond 9. The corresponding 3-sample median for *C. dubia* in Pond 9 is 1.2 TUc. Consistent with the triggers described in the Water Code section 13267 Investigative Order (i.e., > 2 TUc single sample maximum or >1 TUc for a three sample median), accelerated monitoring at Pond 9 is triggered. Complete 4th quarter chronic WET results are contained in the report prepared by Pacific EcoRisk.

Collection of the first Pond 9 accelerated monitoring sample is appropriately scheduled for the week of February 3rd. Consistent with provisions of the 13267 Investigative Order, Lehigh has timely prepared an event-specific *Ceriodaphnia dubia* TRE Work Plan for Pond 9 (enclosed).

TRE Update

Consistent with the terms of the tentative NPDES Permit and Cease and Desist Order for the Permanente Facility, the source water to Pond 9 is expected to change (elimination of flow from Pond 11), and Lehigh has selected a treatment system for installation by October 2014 (interim) and October 2017 (final) that is expected to address the observed toxicity. Lehigh will confirm the control of toxicity under the operational conditions of its NPDES Permit and treatment system.

October Sediment Toxicity Testing

The Permanente Facility received greater than 0.25 inches of precipitation on September 22, 2013, triggering a second sediment sampling event in Pond 14 and Pond 22 per the requirements of Provision 8.d. of the 13267 Investigative Order. Analysis of sediment toxicity testing results for Pond 14 and Pond 22 survival indicated a "pass" by the TST. Growth of surviving organisms in all pond samples was unaffected.

Upon completion of sediment testing and *Hyalella azteca* enumeration, dragonfly larva were observed in Pond 22 samples. Dragonfly larva are predators, and are known to prey on *Hyalella azteca* test organism. While this potential test interference was accounted for in October 2013 Pond 22 sediment testing, it is likely that the previous September 2013 Pond 22 sediment sample was similarly affected. This is particularly likely given the unexpected September result, where *Hyalella azteca* mortality was noted, but there was no corresponding effects to *Hyalella azteca* growth – a chemical toxicant that causes mortality would similarly be expected to inhibit growth in the surviving population. However, predation of *Hyalella azteca* in the September 2013 Pond 22 could explain this unexpected result since predation of individuals would not cause inhibition of growth in surviving organisms that avoided predation.

Complete results of October 2013 sediment toxicity testing at Pond 14 and Pond 22 are contained in the report prepared by Pacific EcoRisk. Results of sediment physical and chemical analyses are contained in the laboratory report prepared by Alpha Analytical.

Request to Modify Toxicity Testing in 2014

Consistent with Provision 8.c of the 13267 Investigative Order (first bullet point), Lehigh requests that whole effluent and receiving water chronic toxicity testing be modified for the 2014 calendar year. Provision 8.a. required Lehigh to conduct whole effluent and receiving water chronic toxicity sampling for one year (four quarters) utilizing three species, the *Pimephales promelas* (fathead minnow), *Selenastrum capricornutum* (green algae), and *Ceriodaphnia dubia.* For the reasons set forth below, Lehigh requests that further chronic toxicity testing with *Pimephales promelas* (fathead minnow) and *Selenastrum capricornutum* (green algae) be

discontinued, and that future chronic toxicity testing for whole effluent and receiving waters in 2014 be specified as set forth below:

- Conduct quarterly chronic toxicity testing in 2014 at Ponds 4A, Pond 9, Pond 13, and Pond 14 with *Ceriodaphnia dubia* (survival and reproduction per EPA 1002.0).

In 2013, Lehigh collected four quarterly samples at Ponds 4A, Pond 9, Pond 13, and Pond 14 and tested for chronic toxicity to fathead minnow and green algae. WET monitoring triggers for these species have never been exceeded – all results have been <1 TUc. In contrast, periodic exceedances of the WET monitoring triggers for *Ceriodaphnia dubia* have been observed. Therefore, *Ceriodaphnia dubia* is the most sensitive species. As such, Lehigh requests that water column chronic toxicity testing continue with only *Ceriodaphnia dubia*. This process of identifying the most sensitive species and continuing toxicity testing with the most sensitive species is consistent with chronic toxicity testing provisions in other Region 2 NPDES permits.

Sediment Toxicity Testing

Finally, Lehigh confirms that, consistent with the terms of the 13267 Investigative Order at Provision 8.d., sediment toxicity testing at Ponds 13, 14, and 22 has concluded. With the exception of Pond 22 sediment testing results in September 2013, which were likely caused by native predatory dragonfly larva as noted above, sediment testing has not identified any sediment toxicity and no further action is warranted.

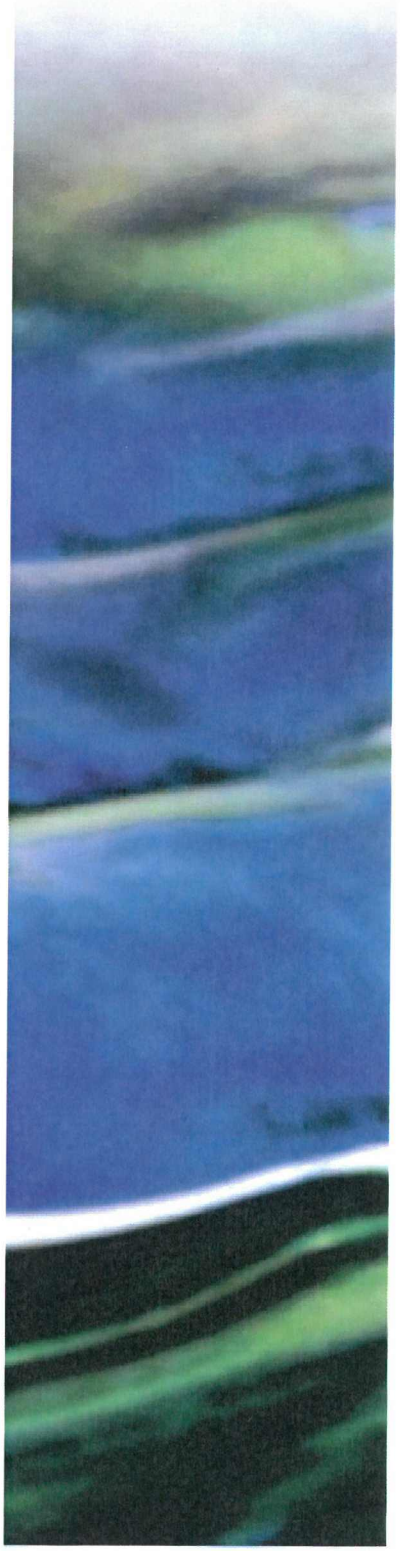
If you or your staff have any questions regarding the above report or enclosed documents, please do not hesitate to contact me or Greg Knapp at Lehigh.

Very truly yours,

Nicole E. Granquist

Cc: Brian Thompson, Regional Water Quality Control Board, San Francisco Bay Region
Greg Knapp, Director Environmental Region West, Lehigh
Scott Rickman, Regional Counsel, Lehigh Hanson

POND 9 TOXICITY REDUCTION EVALUATION WORK PLAN FOR *CERIODAPHNIA DUBIA* PERMANENTE QUARRY AND CEMENT PLANT LEHIGH SOUTHWEST CEMENT COMPANY



Prepared for:

REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

On Behalf of:

LEHIGH SOUTHWEST CEMENT COMPANY

Prepared *by:*

ROBERTSON - BRYAN, INC.
Solutions for Progress

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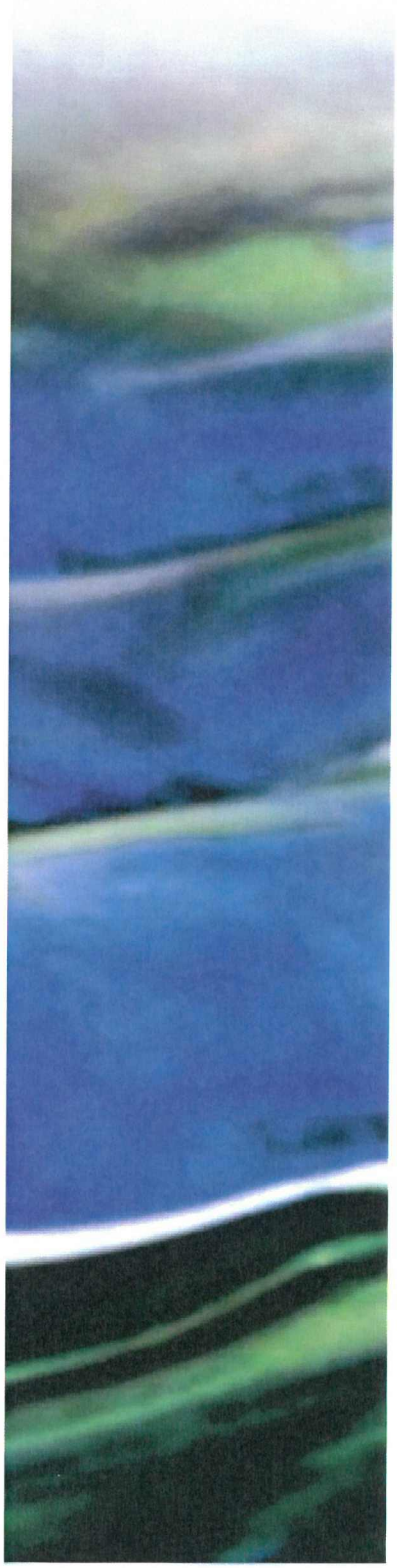

Prepared for:

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SAN FRANCISCO BAY REGION
1515 Clay Street, Suite 1400
Oakland, CA 94612

On Behalf of:

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January 2014

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1 INTRODUCTION

1.1 Facility and Pond 9 Background

The Lehigh Southwest Cement Company (Lehigh) operates the Permanente Quarry and Cement Plant (Permanente Facility) within the drainage of Permanente Creek in southwestern Santa Clara County, California. The discharge of quarry water and other facility process and storm water to Permanente Creek is currently regulated by a general National Pollutant Discharge Elimination System (NPDES) permit for discharges from sand and gravel mining operations (San Francisco Bay Regional Water Quality Control Board (RWQCB) Order R2-2008-0011; NPDES general permit number CAG982001) and a general NPDES permit for stormwater discharges associated with an industrial activity (State Water Resources Control Board (SWRCB) Order No. 97-03-DWQ). In the near future, the Regional Water Board intends to regulate discharges at the Permanente Facility through a facility-specific individual NPDES permit. In 2013, the RWQCB issued a 13267 Investigative Order (R2-2013-0005-A1) directing Lehigh to compile and submit technical and monitoring reports pertaining to discharge water quality, including monitoring for chronic toxicity and a program for toxicity reduction evaluation (TRE).

Discharges from the Permanente Facility to Permanente Creek consist of quarry discharge (ground and storm water entering the quarry that is pumped out), process water, and storm water associated with industrial activities. The 13267 Investigative Order specifies chronic toxicity monitoring for four on-site ponds. The source and characteristics of water in these ponds is summarized in **Table 1**.

Pond 9 is located off-stream and adjacent to Permanente Creek. This pond receives process and storm water from Pond 11 (intermittently) at the cement plant and storm water from the areas immediately adjacent to Pond 9.

Table 1. Characteristics of Permanente Facility Ponds Subject to Chronic Toxicity Testing Provisions of 13267 Investigative Order.

Pond Name	Type of Water	Period / Frequency of Release
Pond 4A	Groundwater and storm water that enters the quarry and primary crusher wash water	Daily
Pond 13	Permanente Creek. During dry season water is primarily that released from upstream Pond 4A	Daily
Pond 9	Cement Plant process water from Pond 11 (intermittent) and storm water	Intermittent in response to inflow
Pond 14	Permanente Creek. During dry season, water is primarily a mix of Pond 4A and Pond 9 proportional to their respective release volumes. Volume of Permanente Creek entering Pond 14 is regulated by an upstream diversion structure that bypasses the majority of flow around Pond 14.	Daily, depending on upstream flow diversion

1.2 Chronic Toxicity Background

Whole effluent toxicity (WET) testing is a monitoring component of Lehigh's 13267 Investigative Order. Chronic three-species WET testing utilizing the green algae *Selenastrum*

capricornutum, the fathead minnow (*Pimephales promelas*) and the water flea (*Ceriodaphnia dubia*) is required on a quarterly basis. WET testing was initiated in the first quarter of 2013. Samples of site water from Pond 4A, Pond 13, and Pond 14 collected in the first quarter of 2013 exceeded the single sample maximum WET monitoring trigger of >2 chronic toxicity units (TUc; expressed as $100/EC_{25}$ or IC_{25}) in the *Ceriodaphnia dubia* test. A similar exceedence of the single sample maximum WET monitoring trigger of >2 TUc was observed during the first accelerated monitoring event, thus triggering a formal TRE. The TRE for observed *Ceriodaphnia dubia* toxicity in Pond 4A, Pond 13, and Pond 14 is currently ongoing, and has identified nickel in quarry seepage water as the principal toxicant. Design and construction of treatment facilities are currently underway.

Samples of Pond 9 site water collected in the first and second quarter of 2013 measured <1TUc to all three species tested. However, for both the third and fourth quarter 2013 *Ceriodaphnia dubia* WET tests indicated 1.2 TUc, and thus the three sample median result exceeded the WET monitoring trigger of >1 TUc. This WET monitoring trigger exceedance at Pond 9 initiated accelerated monitoring and the preparation of this toxicity event-specific TRE Work Plan.

1.3 Purpose and Use of Report

Section 8 of the 13267 Investigative Order describes activities related to chronic WET monitoring. In accordance with the requirements of the 13267 Investigative Order, a general TRE Work Plan was prepared and submitted in May 2013 (RBI, 2013). The general TRE Work Plan provides an initial framework for investigating the causes and sources of chronic toxicity in Ponds 4A, Pond 9, Pond 13, and Pond 14. As required in the 13267 Investigative Order, a toxicity event-specific TRE Work Plan is to be prepared following a chronic toxicity event of magnitude exceeding a WET monitoring trigger. In such cases, the 13267 Investigative Order specifically states:

> *Within thirty (30) days of exceeding either chronic toxicity trigger, the Discharger shall submit to the Regional Water Board a TRE work plan, which shall be the general work plan revised as appropriate for the toxicity event and after consideration of available discharge data.*

Exceedance of the three sample median chronic toxicity trigger for *Ceriodaphnia dubia* in Pond 9 was indicated upon receipt of the final bioassay report received on January 10, 2014. As discussed in greater detail in Section 2, the source or cause of reproductive inhibition observed in Pond 9 initially does not appear related to the *Ceriodaphnia dubia* toxicity under investigation for Ponds 4A, 13 and 14. As such, this document represents Lehigh's toxicity event-specific TRE Work Plan for *Ceriodaphnia dubia* inhibition observed in Pond 9.

The purpose of this TRE Work Plan for *Ceriodaphnia dubia* inhibition is twofold, 1) to comply with the 13267 Investigative Order requirement for a TRE Work Plan specific to the observed toxicity event, and 2) to guide subsequent WET monitoring activities and other actions in response to exceedence of the WET monitoring trigger, including activities during periods of accelerated monitoring and a future possible TRE. This TRE Work Plan builds upon the general guidance provided in Lehigh's general TRE Work Plan (RBI, 2013), and is to be specifically

used to guide all future near-term activities based on a foundation of gathered data relevant to the noted inhibition observed in the third and fourth quarters of 2013.

This Work Plan is presented in three parts, 1) initial investigative actions and findings, 2) suspected cause of toxicity and next steps, and 3) reporting. As discussed in greater detail in the general TRE Work Plan, initial investigative actions include:

- Evaluation of bioassay test performance;
- Initial site water screening, information gathering, and data acquisition; and
- Initial facility performance review.

Based on the findings of these initial investigative actions, the suspected cause or source of toxicity is discussed, and a plan for further investigation is presented. Given the early stage of monitoring and investigative activities, toxicity source evaluation, and toxicity control evaluation are not specifically addressed in this TRE Work Plan. However, a plan of reporting progress to the San Francisco Bay Regional Water Quality Control Board (RWQCB), including future addendums of this toxicity event-specific TRE Work Plan, is provided.

2 INITIAL INVESTIGATIVE ACTIONS AND FINDINGS

2.1 Ceriodaphnia dubia Bioassay Performance Evaluation

Results for calendar year 2013 *Ceriodaphnia dubia* chronic WET tests at Pond 9 are summarized in **Table 2**. All toxicity testing was conducted by Pacific EcoRisk, located in Fairfield, California. Serial dilutions were prepared with laboratory control water. Tests met all method specified test acceptability criteria. Bioassay test results are reliable.

Measurement of standard initial water quality parameters indicated high electrical conductivity (approximately 1200-1500 µS/cm) and very high hardness (approximately 300-700 mg/L as $CaCO_3$), depending on the quarter sampled. Concerns regarding ion balance prompted testing of a hardness blank. The hardness blank was prepared following standard method protocols, utilizing reagent grade salts of calcium, magnesium, sodium and potassium. The hardness blank was prepared to a hardness of approximately 650 mg/L (as $CaCO_3$).

As shown in Table 2, significant effects in the reproduction endpoint for 3rd and 4th quarter WET tests were only observed in 100% site water. Inhibition in 100% site water was relatively weak (i.e., 31% relative effect in Quarter 3 and 32% relative effect in Quarter 4) and was eliminated within the first serial dilution. Inhibition observed in 100% site water was generally equivalent to inhibition in the hardness blank, suggestive of the potential for ionic balance being a possible cause of observed site water inhibition.

Table 2. Pond 9 Survival (%) and Reproduction (neonates/female) Results for *Ceriodaphnia dubia* Chronic WET Testing Conducted in Calendar Year 2013.

Site Water Concentration	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
	Survival	Reproduction	Survival	Reproduction	Survival	Reproduction	Survival	Reproduction
Hardness Blank	100	**10.3***	**10***	**7***	80	**7.5***	100	**20.3***
Lab Control	100	28.9	80	31.4	90	33.3	100	29.5
6.25%	100	32.0	100	30.6	100	34.0	100	29.5
12.5%	100	32.8	100	31.7	100	35.8	100	29.9
25%	100	33.5	100	24.9 [a]	100	31.2	100	26.3
50%	100	33.3	100	30.7	100	35.6	100	29.1
100%	100	27.3	100	**25.1***	90	**23.0***	90	**20.0***
EC_{25}/IC_{25}	>100%	>100%	>100%	>100%	>100%	86.7%	>100%	85.6%
EC_{50}/IC_{50}	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
TUc ($100/EC_{25}$-IC_{25})	<1	<1	<1	<1	<1	1.2	<1	1.2
Site Water Survival at 96 hr	100%		100%		100%		100%	
Sample Dates	March 25, 27, 29 .		June 10, 12, 14		September 9, 11, 13		December 9, 11, 13	

[a] interrupted concentration-response – result considered anomalous
* **statistically significant ($p<0.05$) reduction relative to laboratory control**
EC_{25}/IC_{25} effective or inhibition concentration at 25%
EC_{50}/IC_{50} effective or inhibition concentration at 50%

2.2 Site Water Screening

Recent pond water quality data was compiled for evaluation (**Table 3**). Pond 9 metals and minerals concentrations are similar between inhibitory (12/9/2013) and non-inhibitory samples (3/25/2013). No single constituent, or combination of constituents, is definitively causative.

2.3 Initial Facilities Performance Review

An initial facility performance review indicated that several events and activities occurred during the period of toxicity sampling. Between June and September sampling, Pond 9 filled with macrophytic aquatic vegetation and filamentous algae, creating conditions of pond stagnation at the time of third quarter sampling. In preparation for the coming wet season, Pond 9 was dredged in November to remove the accumulated vegetation, as was Pond 11 (upstream of Pond 9) and the connecting culvert. Maintenance of these two ponds resulted in the resuspension of fine particular matter that was slow to settle. The presence of suspended solids was noted by the field sampler when collecting fourth quarter toxicity samples in early December. It is uncertain to what degree this bloom of vegetation and subsequent maintenance activity caused or contributed to the low levels of *Ceriodaphnia dubia* reproductive inhibition observed in corresponding third and fourth quarter bioassays.

All other activities and operations at the Permanente Facility were routine and within normal operating parameters for the facility.

3 SUSPECTED SOURCE OF EFFLUENT TOXICITY TO CERIODAPHNIA DUBIA AND NEXT STEPS

As indicated in Table 2, toxicity in Pond 9 was weak, and only present in the 100% site water. The relative level of inhibition observed in the third and fourth quarter samples were generally equivalent to the hardness blank. Moreover, observed inhibition occurred during a period of pond stagnation (third quarter) and following a period of pond maintenance (fourth quarter). Chemical analysis of Pond 9 water, and fourth quarter WET sample water does not definitively indicate a responsible chemical constituent. As previously discussed, chemical analysis of metal and mineral constituent concentrations between samples corresponding with the presence and absence of *Ceriodaphnia dubia* reproductive inhibition does not indicate any single constituent, or combination of constituents, as causative - overall metal and mineral composition of inhibitory and non-inhibitory water were generally the same (Table 3).

Investigations into the cause and source of toxicity to *Ceriodaphnia dubia* at Pond 4A identified nickel as the likely cause of toxicity. Nickel concentrations at Pond 9 (1-7 µg/L) are substantially lower than nickel concentrations observed at Pond 4A (50-70 µg/L). Nickel is an unlikely contributor of toxicity observed at Pond 9. Moreover, the source of water at Pond 4A (quarry and primary crusher) is distinctly different from that at Pond 9 (cement plant and storm water runoff). For these reasons, observed inhibition in Pond 9 is unlikely to be strongly related to previously investigated inhibition at Pond 4A.

Table 3. Trace Metals and Bulk Ions in Pond 9 Discharge Water

Parameter	Units	RL	3/21/2013	3/25/2013	4/5/2013	6/12/2013	9/4/2013	12/9/2013
			Grab	1st Quarter WET	Grab	24 hr Composite	Grab	4th Quarter WET
Antimony	µg/L	0.5	0.59	ND	ND	ND	ND	0.53
Arsenic	µg/L	0.5	2.1	0.84	ND	0.81	0.51	1.6
Barium	µg/L	0.5	91	64	63			76
Beryllium	µg/L	0.1	ND	ND	ND	ND	ND	ND
Boron	µg/L	50		120				140
Cadmium	µg/L	0.1	ND	ND	0.37	ND	0.28	ND
Chromium	µg/L	0.5	16	2.7	1.8	ND	ND	8.4
Cobalt	µg/L	0.1	0.70	0.71	0.77			0.71
Copper	µg/L	0.5	3.2	1.9	1.7	1.5	0.88	3.6
Iron	µg/L	100		210				360
Lead	µg/L	0.25	ND	ND	ND	ND	ND	ND
Molybdenum	µg/L	2.5	55	98	100			37
Nickel	µg/L	0.5	4.2	6.5	3.4	1.4	1.9	5.9
Selenium	µg/L	1	20	15	12	5.4	2.0	7.7
Silver	µg/L	0.1	ND	ND	ND	ND	ND	ND
Thallium	µg/L	0.1	2.0	0.79	0.41	ND	ND	0.38
Vanadium	µg/L	10	38	9.4	8.3			31
Zinc	µg/L	5.0	5.0	5.0	ND	2.3	4.8	7.8
Calcium	mg/L	1		150	170			92
Magnesium	mg/L	1		53	59			26
Potassium	mg/L	1		21				42
Sodium	mg/L	1		53				110
Total Dissolved Solids	mg/L	10		1200	1000	1000	1200	860
Total Alkalinity ($CaCO_3$)	mg/L	5		200				140
Chloride	mg/L	0.5		63	47	58	53	140
Sulfate (SO_4)	mg/L	10		470				230

Fourth quarter (12/9/2013) grey shaded column corresponds to 1.2 TUc sample. First quarter (3/25/2013) sample was <1TUc. There was no chemical analysis of 2nd and 3rd Quarter WET samples. Blank cells indicate that parameter was not measured.

RL reporting limit
ND not detected at or above the RL

At the present time, the source and/or cause of observed chronic *Ceriodaphnia dubia* inhibition is not readily identifiable. The observed magnitude of inhibition is such that it is uncertain whether accelerated monitoring will trigger a formal TRE. Despite this uncertainty, future possible TRE-related activities are discussed in the following subsections.

3.1 Continued and Ongoing Facilities Performance Review and Non-WET Monitoring

Facilities performance review is an on-going process, and will continue through accelerated monitoring and TRE process. Chemical constituent monitoring will continue as planned and scheduled per the Sand and Gravel NPDES permit and the 13267 Investigative Order. Additional chemical constituent monitoring beyond that specified in the NPDES permit and 13267 Investigative Order is currently not proposed, but may be added as directed by the TRE investigative process.

3.2 Accelerated Monitoring and Continued 13267 Investigative Order Prescribed Monitoring

As required in Lehigh's 13267 Investigative Order, observed reproductive inhibition to *Ceriodaphnia dubia* in Pond 9 triggers accelerated monitoring. Accelerated monitoring includes monthly WET testing for three consecutive months for the affected species in the affected ponds. If, during accelerated monitoring, the WET trigger is exceeded again, a TRE is initiated. If, after three accelerated monitoring events, the WET trigger is not exceeded, monitoring for the affected species may return to a routine quarterly schedule.

3.3 TRE WET Monitoring and TIE Trigger and Procedures

Monthly accelerated monitoring for *Ceriodaphnia dubia* chronic WET testing will continue at Pond 9 for a minimum of three consecutive months, or until a TRE is triggered. As previously discussed, it is not certain that accelerated monitoring will lead to triggering of a formal TRE, and any incumbent need for further investigation.

Consistent with Lehigh's general TRE Work Plan, sufficient additional sample volume will be collected with each accelerated monitoring sampling in order to further the investigative process if a TRE is triggered. If accelerated monitoring results in TRE initiation, the trigger for follow-up investigative testing will follow the protocol presented below:

- If there is a persistent toxic effect at 2 TUc or less (i.e., $1 < TUc < 2$), then Lehigh would investigate further, including potential Toxicity Identification Evaluation (TIE) work or toxicity stability testing, if the magnitude of the effect is large (i.e., greater than 50% inhibition in undiluted site water).
- If $TUc > 2$ with a relative effect level greater than 50% inhibition in undiluted site water and the effect appears to be persistent and driven by site water toxicity, then one or more TIEs will be conducted in an effort to identify the causative constituent(s).

Per the protocol above, if observed toxicity is sufficiently large to warrant a TIE, a modified Phase I TIE will be performed. Observed toxicity greater than this TIE trigger has a higher probability of developing useful information from the TIE procedures. Given the type of operations at the Permanente Facility, the modified Phase I TIE will target a selection of toxicant

classes, with an emphasis on inorganic metals and ions **Table 4**. Several listed treatments overlap in target toxicant class, but individually confirm and corroborate each other and assist with narrowing the potential list of toxicants within the class. If applicable, aliquots of those treatments that successfully identify a toxicant class will be subject to targeted chemical analysis for preliminary toxicant identification.

Table 4. Initial Phase I TIE Treatments and Targeted Toxicant Classes.

TIE Treatment	Target Toxicant Class
Aeration	Volatiles, oxidizable compounds, semivolatiles with pH adjustment
Filtration/Centrifugation	Physical matrix and particle effects
pH adjustment	Organic acids/bases, metals speciation
Anion/Cation Exchange	Charged ions
Zeolite	Charged ions, ammonia
C_{18} Solid Phase Extraction	Non-polar organics
Ethylenediaminetetraacetate (EDTA)	Cationic metals
Sodium Thiosulfate (STS)	Oxidizable compounds and cationic metals

Upon completion of the initial Phase 1 TIE, results will be evaluated to determine if a toxicant class(es) can be identified. Upon completion of this evaluation, additional targeted Phase I TIE experiments will be developed and scheduled for the same sample, or a new sample, depending on expected toxicant stability, remaining sample volume, and the specific initial Phase I TIE result. Based on the strength of evidence generated through the initial and/or subsequent TIEs, experiments will be conducted to confirm the identified toxicant(s). Experiments may include toxicant removal and add back, serial additions and/or toxicant spiking experiments.

In addition to TIEs, experiments may be conducted with synthetic site water. Given the high dissolved solids, hardness, and sulfate content of Pond 9 site water, inhibition due to ion imbalance may be occurring. Evidence for such effects is supported by the hardness blank test conducted along with WET testing. Synthesizing a site water based on actual measured chemical composition of Pond 9 sample will allow specific investigation into possible ion effects. Possible experiments could include comparison of concentration-response relationships from diluting site water with laboratory control water alongside site water diluted with synthetic effluent.

In summary, all TRE-related WET testing and TIE work will be conducted on an evidence-driven basis. Evidence and data developed through the forensic TRE process, including TIE testing, will determine next steps and associated schedule for TRE actions. Given issues of possible toxicant stability and necessary sample volume, sampling for experimentation as described above is anticipated to be conducted on an approximate once per month schedule, the frequency of which will be accelerated or reduced pending findings from initial TRE activities.

3.4 Mitigation and Prevention Activities Schedule

Further investigation under this TRE Work Plan will be necessary before mitigation and prevention activities can be identified. In such a case, mitigation and prevention activities, and associated schedules, will be provided when potential causes and/or sources of toxicity can be more assuredly identified. As discussed in Lehigh's general TRE Work Plan, once toxicity has been identified and controlled at its source, confirmatory tests will be conducted to verify that toxicity is no longer present.

4 REPORTING

Lehigh will report on activities to the RWQCB: 1) following the completion of accelerated monitoring that indicates frequent toxicity is not occurring and thus a return to routine monitoring is warranted, or 2) in the third quarter of 2014, should *Ceriodaphnia dubia* toxicity greater than the WET monitoring triggers formally initiate a TRE at Pond 9. In the first case, Lehigh will communicate to the RWQCB its intent to return to routine quarterly monitoring for *Ceriodaphnia dubia*. In the second case, an Addendum will be prepared to this specific TRE Work Plan, that will add information obtained from the accelerated monitoring and any related actions, and submitted to the RWQCB. The TRE Work Plan Addendum will summarize all TRE activities accomplished to date, including any forensic TIE, and provide a revised schedule for TRE activities in the future.

5 REFERENCES

Robertson-Bryan, Inc. (RBI). 2013. *General Toxicity Reduction Evaluation Work Plan, Permanente Quarry and Cement Plant, Lehigh Southwest Cement Company*. Elk Grove, CA. May 2013.