Fact Sheet for NPDES Permit WA0045586
Lehigh Cement Company

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Lehigh Cement Company.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least 30 days before issuing the final permit. Copies of the fact sheet and draft permit for Lehigh Cement Company NPDES permit WA0045586, are available for public review and comment from June 16, 2021 until July 16, 2021. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement** Information.

Lehigh Cement Company reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as **Appendix F** - **Response to Comments**, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

Lehigh Cement Company (Lehigh) maintained ownership of the landfill commonly referred to as the closed cement kiln dust (CKD) pile. The cement plant placed an estimated 544,000 tons of waste in the onsite landfill, completely filling the ravine where the landfill was located. The CKD pile is covered with an impermeable membrane to eliminate, to the extent practicable, the amount of precipitation infiltration that comes into contact with the waste kiln dust. However, the CKD pile comes into contact with groundwater flow. Contact with groundwater results in a change to the pH of the groundwater, which also has an impact on the mobilization of the metals in naturally occurring minerals in the vadose and saturated zone Lehigh, 2006).

Lehigh installed a groundwater capture zone and subsurface treatment system that discharges to Sullivan Creek. The proposed permit includes the allowance of a mixing zone for water quality based effluent limits (WQBELs); changes the water quality based pH limit from 6.5-8.5 to 6.87-8.5; and continues the technology based limits of arsenic, lead, chromium, and manganese identified in the previous permit.

The proposed permit provides a compliance schedule requiring an engineering report that identifies a path to compliance, installation of a flow meter, and a plan for either manual composite samples or a mechanical composite sampler for all three points of discharge to the diffuser.

In addition to the changes to limits and monitoring, the proposed permit includes a baseline sediment study and a trace metals receiving water study.

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I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to industrial NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any industrial facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A - Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix F**.

II. Background Information

Table 1: General Facility Information

	Facility Information
Applicant:	Lehigh Cement Company
Facility Name and Address	Lehigh Cement Company Closed Cement Kiln Dust Pile Site Milepost 14.7 Washington State Route 31 Metaline Falls, WA 99153
Contact at Facility	Greg Ronczka, MPH, P.G. Vice President - Environment & Sustainability 300 E. John Carpenter Freeway Irving, TX 75062 (972) 657-4301
Responsible Official	Greg Ronczka, MPH, P.G. Vice President, Environment & Sustainability 300 East John Carpenter Freeway Irving, TX 75062 (972) 657-4301
Industry Type	Closed Cement Kiln Dust Pile Groundwater Contamination Treatment Facility
Type of Treatment	Neutralization by diffusing carbon dioxide into high pH groundwater
SIC Codes	3241
NAIC Codes	327310
Facility Location (NAD83/WGS84 reference datum)	Latitude:48.8609 Longitude: -117.3668
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Sullivan Creek Latitude: 48.861192 Longitude: -117.366772

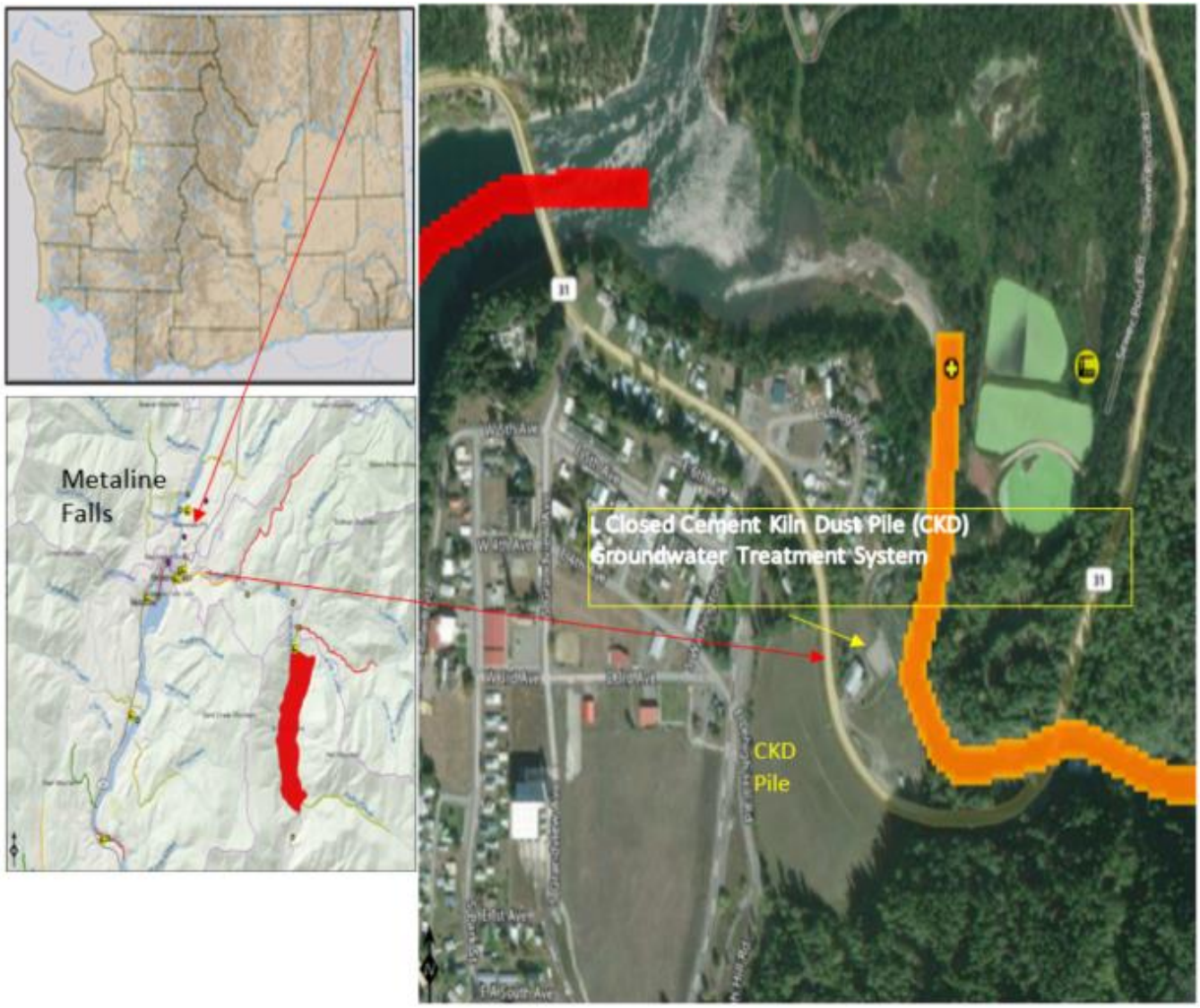
Table 2: Permit Status

	Permit Status
Issuance Date of Previous Permit	September 27, 2006
Application for Permit Renewal Submittal Date	July 02, 2018
Date of Ecology Acceptance of Application	July 19, 2018

Table 3: Inspection Status

	Inspection Status
Date of Last Non-sampling Inspection Date	09/20/2017

Figure 1: Facility Location Map



A. Facility description

History

Lehigh Cement Company (Lehigh) maintained ownership of the landfill commonly referred to as the cement kiln dust (CKD) pile. The cement plant placed an estimated 544,000 tons of waste in the onsite landfill, completely filling the ravine where the landfill was located.

On November 5, 1984, Lehigh submitted Part A of the Dangerous Waste Permit application to Ecology. Upon submittal of the Part A application, the CKD landfill became an interim status dangerous waste treatment, storage, and disposal (TSD) facility.

Starting in 1984, the regulations changed and Lehigh's activities were no longer exempt from state dangerous waste regulations. Lehigh submitted a Notification of Dangerous Waste Activities to Ecology (Form 2) informing that Lehigh would be generating and disposing of dangerous wastes at the Metaline Falls facility. Ecology issued identification number (ID #) WAD 009063116 to Lehigh. Lehigh transferred this ID# to Lafarge Corporation in 1989 at the time of sale. Lehigh retained ownership of the closed cement kiln dust landfill - see Figure 2.

On August 17, 1995, Lehigh submitted a new Notification of Dangerous Waste Activities for the landfill. Ecology issued ID# WAR00004598 to the landfill and made the number retroactive to the date of the sale, May 31, 1989.

Lehigh did not complete the application process for a permitted TSD by completing and submitting Part B of the application. Instead, they closed the landfill as an interim status TSD per the regulations (WAC 173-303-400 and 40 CFR Part 265 Subparts F-R). However, Ecology found that the CKD landfill is still a "dangerous waste facility as defined by 173-303-040." This included the "landfill and property adjacent to the landfill regardless of control, which are affected by releases of dangerous constituents from the landfill" (Consent Decree, 2006).

This led to investigations, and site surface and groundwater characterizations prepared by Dames and Moore Consultants in 1991 and 1993. The investigations identified that the groundwater was strongly alkaline and contained concentrations of arsenic and lead that exceeded the groundwater cleanup level established under the Model Toxics Control Act (MTCA) (Chapter 173-340 WAC and 70.105D RCW).

In April 1996, Lehigh submitted the "Final Closure Plan, Cement Kiln Dust Pile, Metaline Falls, Washington" to Ecology. Ecology reviewed the plan and issued a letter in May 1996 identifying the plan deficiencies. Lehigh resubmitted in June 1996 and Ecology approved in June 1996.

Lehigh implemented the approved plan during the remainder of 1996. Closure included construction of an impermeable cover on the landfill surface to minimize infiltration of precipitation. They constructed a stormwater management system to limit run-on and -off of precipitation from the pile. Lehigh received the Closure Certificate from Ecology on June 17, 1997.

Lehigh implemented the Post Closure and Maintenance Plan submitted to Ecology in 1995. Ecology issued Order No. DE96HS-E934, which required Lehigh to submit and implement a short-term plan for groundwater monitoring data collection. In 1997, Lehigh submitted the "Short-Term Post – Closure Care Plan, Cement Kiln Dust (CKD) Pile, Metaline Falls, Washington" to Ecology. Lehigh collected groundwater data between December 1996 and December 1998.

In 1999, Lehigh submitted the groundwater data report to Ecology. The data report indicated that high pH leachate from the landfill was still entering the groundwater and contained high levels of arsenic, lead, and chromium. Ecology issued Agreed Order No. DE99HS-E941 requiring Lehigh to conduct a remedial investigation (RI) and feasibility study (FS) under MTCA to address groundwater impacts.

The RI indicated that high pH groundwater surfaced on low-lying areas northeast of the site and north of Highway 31. The groundwater discharged through the bank of Sullivan Creek and through North Creek to Sullivan Creek.

Following the RI, Lehigh completed an in situ pilot study of a groundwater treatment wall delivering in situ carbon dioxide to lower the groundwater pH to between 6.5 and 8.5. The pilot accomplished lowering the pH to the desired range and lowering the dissolved arsenic concentration of the groundwater.

In 2003, Lehigh submitted the FS "Feasibility Study Technical Memorandum", screening the remedial alternatives for the site, followed by the draft technical report to Ecology. The report evaluated a narrowed list of remedial alternatives. Lehigh revised the report based on Ecology comments and resubmitted in 2005. The public reviewed the final FS, Ecology addressed comments, and issued the final approval for the revised FS report.

Based on the RI and FS, Ecology prepared a draft Cleanup Action Plan for the site. This plan is Exhibit B in the 2006 Consent Decree. Lehigh implemented the Consent Decree cleanup alternative in situ carbon dioxide injection (Figure 3), Ecology's Toxics Cleanup Program developed NPDES Permit WA 0045586, and the Water Quality Program issued the permit. The permit expired in 2011 and Ecology administratively extended the permit. The permit allowed for discharge to Sullivan Creek and placed limits on total arsenic, chromium, lead, manganese, and pH.

From 2011 to present, Lehigh has been working to address elevated metals concentrations and to identify portions of the groundwater collection system that are not directing high pH groundwater into the treatment system. This area discussed with TCP and Lehigh during the 2017 inspection is just north of the slurry wall and includes monitoring wells PM15 and PM19 (Figure 3). Lehigh indicated that they assumed that this would self correct once the slurry wall cut off the source of high pH groundwater. According to the information provided during the inspection, this has not been the case

Figure 2: Closed CKD Pile Site Layout

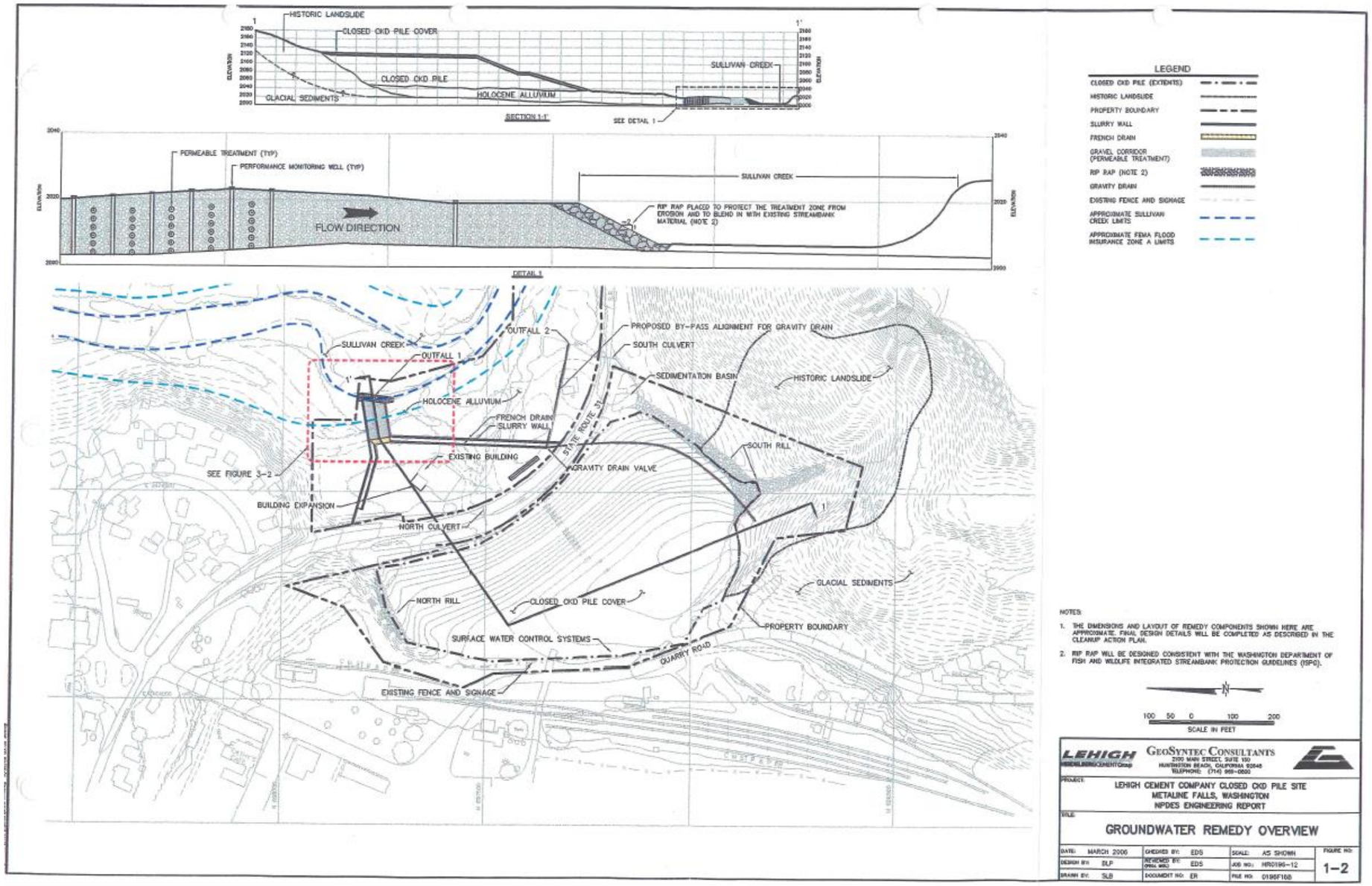
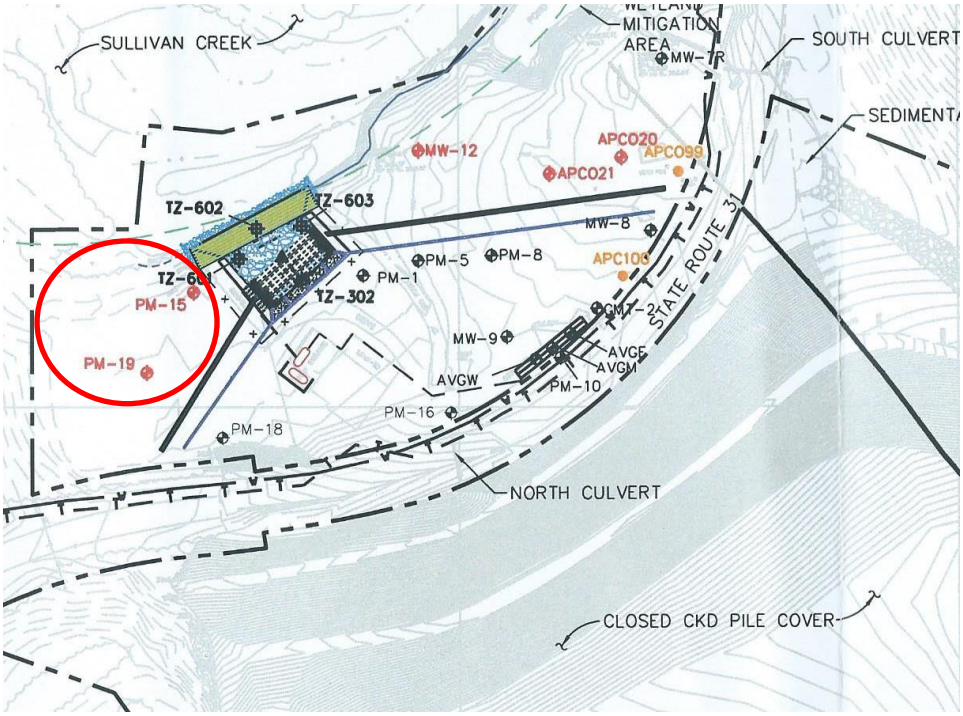


Figure 3: Groundwater Monitoring Network in and Around Treatment Area



The proposed permit will require Lehigh to provide an engineering report identifying the nature of the groundwater northwest of the treatment system groundwater capture zone and indicate whether or not the groundwater discharging to Sullivan creek is meeting water quality criteria(Figure 3).

The engineering report should also identify a path way to compliance with permit limits for the groundwater in the treatment capture zone. The engineering report must discuss alternatives and provide recommendation for upgrades needed to the treatment system to meet water quality criteria for Sullivan Creek. The permit also has a compliance schedule for installation of a flow meter and identify a mechanism for either manual or composite samples.

Based on flow, the facility is considered a minor discharger.

Industrial Processes

Lehigh no longer owns the cement production facility. As a result, there are no active industrial processes at the site.

Wastewater Treatment Processes

The groundwater remediation carbon dioxide treatment system (Figure 4) treats groundwater contamination resulting from CKD contact with groundwater and infiltrating precipitation prior to discharge to Sullivan Creek. The cleanup action included:

- A cap of the kiln dust pile to limit the future infiltration of the precipitation
- A hydraulic boundary that directs groundwater to the wastewater treatment system and away from the kiln dust pile (Figure 2)
- A carbon dioxide injection system (Figure 5)
- A subsurface carbon dioxide addition system to lower pH to 7 standard units

Figure 4: Carbon Dioxide Treatment Schematic

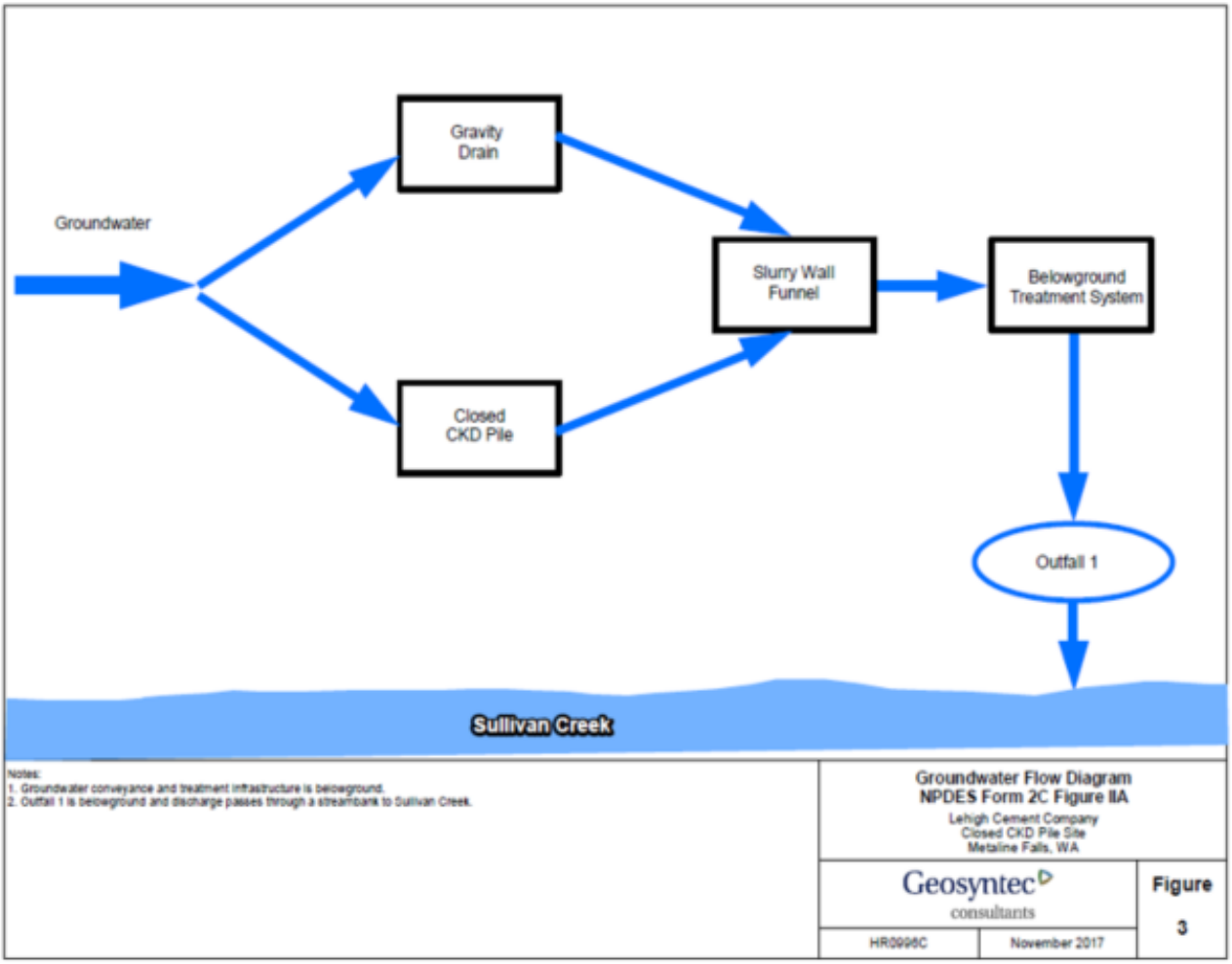


Figure 4 provides a schematic flow diagram for the surface and groundwater exposed to the CKD pile material. As high pH water contacts naturally occurring minerals in the soil, metals including arsenic move to a mobile dissolved form and flow with the groundwater into the treatment system. When the system adjusts the pH to 7, ideally the dissolved form of the metals precipitate. The engineered treatment reactor acts as a filter to remove precipitant before intermittent discharge to the creek.

Solid wastes

The system results precipitates metals in the system. Lehigh indicated that the system does not produce a volume of solid precipitate that would affect the treatment volume of the system. Lehigh will not be required to develop a solids management plan during this permit cycle. If Lehigh has to remove solids from the treatment system, they will need to work with Ecology to demonstrate that the solids are not dangerous waste before disposalLehigh collects non-treatment related solid waste and disposes of the waste at the local landfill.

Discharge outfall

The treated effluent flows intermittently into Sullivan Creek through one to three valves to the streambank stabilization structure (diffuser) into the creek via gravity (Figure 5). There is not a sampling port built into the diffuser. Ecology assumes that the valves where samples are taken serve as the point(s) of compliance.

A constructed stormwater outfall to the Creek exists along the east side of the treatment site (Figure 6). Lehigh indicated in the engineering report that the outfall carries only precipitation and does not encounter the contaminated groundwater or the CKD pile materials. The proposed permit will require Lehigh to monitor both the treatment outfall and the stormwater outfall from the site to verify the findings.

Figure 5: Treatment System

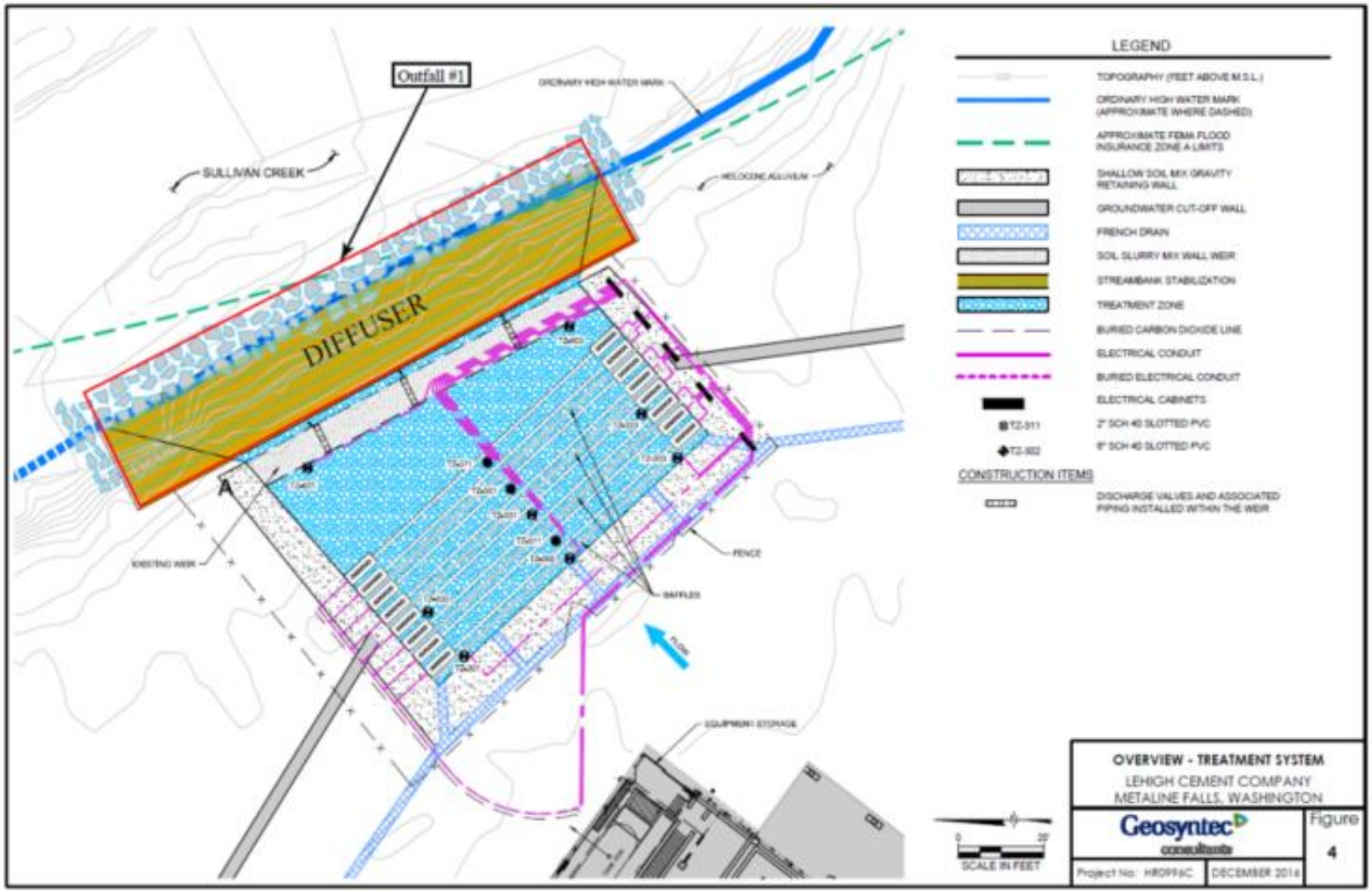


Figure 6: Closed CKD Pile Stormwater Drainage and Discharge

B. Description of the receiving water

The ambient background data used for this permit includes the following where data was available from EIM. The U flags were treated at non-detect and the reported value is the 90th percentile:

Table 4: Ambient Background Data

Parameter	Value Used	Source
Temperature (highest annual 1-DMax)	19.4 °C	EIM Study ID #SCL_BWQS 07/09/2014 - 11/01/2019
Temperature (highest annual 7-DADMax)	18.6 °C	EIM Study ID #SCL_BWQS 07/09/2014 - 11/01/2019
pH (Maximum / Minimum)	7.95 standard units	Lehigh Permit Application
Dissolved Oxygen	13.1 mg/L	EIM Study ID#PPlC0006 06/26/2004 - 10/19/2004
Total Ammonia-N	0.117 mg/L	EIM Study ID#PPlC0006 06/26/2004 - 10/19/2004
Fecal Coliform OR *E.coli* OR Enterococci	21.8/100 mL dry weather	EIM Study ID#PPlC0006 06/26/2004 - 10/19/2004
Turbidity	5.25 NTU	EIM Study ID#PPlC0006 06/26/2004 - 10/19/2004
Hardness	89 mg/L as CaCO3	Lehigh Permit Application
Alkalinity or Salinity	88 mg/L as CaCO3	Lehigh Permit Application
Arsenic	Non-detect	Lehigh Permit Application
Lead	Non-detect	Lehigh Permit Application
Copper	Non-detect	Lehigh Permit Application
Zinc	0.0126 µg/L	Lehigh Permit Application
Mercury-CVAFS	0.00304 µg/L	Lehigh Permit Application

Lehigh reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data, available in Appendix G, represents the quality of the wastewater effluent discharged from 7/1/2009-4/7/2019. The wastewater effluent is characterized as follows:

Table 5: Wastewater Characterization

Parameter	Units	Average Value	Maximum Value	Data Source
Flow	Gallons per day	11,400	86,000	Permit Application Technical Memo
Biochemical Oxygen Demand (BOD_5)	mg/L	Non detect	-	Permit Application
Chemical Oxygen Demand (COD)	mg/L	-	21.1	Permit Application
Total Suspended Solids (TSS)	mg/L	Non-detect	-	Permit Application
Chemical Oxygen Demand	mg/L	-	21.1	Permit Application
Total Organic Carbon	mg/L	4.58	4.84	Permit Application (Estimated using the 2009 data)
pH (maximum)	standard units	6.1(Minimum)	9.8	Discharge Data Provided by Lehigh
Ammonia as N	mg/L	Not Available	0.125	Permit Application
Temperature (Winter)	^oC	Not Available	4.64	Permit Application
Temperature (Summer)	^oC	Not Available	NA	Permit application states, no discharge during the Summer
Fluoride	mg/L	Not Available	0.380	Permit Application

Parameter	Units	Average Value	Maximum Value	Data Source
Phosphorus	mg/L	Not Available	0.291	Permit Application
Sulfate	mg/L	Not Available	186	Permit Application
Aluminum (Total)	mg/L	Not Available	0.0430	Permit Application
Barium (Total)	mg/L	Not Available	0.0878	Permit Application
Boron (Total)	mg/L	Not Available	0.0271	Permit Application
Cobalt (Total)	mg/L	Not Available	0.00315	Permit Application
Iron (Total)	mg/L	Not Available	3.18	Permit Application
Magnesium (Total)	mg/L	Not Available	5.19	Permit Application
Molybdenum (Total)	mg/L	Not Available	0.0705	Permit Application
Manganese (Total)	mg/L	1.13	9.38	Discharge Data Provided by Lehigh
Titanium (Total)	mg/L	Not Available	0.00644	Permit Application
Arsenic (Total)	mg/L	0.008	0.076	Discharge Data Provided by Lehigh
Chromium (Total)	mg/L	0.0011	0.0135	Discharge Data Provided by Lehigh
Copper (Total)	mg/L	Not Available	0.00736	Permit Application

Parameter	Units	Average Value	Maximum Value	Data Source
Lead (Total)	mg/L	0.003	0.023	Discharge Data Provided by Lehigh
Mercury (Total)	µg/L	Not Available	0.0584	Permit Application
Nickel	mg/L	Not Available	0.00481	Permit Application
Zinc	mg/L	Not Available	0.00867	Permit Application
Ethylbenzene	µg/L	Not Available	0.72	Permit Application
Bis(2-Ethyl-hexyl) Phthalate	µg/L	Not Available	0.86	Permit Application

C. Summary of compliance with previous permit Issued

Table 6: Previous Permit Effluent Limits

Parameter	Average Monthly	Maximum Daily
Arsenic (total)	5 µg/l	5 µg/l
Chromium (total)	10 µg/l	10 µg/l
Lead (total)	5 µg/l	5 µg/l
Manganese (total)	2,240 µg/l	2,240 µg/l
pH	Not Applicable	Daily min is equal to or greater than 6.5 and the daily maximum is less than or equal to 8.5

Lehigh has not consistently complied with the effluent limits and permit conditions throughout the duration of the permit issued on September 27, 2006 and with discharge beginning in July 2009. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs).

The following table summarizes the violations that occurred during the permit term. The discharge data table for parameters are in Appendix G. Ecology considered all values reported in a month when calculating the monthly average. If multiple valves were discharging to the diffuser identifying that all valves were in excess of the daily maximum limit, Ecology only counted this as a single violation of the limit.

Table 7: Permit Violations

Parameter	Average Monthly	Maximum Daily	Minimum Daily
pH	-	8	10
Arsenic (Total)	63	77	-
Chromium (Total)	-	1	-
Lead (Total)	17	16	-
Manganese (Total)	5	8	-

The following table summarizes compliance with report submittal requirements over the permit term.

Table 8: Permit Submittals

Submittal	Frequency	Number of Missing Submittals
Operations and Maintenance Manual Update or Review Confirmation Letter	Annually	12

D. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- The technology based effluent limitations are set at the groundwater cleanup levels for this site. Ecology developed Method B cleanup levels in the previous permit using formulas provided in WAC 173-340-720 through 760.

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application.

The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design criteria

According to WAC 173-220-150 (1)(g), neither flows nor waste loadings may exceed approved design criteria. The 2006 Lehigh engineering report, Table 2-1 indicates that the system was design to meet the cleanup levels. As a result, the cleanup levels serve as the design criteria for the treatment system.

B. Technology-based effluent limits

Ecology must ensure that facilities provide all known, available, and reasonable methods of prevention, control, and treatment (AKART) when it issues a permit. The previous permit established the technology-based effluent limits based on groundwater cleanup levels for arsenic, chromium, lead, and manganese.

Table 9: Technology-based Limits

Parameter	Average Monthly	Daily Maximum
Arsenic	5 µg/L	5 µg/L
Chromium	10 µg/L	10 µg/L
Lead	5 µg/L	5 µg/L
Manganese	2,240 µg/L	2,240 µg/L

According to 40 CFR Part 411- Cement Manufacturing Point Source Category, Subpart C, Materials Storage Piles Runoff Subcategory, the facility should have a technology-based limit for pH.

Table 10: Technology-based Limits

Parameter	Daily Minimum	Daily Maximum
pH	6 standard units	9 standard units

C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters.

Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical criteria for the protection of aquatic life and recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water.

Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical criteria for the protection of human health

In 1992, U.S. EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State in its National Toxics Rule 40 CFR 131.36 (EPA, 1992). Ecology submitted a standards revision for 192 new human health criteria for 97 pollutants to EPA on August 1, 2016. In accordance with requirements of CWA section 303(c) (2) (B), EPA finalized 144 new and revised Washington specific human health criteria for priority pollutants, to apply to waters under Washington’s jurisdiction. EPA approved 45 human health criteria as submitted by Washington. The EPA took no action on Ecology submitted criteria for arsenic, dioxin, and thallium. The existing criteria for these three pollutants remain in effect; and were included in 40 CFR 131.45. Revision of certain Federal Water quality criteria applicable to Washington.

These newly adopted criteria, located in WAC 173-201A-240, are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below that have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2016) and of all marine waters (WAC 173-201A-210, 2016) in the state of Washington.

Antidegradation

Description - The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2016) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I: ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions.

Tier II: ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

Tier III: prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility Specific Requirements - Lehigh must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge does not interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time-period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual available at online https://apps.ecology.wa.gov/publications/documents/92109.pdf). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria.

The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions.

These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. **Ecology must specify both the allowed size and location in a permit.**

   The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. **The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.**

   Ecology has determined that the treatment provided at Lehigh meets the requirements of AKART (see "Technology-based Limits").

3. **Ecology must consider critical discharge conditions.**

   Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

   Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The manual is available online at https://fortress.wa.gov/ecy/publications/documents/92109.pdf.

Table 11: Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	35.6 cfs
Harmonic Mean Streamflow	110 cfs
River depth at the 7Q10 period	Side Channel = 0.185 m Main Channel = 0.30 m
River velocity	Side Channel = 0.149 m/sec

Critical Condition	Value
	Main Channel = 0.34 m/sec
Manning roughness coefficient	0.07
Slope	1.49%
Channel width	Side Channel = (4.67 m) Main Channel = (10.0 m)
Maximum average monthly effluent flow for chronic and human health non-carcinogen	86,000 gpd
Annual average flow for human health carcinogen	86,000 gpd

Ecology obtained ambient data at critical conditions near the outfall from the mixing zone study conducted by Lehigh and submitted with the permit application and the USGS Stream Stats Database at Metaline Falls. The critical season occurs during the winter and summer months. The mixing zone used a CORMIX model to evaluate the mixing in two parts, the side channel and the main channel. The model results are discussed below.

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to protect the species tested and to protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away.

Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

5. **The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.**

   Ecology conducted a reasonable potential analysis using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. **The size of the mixing zone and the concentrations of the pollutants must be minimized.**

   At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

   Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

   Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. **Maximum size of mixing zone.**

   The authorized mixing zone does not exceed the maximum size restriction.

8. **Acute mixing zone.**

   - The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.

Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone at the ten-year low flow.

- The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- Comply with size restrictions.

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone. The constructed bank diffuser at Lehigh is approximately 800 feet upstream of the Metaline Falls Publicly Owned Treatment Works outfall.

CORMIX Model Findings

Lehigh submitted the 2018 Mixing Zone Study Results Report for the Closed Cement Kiln Dust Pile Site Groundwater Treatment System with the permit application. The outfall at the Lehigh treatment facility consists of three distinct discharge pipes buried in the 54-foot constructed riverbank diffuser. Lehigh operates one, two, or three ports when discharging. As a conservative approach, Lehigh modeled the discharge assuming all three ports were discharging with a combined maximum flow of 86,000 gallons per day. Due to the unique nature of the effluent flow discharge, an alternating diffuser configuration parallel to the bank was used to simulate a sheet flow of effluent discharge into the creek with no net horizontal momentum to the receiving water. Lehigh used 50 ports with a diameter of 0.1 feet each along the 54-foot length of the treatment bank.

Ecology independently verified the model findings using the mixing zone geometry proposed by the study: a downstream distance of 147 feet from the beginning of the 54-foot diffuser and a maximum width of 2.4 feet. Extending the mixing zone beyond 147 feet would encounter a 90-degree bend and narrowing of the stream channel. These conditions would likely result in effluent mixing occupying greater than 25% of the width of the stream channel. Ecology set the acute criteria at 10% of the distance of the chronic mixing zone, or 14.7 feet. The unidirectional flow did not indicate that there was any mixing upstream of the outfall.

Based on the model results, Ecology will grant a mixing zone. The mixing zone will extend a maximum of 147 feet from the beginning of the constructed riverbank diffuser with a width of 2.4 feet.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The table included below summarizes the criteria applicable to this facility's discharge.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species.
- The **Aquatic Life Uses** for this receiving water are identified below.

Freshwater Aquatic Life Uses and Associated Criteria

Table 12: Salmonid Spawning, Rearing, and Migration

Criteria	Value
Temperature Criteria – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L
Turbidity Criteria	5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- **The recreational uses** for this receiving water are identified below.

Table 13: Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation (effective 1/1/2021)	**E.coli** organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.

- The **water supply uses** are domestic, agricultural, industrial, and stock watering.
- The **miscellaneous freshwater uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water quality impairments

Sullivan Creek is listed on the current 303(d) for the segments identified in the Colville National Forest for temperature according to the Colville National Forest multi-parameter TMDL. The waste load allocations and listings apply only to the portions of Sullivan Creek located within the Colville National Forest.

F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-260 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in the fact sheet.

G. Evaluation of surface water quality-based effluent limits for numeric criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser is considered to be the length of the bank (54 feet) as identified in Figures 2 and 4. The treatment system discharges through three separate ports to the bank diffuser as described in the mixing zone evaluation discussed above.

The engineering and mixing zone evaluation requires review and approval by Ecology prior to implementation of the changes.

Chronic Mixing Zone - WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 300 feet. The mixing zone extends from the bottom to the top of the water column.

Acute Mixing Zone - WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than 2.5% of the flow and not occupy greater than 25% of the width of the water body.

Ecology determined the aquatic life dilution factors that occur within these zones at the critical condition using the CORMIX Model. Ecology based the human health for both carcinogen and non-carcinogen on the dilution factors are listed below.

Table 14: Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	1.4	25.6
Human Health, Carcinogen	-	1515
Human Health, Non-carcinogen	-	94.6

Ecology determined the impacts of pH, ammonia, metals, and other toxics as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

pH - Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor tabulated above. Appendix D includes the model results.

Under critical conditions, modeling predicts a violation of the pH criteria for the receiving water. Therefore, the proposed permit includes water quality-based effluent limits for pH of 6.87 to 8.5. Using the RPA model and the critical conditions, Ecology iterated until the pH resulted in less than a 0.5 pH unit change. The worksheet used to evaluate the pH limit is available in Appendix D.

Turbidity - Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. Based on visual observation of the facility's effluent, Ecology expects no violations of the turbidity criteria outside the designated mixing zone.

Toxic Pollutants — Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge; ammonia, heavy metals, Bis(2-Ethylhexyl) Phthalate and Ethylbenzene. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the spreadsheet tools.

No valid ambient background data were available for ammonia, aluminum, iron, lead, manganese, nickel, Bis(2-Ethylhexyl) Phthalate and Ethylbenzene. Ecology used zero for background because there is not any data available for these pollutants. Because of the lack of data, Special Condition S9 of the proposed permit requires Lehigh to conduct a receiving water study. The study includes collection of background concentrations near the point of discharge both upstream and downstream outside the effective mixing zone. This information may result in a permit modification or additional limits in the next permit renewal.

Valid ambient background data were available for mercury and zinc. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Using zero as the background concentration, Ecology determined that ammonia, aluminum, iron, lead, manganese, nickel, zinc, Bis(2-Ethylhexyl) Phthalate and Ethylbenzene, pose no reasonable potential to exceed the water quality criteria. However, base on one sample, copper and mercury may have a reasonable potential to cause a violation of the aquatic criteria at the critical condition using procedures given in EPA, 1991 (**Appendix** D) and as described above. Because this is base on one sample, the proposed permit will not contain a limit for copper and mercury. The proposed permit will require additionall monitoring for metals and a receiving water study for metals.

Additionally, the proposed permit contains a compliance schedule for coming into compliance with the cleanup limits for arsenic, chromium, lead and manganese set by the Consent Decree between Lehigh and Ecology.

The proposed permit also includes a compliance schedule for installation of a flow meter and composite sampler or implement a manual composite procedure. The procedure must assure a representative sample of the discharge.

Water quality criteria for most metals published in chapter 173-201A WAC are based on the dissolved fraction of the metal (see footnotes to table WAC 173-201A-240(3); 2016). Lehigh may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Ecology may adjust a metal's translator (i.e. its partitioning coefficient, the amount of metal present in dissolved form compared to the total amount present) on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Temperature - The state temperature standards (WAC 173-201A, WAC 173-201A-200, WAC 173-201A-600, and WAC 173-201A-602) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects
- Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.
- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), WAC 173-201A-210(1)(c), and WAC 173-201A-602, Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), WAC 173-201A-210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment.

These increments are permitted only to the extent doing so does not cause temperatures to exceed the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for temperature acute effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Lehigh discharges treated groundwater. The water is not exposed to any source of heat and is lower in temperature than the receiving water. As a result, there is not reasonable potential for the treated groundwater to exceed the temperature for the designated use.

H. Human health

Washington's water quality standards include numeric human health-based criteria for 97 priority pollutants that Ecology must consider when writing NPDES permits.

Ecology determined the effluent may contain chemicals of concern for human health, based on data or information indicating the discharge contains regulated chemicals.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in EPA Publication EPA/505/2-90-001, the **Technical Support Document for Water Quality-Based Toxics Control** (https://www3.epa.gov/npdes/pubs/owm0264.pdf) and Ecology Publication #92-109, **Ecology's Permit Writer's Manual** (https://apps.ecology.wa.gov/publications/documents/92109.pdf) to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards for the parameters identified in the previous permit.

The discharge does indicate a reasonable potential to exceed the copper and mercury limits. The limits in the previous permit based on the clean up level will be carried forward in the proposed permit. As a result, the proposed permit includes effluent limits for arsenic, chromium, lead, and manganese cleanup levels identified in the Consent Decree between Lehigh and Ecology. Additionally the proposed permit contains water quality based effluent limits for copper mercury and pH based on reasonable potential evaluation.

Lehigh exceeded the limits in the previous permit numerous times as previously discussed. The proposed permit will have a compliance schedule requiring Lehigh to identify and implement a path to compliance.

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards the proposed permit requires Lehigh to conduct baseline sediment sampling in Section S9. You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website available at https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups.

Ecology determined that this discharge has potential to cause a violation of the sediment quality standards because of Mercury data received with the permit application. The proposed permit includes a Special Condition requiring Lehigh to demonstrate either:

- The point of discharge is not an area of deposition, or
- Toxics do not accumulate in the sediments even though the point of discharge is a depositional area.

J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Lehigh treatment facility does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

K. Whole effluent toxicity

Whole effluent toxicity (WET) testing has not been completed for the discharge. The proposed permit requires engineering to support changes that will bring the facility into compliance with the limits. Ecology may require WET testing after the changes to the facility's treatment system are completed.

L. Comparison of effluent limits with the previous permit issued on September 27, 2006

Table 15: Comparison of Previous and Proposed Effluent Limits

		Previous Effluent Limits: Outfall # 001	Previous Effluent Limits: Outfall # 001	Proposed Effluent Limits: Outfall # 001	Proposed Effluent Limits: Outfall # 001
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Average Weekly**
Arsenic (Total)	Consent Decree	5 µg/L	5 µg/L	5 µg/L	5 µg/L
Chromium (Total)	Consent Decree	10 µg/L	10 µg/L	10 µg/L	10 µg/L
Lead (Total)	Consent Decree	5 µg/L	5 µg/L	5 µg/L	5 µg/L
Manganese (Total)	Consent Decree	2,240 µg/L	2,240 µg/L	2,240 µg/L	2,240 µg/L

Parameter	Basis of Limit	Limit	Limit
pH	Water Quality	6.5 - 8.5 s.u.	6.87 - 8.5 s.u.

Based on the mixing and the reasonable potential, the effluent will decrease the pH at the mixing zone boundary greater than 0.5 pH units. As a result, Ecology adjusted the limits until the pH in the receiving water is changed less than 0.5 pH units. The proposed permit includes a pH limit of 6.87 as a minimum limit.

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit.

The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects.

When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the intermittant discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Lehigh has not been measuring and reporting flow. Instead, they have been estimating the flow as provided in the flow memo submitted with the permit application. The proposed permit will require that a flow measurement device be installed to measure the flow continuously during discharge to the creek. The flow will be reported as a daily average and a daily maximum.

The permit requires Lehigh to monitor additional parameters based on the findings in the priority pollutant scan. Ecology will use this data along with the receiving water evaluation to run reasonable potential for the next permit. Ecology will evaluate temperature and DO data to establish that Lehigh's discharge is meeting water quality criteria.

B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters).

C. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits for arsenic are near the limits of current analytical methods to detect or accurately quantify. The method detection level (MDL) also known as detection level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

V. Other Permit Conditions

A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Operation and maintenance manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. The facility will prepare and submit an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

C. Compliance schedule

The proposed permit includes a compliance schedule to install a composite sampler and flow meter. The compliance schedule will also require Lehigh to submit an engineering report and implementation plan for facility improvements required to consistently achieve compliance with the permit limits. Additionally, the engineering report will identify the design criteria and limits for the treatment system and include flow monitoring implementation plan.

D. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwater, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. References for Text and Appendices

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C. Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Lehigh Cement Co.

2006. Closed Cement Kiln Dust Pile Consent Decree Draft Cleanup Action Plan

2006. Lehigh Portland Cement Co Engineering Design Report June 2006

2008. Cleanup Action Report Consent Decree 06-2-00034-6 Lehigh Cement Company Closed Cement Kiln Dust Pile Site, Metaline Falls, Washington

2008 Operations and Maintenance Plan

2018 Preliminary Reasonable Potential Analysis NPDES Wastewater Discharge Permit Renal Application

2018. Mixing Zone Study Results Report for Closed Cement Kiln Dust Pile Site Groundwater Treatment System.

Washington State Department of Ecology

July 2018. Permit Writer's Manual. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/documents/92109.pdf)

September 2011. Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation. Publication Number 11-10-073 (https://fortress.wa.gov/ecy/publications/summarypages/1110073.html)

October 2010 (revised). Water Quality Program Guidance Manual – Procedures to Implement the State's Temperature Standards through NPDES Permits. Publication Number 06-10-100 (https://fortress.wa.gov/ecy/publications/summarypages/0610100.html)

February 2007. Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees, Publication Number 07-10-024. (https://fortress.wa.gov/ecy/publications/documents/0710024.pdf) Wright, R.M., and A.J. McDonnell).

Laws and Regulations (http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx)

Permit and Wastewater Related Information (https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance)

Appendix A — Public Involvement Information

Ecology proposes to reissue a permit to Lehigh Cement Company. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on August 15, 2018 and August 22, 2018 in the Newport Miner to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology will place a Public Notice of Draft on June 16, 2021 in the Newport Miner to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled Frequently Asked Questions about Effective Public Commenting (https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html).

For more information, call the Department of Ecology Eastern Regional Office at (509) 329-3400 or visit Ecology's webpage at www.ecy.wa.gov.

The primary author of this permit and fact sheet is Diana Washington.

Appendix B — Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. “Date of receipt” is defined in RCW 43.21B.001(2); (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Table 16: Address and Location Information

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C — Glossary

1-DMax or 1-day maximum temperature – The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures – The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity – The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART – The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and RCW 90.48.520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance – An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality – The existing environmental condition of the water in a receiving water body.

Ammonia – Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF) – average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit – The average of the measured values obtained over a calendar months' time taking into account zero discharge days.

Average monthly discharge limit – The average of the measured values obtained over a calendar months' time.

Background water quality – The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) – Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD5 – Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass – The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards – National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine – A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity – The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA) – The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling – A site visit to determine the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling – A site visit to determine the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition, it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample – A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity – Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring – Uninterrupted, unless otherwise noted in the permit.

Critical condition – The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit – The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) – A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity – The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value – The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit – The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report – A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis, S. faecium, S. gallinarum,* and *S. avium.* The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

Fecal coliform bacteria – Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample – A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater – Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user – A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater – Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference – A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits – Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility – A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit – The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) – The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) – The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) – The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) – See Detection Limit.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone – An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) – The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH – The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through – A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) – The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) – The maximum anticipated instantaneous flow.

Point of compliance – The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) – A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) – Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1, 2, or 5) x 10^n, where n is an integer. (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential – A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer – A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) –

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up five percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

   Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge – Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist – An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste – All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 – Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters – Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater – That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit – A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria – A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids – That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) – A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation.

Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset – An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit – A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D — Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards is in the PermitCalc workbook on Ecology's webpage at https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance.

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone.

The predicted concentration at the edge of a mixing zone (C_{mz}) is based on the following calculation:

$$C_{mz} = Ca + \frac{(Ce - Ca)}{DF}$$

where: Ce = Effluent Concentration
Ca = Ambient Concentration
DF = Dilution Factor

Reasonable Potential Analysis:

The spreadsheets Input 2 – Reasonable Potential, and LimitCalc in Ecology's PermitCalc Workbook determine reasonable potential (to violate the aquatic life and human health water quality standards) and calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the Technical Support Document for Water Quality-based Toxics Control, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

$$WLA_a = (\text{acute criteria} \times DF_a) - [(\text{background conc.} \times (DF_a - 1)]$$
$$WLA_c = (\text{chronic criteria} \times DF_c) - [(\text{background conc.} \times (DF_c - 1)]$$

where: DF_a = Acute Dilution Factor
DF_c = Chronic Dilution Factor

2. Calculate the long term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA.

$LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$

CV = coefficient of variation = std. dev/mean

$LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$

$z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit and the monthly average effluent limit.

MDL=Maximum Daily Limit

$MDL = LTA x e^{(z\sigma - 0.5\sigma^2)}$

where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$ (99th percentile occurrence)

LTA = Limiting long term average

AML = Average Monthly Limit

$AML = LTA x\ e^{(z\,\sigma_n - 0.5\,\sigma_n^2)}$

where: $\sigma^2 = \ln[(CV^2 \div n) + 1]$

n = number of samples/month

$z = 1.645$ (95^{th} % occurrence probability)

LTA = Limiting long term average

Figure D1: Dilution Factor Calculation & Receiving Water Critical Conditions

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Lehigh Cement
Receiving Water	Sullivan Creek

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Flow Data

	Annual Average	Max Monthly Average	Daily Max
Facility Flow, MGD	0.0114	0.086	0.086
Facility Flow, cfs (calculated)	0.02	0.13	0.13

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed	
Aquatic Life - Acute	7Q10	35.6	0.025	**1.4**	Based on Cormix Model
Aquatic Life - Chronic	7Q10	35.6	0.25	**25.6**	Based on Cormix Model
HH-Non-Carcinogen	30Q5 (1.4/7Q10)	49.8	0.25	**94.6**	Based on 25% of flow
HH-Carcinogen	Harmonic Mean (3*7Q10)	106.8	0.25	**1515.0**	Based on 25% of flow
Whole river at 7Q10	7Q10	35.6	1	**268.6**	

Step 3: Enter Critical Data

	Effluent	Receiving Water
Temp, °C	4.6	16.5
pH, s.u.	9.8	8.3
Alkalinity, mg/L as CaCO3	401	88
Hardness, mg/L CaCO3	91	89
Salinity, psu		
Receiving water TSS, mg/L (leave blank if unknown)		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	Y	Y	Y
Acute Zone Boundary	90.4	8.0	9.3
Chronic Zone Boundary	89.1	16.0	8.4
Whole river at 7Q10	89.0	16.5	8.3

Figure D2: Reasonable Potential Calculation Page 1

Reasonable Potential Calculation

												Dilution Factors:	Acute	Chronic
Facility	Lehigh Cement											Aquatic Life	1.4	25.6
Water Body Type	Freshwater											Human Health Carcinogenic		1515.0
Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ALUMINUM, total recoverable, pH 6.5-9.0 7429905	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	COPPER - 744058 6M Hardness dependent	ETHYLBENZENE 100414 19V	IRON 7439896	LEAD - 7439921 7M Dependent on hardness	MANGANESE 7439965	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	ZINC- 7440666 13M hardness dependent		
Effluent Data	# of Samples (n)		1	1	1	1	1	1	36	62	1	1	1		
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	1.09	1.02	0.6	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)		125	43	0.86	7.36	1.03	3180	9.2		0.0584	4.81	8.67		
	Calculated 50th percentile Effluent Conc. (when n>10)									2240					
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0		0	0		0.003	0	12.6		
	Geo Mean, ug/L				0	0	0	0	0	0.0052	0	0	12.6		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,149	750	-	15.477	-	-	57.871	-	2.1	1299.9	105.1		
		Chronic	606	87	-	10.283	-	1000	2.2184	-	0.012	142.54	94.752		
	WQ Criteria for Protection of Human Health, ug/L		-	-	0.23	1300	200	300	-	50	0.14	150	2300		
	Metal Criteria Translator, decimal	Acute	-	-	-	0.996	-	-	0.466	-	0.85	0.998	0.996		
		Chronic	-	-	-	0.996	-	-	0.466	-	-	0.997	0.996		
	Carcinogen?		N	N	Y	N	N	N	N	N	N	N	N		
Aquatic Life Reasonable Potential															
Effluent percentile value			0.950	0.950		0.950		0.950	0.950		0.950	0.950	0.950		
s	$s^2=\ln(CV^2+1)$		0.555	0.555		0.555		0.555	0.885		0.555	0.555	0.555		
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050	0.050		0.050		0.050	0.920		0.050	0.050	0.050		
Multiplier			6.20	6.20		6.20		6.20	1.00		6.20	6.20	6.20		
Max concentration (ug/L) at edge of…		Acute	553	190.359		32.452		14077.735	3.062		0.221	21.251	41.828		
		Chronic	30	10.410		1.775		769.876	0.167		0.017	1.161	14.198		
Reasonable Potential? Limit Required?			**NO**	**NO**		**YES**		**NO**	**NO**		**YES**	**NO**	**NO**		
Human Health Reasonable Potential															
s	$s^2=\ln(CV^2+1)$				0.5545	0.5545	0.5545	0.554513		0.8445	0.5545	0.5545	0.5545		
Pn	Pn=(1-confidence level)1/n				0.050	0.050	0.050	0.050		0.953	0.050	0.050	0.050		
Multiplier					2.4895	2.4895	2.4895	2.4895271		0.2435	2.4895	2.4895	2.4895		
Dilution Factor					1515	94.579	94.579	94.579471		94.579	94.579	94.579	94.579		
Max Conc. at edge of Chronic Zone, ug/L					0.0014	0.1937	0.0271	8.4E+01		23.689	0.0015	0.1266	12.695		
Reasonable Potential? Limit Required?					**NO**	**NO**	**NO**	**NO**		**NO**	**NO**	**NO**	**NO**		

Figure D3: Reasonable Potential Calculation Page 2

Reasonable Potential Calculation - Page 2

Dilution Factors:	Acute	Chronic
Aquatic Life	1.4	25.6
Human Health Carcinogenic		1515.0

Facility	Lehigh Cement
Water Body Type	Freshwater

Pollutant, CAS No. & NPDES Application Ref. No.			ARSENIC (dissolved) 7440382 2M	CHROMIUM(TRI) -16065831 5M Hardness dependent									
Effluent Data	# of Samples (n)		56	18									
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		23.9	6.4									
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0	0									
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	360	505.33511									
		Chronic	190	161.91782									
	WQ Criteria for Protection of Human Health, ug/L		-	-									
	Metal Criteria Translator, decimal	Acute	1	0.316									
		Chronic	1	0.86									
	Carcinogen?		Y	N									

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950									
s	$s^2=\ln(CV^2+1)$		0.555	0.555									
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.948	0.847									
Multiplier			1.00	1.41									
Max concentration (ug/L) at edge of...		Acute	17.071	2.040									
		Chronic	0.934	0.304									
Reasonable Potential? Limit Required?			**NO**	**NO**									

Figure D4: Aquatic Life & Human Health Limits Calculations

Aquatic Life and Human Health Limits Calculations

Facility	Lehigh Cement
Water Body Type	Freshwater
Rec. Water Hardness	Acute=90.4, Chronic=89.1 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.4	25.6
Human Health Carcinogenic		1515.0
Human Health Non-Carcinogenic		94.6

Pollutant, CAS No. & NPDES Application Ref. No.		COPPER - 7440508 6M Hardness dependent	MERCURY 7439976 8M								
Effluent Data	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Receiving Water Data	90th Percentile Conc., ug/L	0	0.00304	0	0	0					
	Geo Mean, ug/L		0	0		0					
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	15.4773	2.1								
	Chronic	10.28275	0.012								
	WQ Criteria for Protection of Human Health, ug/L	1300	0.14								
	Metal Criteria Translator, decimal Acute	0.996	0.85								
	Chronic	0.996	-								
	Carcinogen?	N	N								

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		1	1								
LTA Coeff. Var. (CV), decimal		0.6	0.6								
Permit Limit Coeff. Var. (CV), decimal		0.6	0.6								
Waste Load Allocations, ug/L	Acute	21.66823	2.938784								
	Chronic	263.2383	0.232416								
Long Term Averages, ug/L	Acute	6.957304	0.943594211								
	Chronic	138.8407	0.122583971								
Limiting LTA, ug/L		6.957304	0.122583971								
Metal Translator or 1?		1.00	1.00								
Average Monthly Limit (AML), ug/L		**14.9**	**0.262**								
Maximum Daily Limit (MDL), ug/L		**21.8**	**0.382**								

Figure D5: Calculation of Fecal Coliform at Chronic Mixing Zone

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	25.6
Receiving Water Fecal Coliform, #/100 ml	6
Effluent Fecal Coliform - worst case, #/100 ml	100
Surface Water Criteria, #/100 ml	*14*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**10**
Difference between mixed and ambient, #/100 ml	4

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	25.6
Receiving Water DO Concentration, mg/L	8.7
Effluent DO Concentration, mg/L	1.0
Effluent Immediate DO Demand (IDOD), mg/L	0
Surface Water Criteria, mg/L	*8*
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**8.35**
DO decrease caused by effluent at chronic boundary, mg/L	**0.30**

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for dissolved oxygen.

References: EPA/600/6-85/002b and EPA/430/9-82-011

Figure D6: Calculation of Minimum pH of a Mixture of Two Flows

Calculation of Minimum pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT		
	@ Acute Boundary	@ Chronic Boundary
1. Dilution Factor at Mixing Zone Boundary	1.4	67.9
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	16.50	16.50
pH:	8.30	8.30
Alkalinity (mg CaCO3/L):	88.00	88.00
3. Effluent Characteristics		
Temperature (deg C):	4.64	4.64
pH:	6.50	6.50
Alkalinity (mg CaCO3/L):	401.00	401.00
4. Aquatic Life Use Designation	Other species (salmonid/redband trout/warmwater species)	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.41	6.41
Effluent pKa:	6.52	6.52
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.99	0.99
Effluent Ionization Fraction:	0.49	0.49
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	89	89
Effluent Total Inorganic Carbon (mg CaCO3/L):	819	819
4. Conditions at Mixing Zone Boundary		
Temperature (deg C):	8.03	16.33
Alkalinity (mg CaCO3/L):	311.57	92.61
Total Inorganic Carbon (mg CaCO3/L):	610.33	99.87
pKa:	6.48	6.41
5. Allowable pH change	NA	0.50
RESULTS		
pH at Mixing Zone Boundary:	**6.50**	**7.51**
pH change at Mixing Zone Boundary:	1.80	0.79
Is permit limit needed?	NO	YES

Figure D7: Calculation of Minimum pH of a Mixture of Two Flows

Calculation of Minimum pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT		
	@ Acute Boundary	**@ Chronic Boundary**
1. Dilution Factor at Mixing Zone Boundary	1.4	67.9
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	16.50	16.50
pH:	8.30	8.30
Alkalinity (mg CaCO3/L):	88.00	88.00
3. Effluent Characteristics		
Temperature (deg C):	4.64	4.64
pH:	6.50	**6.87**
Alkalinity (mg CaCO3/L):	401.00	401.00
4. Aquatic Life Use Designation	Other species (salmonid/redband trout/warmwater species)	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.41	6.41
Effluent pKa:	6.52	6.52
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.99	0.99
Effluent Ionization Fraction:	0.49	0.69
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	89	89
Effluent Total Inorganic Carbon (mg CaCO3/L):	819	579
4. Conditions at Mixing Zone Boundary		
Temperature (deg C):	8.03	16.33
Alkalinity (mg CaCO3/L):	311.57	92.61
Total Inorganic Carbon (mg CaCO3/L):	610.33	96.35
pKa:	6.48	6.41
5. Allowable pH change	NA	0.50
RESULTS		
pH at Mixing Zone Boundary:	**6.50**	**7.80**
pH change at Mixing Zone Boundary:	1.80	0.50
Is permit limit needed?	NO	NO

Figure D8: Calculation of Maximum pH of a Mixture of Two Flows

Calculation of Maximum pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT		
	@ Acute Boundary	@ Chronic Boundary
1. Dilution Factor at Mixing Zone Boundary	25.0	25.6
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	16.50	16.50
pH:	8.30	8.30
Alkalinity (mg CaCO3/L):	88.00	88.00
3. Effluent Characteristics		
Temperature (deg C):	4.64	4.64
pH:	9.30	9.30
Alkalinity (mg CaCO3/L):	401.00	401.00
4. Aquatic Life Use Designation	Other species (salmonid/redband trout/warmwater species)	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.41	6.41
Effluent pKa:	6.52	6.52
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.99	0.99
Effluent Ionization Fraction:	1.00	1.00
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	89	89
Effluent Total Inorganic Carbon (mg CaCO3/L):	402	402
4. Conditions at Mixing Zone Boundary		
Temperature (deg C):	16.03	16.04
Alkalinity (mg CaCO3/L):	100.52	100.23
Total Inorganic Carbon (mg CaCO3/L):	101.63	101.34
pKa:	6.41	6.41
5. Allowable pH change	NA	0.50
RESULTS		
pH at Mixing Zone Boundary:	**8.37**	**8.37**
pH change at Mixing Zone Boundary:	0.07	0.07
Is permit limit needed?	NO	NO

Appendix E - Response to Entity Comments

Ecology received comments during the entity review comment period (December 23, 2020 through January 29, 2021). The comments and Ecology's responses are attached to this fact as Attachment E1.

Appendix F — Response to Public Comments

[Ecology will complete this section after the public notice of draft period.]

Appendix G — Summary of Discharge Data and Violations

The data tables are attached to this fact as Attachment G1.

Attachment E1

Attachment E1
Ecology Responses to Entity Review Comments
for Lehigh Cement Company
Draft Permit WA0045586 and Fact Sheet

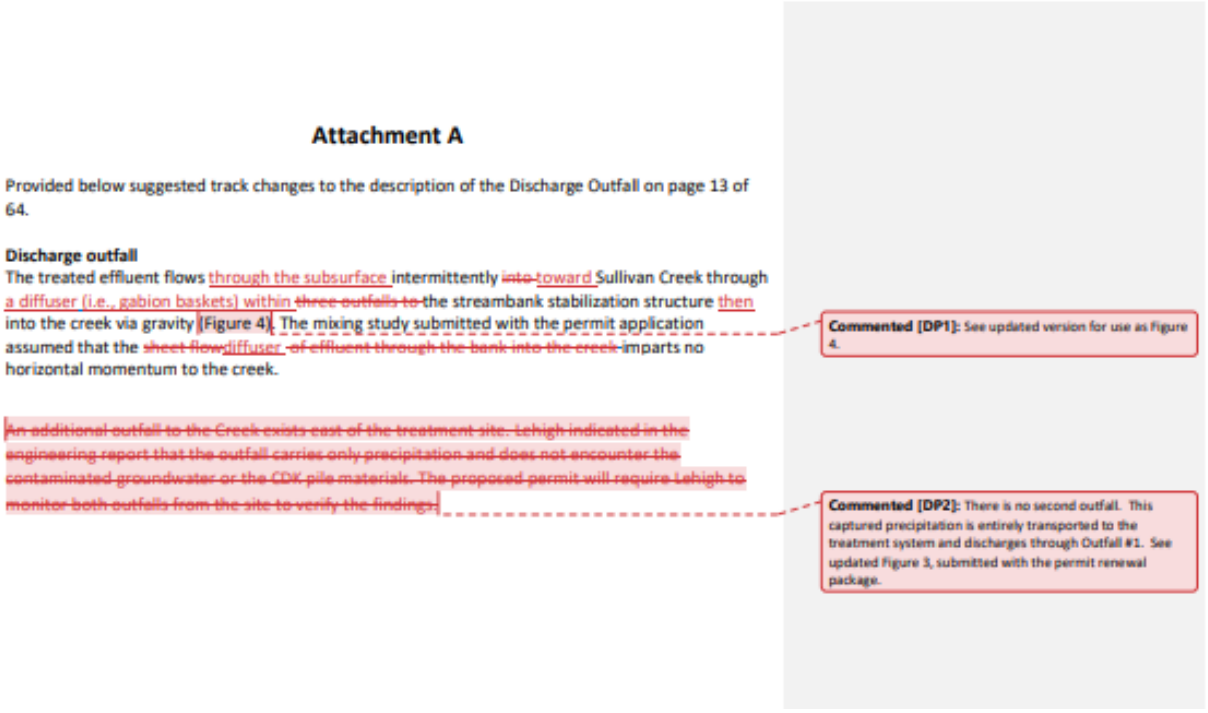
Lehigh Cement Company was given time to review the draft permit and fact sheet and submit comments during the period of December 23, 2020 through January 31, 2021. Ecology received comments during the entity review period. Below are the comments and Ecology's responses. A copy of the original email is included at the end of this document.

The following comments were received from Lehigh Hanson by email dated January 29, 2021:

Cover Letter Comments:

1. The description of multiple outfalls is incorrect. The existing 2006 permit lists a single outfall because the treatment system does not discharge through a pipe to the creek, but discharges to the subsurface through a diffuser and flow through the subsurface to the creek as a single source. The description of the discharge should be described as a single outfall, Outfall #1 Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W), that is a diffuser. Because of the apparent misunderstanding of how the system performs and discharges, we have provided a revised Figure 3 and Discharge Outfall description (Attachment A), for use in the Fact Sheet on Pages 12 and 13 of 64.

Figure 1: Text Changes Recommended by Lehigh



Attachment A

Provided below suggested track changes to the description of the Discharge Outfall on page 13 of 64.

Discharge outfall
The treated effluent flows through the subsurface intermittently ~~into~~ toward Sullivan Creek through a diffuser (i.e., gabion baskets) within ~~three outfalls to~~ the streambank stabilization structure then into the creek via gravity (Figure 4). The mixing study submitted with the permit application assumed that the ~~sheet flow~~diffuser ~~of effluent through the bank into the creek~~ imparts no horizontal momentum to the creek.

~~An additional outfall to the Creek exists east of the treatment site. Lehigh indicated in the engineering report that the outfall carries only precipitation and does not encounter the contaminated groundwater or the CDK pile materials. The proposed permit will require Lehigh to monitor both outfalls from the site to verify the findings.~~

Commented [DP1]: See updated version for use as Figure 4.

Commented [DP2]: There is no second outfall. This captured precipitation is entirely transported to the treatment system and discharges through Outfall #1. See updated Figure 3, submitted with the permit renewal package.

Figure 2: Updated Line and Box Flow Diagram Provided by Lehigh

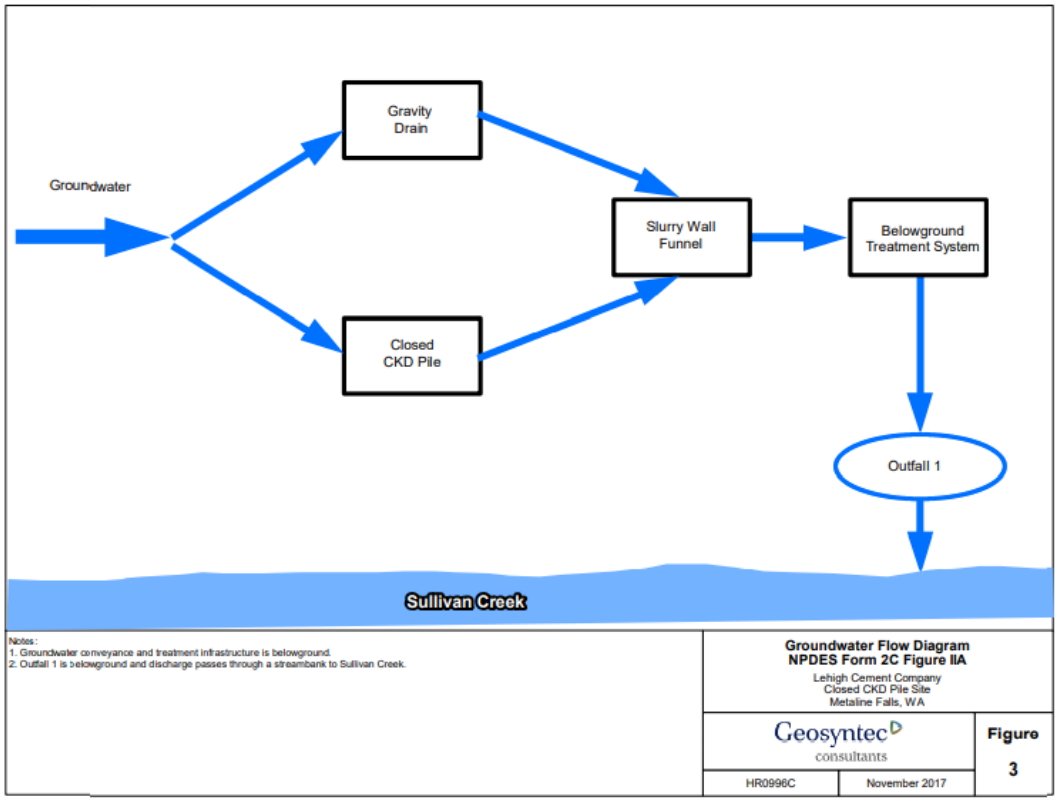


Figure 3: Updated Treatment System Drawing Provided by Lehigh

Ecology Response: Ecology agrees that the treatment system discharges to a diffuser that serves as the outfall to Sullivan Creek. However, the diffuser has no single point of compliance. The three valves that open pipes that discharge to the diffuser therefore serve as the points of compliance.

According to the information and data submitted with the permit application and during permit development, Lehigh opens the valve(s) during discharge.The information provided during the site inspection prior to permit development indicated that Lehigh opens the valves manually. Ecology changed the fact sheet to clarify that there is one diffuser and three points of compliance for the discharge.

Ecology will replace line and box diagram with the updated flow diagram provided. However, there does appear to be a second outfall, which discharges stormwater and snow melt from the closed kiln dust pile (CKD). Ecology added a Figure 4 below to the fact sheet showing the location of the CKD stormwater drainage.

The remainder of this comment is a substantive comment. Please submit this comment during the public comment period.

2. The description of the treatment system as performing “batch discharge” of batch treatment, is incorrect. The treatment system performs continuous passive treatment, and discharges intermittently when groundwater levels have risen to the point that discharge is possible. When the system does not discharge, it is because as a passive groundwater treatment system, groundwater levels are below the gravity drain outlet. We have provided and updated figure 4 that illustrates that the three outlets convey treated water to the stream bank through a diffuser.

   Ecology Response: Ecology will revise the description of the treatment system as indicated. The treatment system provides continuous passive treatment of the groundwater. When the treated groundwater reaches the capacity of the system, Lehigh opens the manually controlled valve(s) to allow gravity discharge to the diffuser.

3. The increased frequency of monitoring, changing from monthly to weekly, has no technical evaluation to provide a rationale for this decision. Lehigh believes that this increase is in part the result of the misunderstanding of how the treatment system functions. There are over 10 years of monthly or more frequent, monitoring data that clearly support the performance of the system. For this reason, Lehigh request that the monitoring frequency remain monthly.

   Ecology Response: This is a substantive comment. Please submit this comment during the public comment period.

4. The assessment of the mixing zone analysis and reasonable potential analysis (RPA) calculation needs to be extended to all effluent constituents. The draft Fact Sheet authorizes a mixing zone and performs and RPA calculation that provides effluent limits for copper and mercury that would meet water quality criteria at the boundary of the mixing zone. But this analysis was not extended to the remaining constituent, even though the existing 2006 permit explicitly states that "Ecology may propose alternative final effluent limits based on the results of the effluent mixing study…" Ecology should calculate the effluent limits for the remaining constituents based on the mixing zone and RPA in the same manner that copper and mercury effluent limits were calculated.

   Ecology Response: This is a substantive comment. Please submit during the public comment period.

Table 1 - Fact Sheet Editorial Comments:

5. Page 1 of 64, seventh paragraph, second sentence WQBEI needs to be spelled out on first use - "Water Quality Based Effluent Limits (WQBEL)", and the "l" should be capitalized.

   Ecology Response: Thank you, change made.

6. Page 4 of 64 Appendix G needs to be added to Table of Contents

   Ecology Response: Thank you.

7. Page 6 of 64, Table 1, rows three and four: Contact at the Facility, and Responsible Official should be:

   Greg Ronczka, MPH, P.G.
   Vice President - Environment & Sustainability
   300 E. John Carpenter Freeway
   Irving, TX 75062
   (972) 657-4301

   Ecology Response: Updated.

8. Page 7 of 64 Figure 1: Image of site on left side of figure has text: "Lehigh Cement Closed Kiln Dust Pile (KDP)." This should be "…Closed Cement Kiln Dust Pile (CKD)". As defined on first page of Fact Sheet.

   Ecology Response: Thank you, the acronym is consistent.

9. Page 8 of 64, third paragraph, second sentence: Confusing sentence reads: "Lehigh submitted a Notification of Dangerous Waste Activities to Ecology (Form 2) informing them that they would be…" This needs clarification - rephrase to say "Lehigh submitted a … to Ecology stating that Lehigh would be generating..."

   Ecology Response: Thank you, Ecology reworded for clarity.

10. Page 10 of 64: Figure 2 title says "Closed CDK Pile Site Layout"; this should say "Closed CKD Pile…."

Ecology Response: Thank you.

11. Page 11 of 64, last paragraph, first sentence: Mentions "kiln dust" - this has been defined as cement kiln dust (CKD) previously and should be referred to here as CKD.

    Ecology Response: Thank you.

12. Page 11 of 64, last bullet on page: Bullet states that "A subsurface recirculation system to lower pH to 7 standard units" There is presently no recirculation system; there was no mention of a recirculation system in the clean-up action. This bullet should be deleted.

    Ecology Response: Change to, “A subsurface carbon dioxide addition system to lower pH to 7 standard units.”

13. Page 12 of 64, Figure 3: This figure is from 2006, and does not represent the site as it currently is configured. An updated flow diagram was provided in the NPDES Permit Application, and is attached as Figure 3 for use here. The key item is that there is no "Outfall 2". All flow from the gravity drain is routed to the treatment system.

    Ecology Response: Figure 3 updated.

14. Page 12 of 64, first paragraph, first sentence: Replace "CDK" with "CKD".

    Ecology Response: Thank you.

15. Page 12 of 64, first paragraph, second sentence: Replace "dissolve" with "dissolved"

    Ecology Response: Thank you.

16. Page 12 of 64, first paragraph, last sentence: The Fact Sheet states "…before batch discharge to the creek." The groundwater treatment system is not a batch treatment system. It treats passively and continuously, and discharges intermittently. In addition, treated groundwater flows through the three outlets to a single diffuser in the streambank (Outfall #1 in the existing permit), and then discharges through subsurface flow to the creek.

    Ecology Response: Thank you. Ecology changed to “intermittent discharge.”

17. Page 13 of 64, second paragraph, first sentence: There is no "additional outfall". The draft Permit makes no mention of an "additional outfall". There was a designed second outfall that would have collected surface discharge from the CKD pile, but there has never been any flow to this system. It has been permanently closed and stormwater, should there ever be any, will be directed to the treatment system (see Attachment A).

    Ecology Response: Ecology reworded the paragraph to indicate that it is the stormwater outfall that the Fact Sheet is discussing.

    A constructed stormwater outfall to the Creek exists along the east side of the treatment site (Figure 6). Lehigh indicated in the engineering report that the outfall carries only precipitation and does not encounter the contaminated groundwater or the CKD pile materials.

The proposed permit will require Lehigh to monitor both the treatment outfall and the stormwater outfall from the site to verify the findings.

18. Page 13 of 64, second paragraph, second sentence: Sentence contains "CDK"; this should be changed to "CKD" (see Attachment A).

    Ecology Response: Thank you.

19. Page 15 of 64, first paragraph, first sentence: There should be a period after "EIM", and "the" should be capitalized to begin a second sentence.

    Ecology Response: Thank you, corrected.

20. Page 16-17 of 64, Table 5 Wastewater Characterization: The average values calculated for constituent data from "Discharge Data Provided by Lehigh" (manganese, arsenic, chromium, and lead) do not include non-detect results. Based on the 2018 Ecology Permit Writer's Manual, Section 3.3.5, one half the detection limit for non-detect values should be used to calculate these average values.

    Ecology Response: Thank you for your comment. I have reviewed the data using ½ the detection level for values reported below the detection level and updated the values for arsenic, chromium, and lead.

21. Page 18 of 64, Table 7: Violations: This table lists violations at TZOutlet-1, TZOutlet-2, and TZOutlet-3; but the existing permit lists only a single outfall. In addition, footnote d to Effluent Limitations table in the existing permit states "The daily discharge means the discharge of a pollutant measured during a calendar day" and "For other units of measurement, the daily discharge is the average measurement of the pollutant over the day." Therefore, multiple exceedances on the same date should represent a single exceedance. This will reduce the number of exceedances to: pH - 18; Total Arsenic - 78; Total Chromium - 1; Total Lead - 21; Total Manganese - 13.

    Ecology Response: Thank you for pointing out the issue with the violations evaluation. Ecology analyzed the data and corrected the average monthly violations. The analysis found that the Ecology did not include the maximum daily violation in Table 7. Ecology updated Table 7 to include violations for average month and daily maximum. Ecology replaced tables in Appendix G to include all violations. Where Lehigh opened all valves and sampled from each, Ecology calculated the monthly average, using all the values reported. Ecology identified a daily max by selecting the high value from the open valves sampled for the day. Ecology provided an explanation in the Fact Sheet with Table 7.

22. Page 18 of 64, Table 7: Violations: Combined number of pH exceedances listed is 25, but Appendix F only lists 23 combined exceedances. Combined number of total arsenic exceedances listed is 118, but Appendix F lists 117 combined exceedances.

    Ecology Response: Ecology updated the fact sheet appendix from F to and provide all the data used to evaluate the violations.

23. Page 20 of 64, A. Design Criteria: The end of the first sentence of this paragraph states "...Ecology does not have an engineering report that specifies the design criteria for the wastewater treatment plant at this facility." This is incorrect, a Final Engineering Design Report was submitted to Ecology on June 30, 2006.

    This statement also appears to be in conflict with statements on page 13 second paragraph that references "the engineering report", and on page 19 in Section III Proposed Permit Limits.

    Ecology Response: Thank you for pointing this out. Ecology updated the text to include as design criteria the 2006 Engineering Design Report Consent Decree 06-2-00034-6.

24. Page 25 of 64, Table 10: Reference to a "Side Channel" in rows 3, 4 and 7 are not consistent with Figure 5 of the mixing zone on page 29. We believe these references to a "side channel" are based on the original mixing zone configuration when an island existed in the creek. This island no longer exists, and it appears that the mixing zone calculation takes that change into affect, and therefore this Table 10 needs to be updated in order to be consistent.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

25. Page 26 of 64, first paragraph, third sentence: Sentence references, with respect to mixing zone model, "mixing in two parts, the side channel and the main channel". We believe this should be changed to "mixing in the main channel", as the mixing zone discussion on page 28 and Figure 5 on page 29 illustrate.

    Ecology Response: As indicated in comment 24, Ecology will reconsider the description of the mixing zone upon submittal of a dye study demonstrating mixing through the bank diffuser.

26. Page 29 of 64, last paragraph, last sentence: Sentence beginning "All indigenous fish…" does not make sense. It references aquatic species must be "waters of the state". Please review and revise.:

    Ecology Response: Thank you for catching the typo. It should say: “All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species.” Text updated.

27. Page 31 of 64, last paragraph, last two sentences: These sentences state that "Lehigh is planning to modify discharge….. Prior to modification Lehigh will be required….to demonstrate the change in mixing will not result in an exceedance…." Lehigh has no plans to modify discharge. Modifications that are planned are internal to the treatment system and would include a flow meter, but this will not modify discharge. Please either clarify the planned modifications or delete reference to planned modifications to discharge.

    Ecology Response: Reference to a future modification of the discharge has been removed.

28. Page 37 of 64, Table 14: The Average Weekly limits listed for Copper and Mercury are actually based on Figure D4, Maximum Daily Limits.

    Ecology Response: Table corrected.

29. Page 37 of 64, first paragraph, first sentence: Sentence states that "…the effluent will increase the pH…". Reference to worksheets in Appendix D clearly indicate that the reason the minimum pH is being raised by Ecology is because the calculation results in a decrease in pH at the mixing zone boundary of greater than 0.5 standard pH units.

    Ecology Response: Corrected.

30. Page 38 of 64, Section A, first paragraph, first sentence: Sentence references the proposed permit as requiring Lehigh to monitor "RCRA 8" metals. The proposed permit does not require monitoring RCRA 8 metals. Please make consistent with the permit.

    Ecology Response: The first paragraph was removed. The monitoring schedule is in Special Condition S2 of the permit.

31. Page 38 of 64, Section A, second paragraph, second sentence: The sentence references "…variability of the batch discharge…" The system does not batch discharge. When intermittently discharging, the treatment and discharge are continuous. Please delete reference to "batch discharge".

    Ecology Response: Changed to intermittent discharge.

32. Page 38 of 64, Section A, third paragraph, second sentence: Again references "batch discharged" - the system, when intermittently discharging, treatment and discharge are continuous.

    Ecology Response: Corrected.

33. Page 39 of 64, third paragraph, second sentence: The word "requiring" should be changed to "require".

    Ecology Response: Corrected.

Table 2 - Fact Sheet Content Comments

34. Page 1 of 64, sixth paragraph, last sentence: The sentence reads "Contact with groundwater results in a change to the pH of the groundwater, which also has an impact on the mobilization of the metals in naturally occurring minerals in the vadose and saturated zone." The words "vadose and" should be deleted. The pH of groundwater has no impact on naturally occurring minerals in the vadose zone.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

35. Page 2 of 64, first paragraph, last sentence: "…three discharges." See text provided in Attachment A. There is a single diffuser Outfall that presently has three outlets connected to it. It should be stated here there will be a single Outfall location.

Ecology Response: Changed to read, “three points of discharge to the diffuser.”

36. Page 11 of 64 fourth paragraph first sentence: Lehigh takes issue with the statement that "…portions of the groundwater collection system that are not effective." There is no indication that the groundwater collection system is not effective.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

37. Page 12 of 64, second paragraph, first sentence: The system does not produce significant volume of solids to require a solids management plan.

    Ecology Response: Ecology updated the solid wastes section.

38. Page 13 of 64, first paragraph, first sentence: The draft Fact Sheet states that the system flows "...into Sullivan Creek through three outfalls to the streambank stabilization structure into the creek via gravity (Figure 4)." The system does not discharge to the creek through three outfalls. The system discharges to Sullivan Creek through a diffuser that represents a single Outfall. There are three outlets connected to the streambank diffuser that then discharges via subsurface flow to the creek.
    As the existing permit issued in 2006 makes clear, the system represents a single outfall (see revised Figure 4, and Attachment A).

    Ecology Response: Ecology updated as discussed in comment 2.

39. Page 26 of 64 Item #5, last paragraph: Ecology makes the statement that a reasonable potential analysis was performed for each pollutant. But Appendix D which provides results of the RPA does not provide the result for Human Health Criteria for arsenic or chromium, as it does for other constituents.
    The RPA for arsenic, using the mixing zone results that Ecology used for all other constituents, results in an Average Monthly Effluent Limit for arsenic of 27.27 ug/L, and a Maximum Daily Effluent Limit for arsenic of 40 ug/L. These values can be used by Ecology because the existing permit clearly states as a footnote to the Table of Effluent Limitations that "Ecology may propose alternative final effluent limits based upon the results of the effluent mixing study required under Special Condition 7 (S7) and other factors."

    Ecology Response: The RPA for arsenic and chromium are provide in Appendix D with the other constituents on Figure D3 page 2.

40. Page 36 of 64, first paragraph second and third sentences: The statements here from Ecology indicate that effluent limits for arsenic, chromium, lead, and manganese will be carried forward from the existing permit. But as pointed out above, the existing permit allows for alternative final effluent limits based on the results of the mixing zone analysis, which Ecology has approved. The RPA using the mixing zone results in an arsenic average monthly effluent limit of 27.27 ug/L. Lehigh requests Ecology revise the sentence here to reflect that.

Ecology Response: This is a substantive comment. Please submit during the public comment period.

41. Page 36 of 64, second paragraph: The approval of the mixing zone, and using the RPA worksheets, results in compliance, and therefore this paragraph can be deleted.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

42. Page 37 of 64, Table 14: The proposed effluent limits include chromium. After 11 years of monitoring, and 129 reported results there have been three exceedances of the chromium limit, all from the same monitoring date in the first quarter of 2010. The treatment system has been in compliance for chromium for 10 years. Lehigh requests that chromium monitoring be reduced to annual or once per permit cycle, which the RPA analysis confirms.

    Ecology Response: The technology based cleanup limit has to be monitored. Based on the compliance record for chromium, Ecology reduced the chromium monitoring to monthly.

43. Page 38 of 64, Section A. Wastewater Monitoring: Wastewater monitoring includes several additional constituents (hexavalent chromium, zinc, and nickel) that do not represent a reasonable potential to exceed water quality criteria based on Ecology's RPA analysis. Lehigh requests that these be removed from draft effluent monitoring.

    In addition, hexavalent chromium monitoring would in fact not be technically compatible with 24-hr composite sampling requirement because of the maximum 24-hr hold requirements.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

44. Page 38 of 64, Section A, second paragraph, second sentence: The sentence states that the proposed frequency of monitoring takes into account the cost of monitoring. Quadrupling the monitoring frequency will have an enormous impact on cost, without any demonstrated benefit.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

Table 3 - Proposed Permit Editorial Comments

45. Page 1 of 46: Facility location - Reads "Route 3,1 Metaline Falls"; change to "Route 31, Metaline Falls".

    Ecology Response: Typo corrected.

46. Page 1 of 46: Capitalize d in dust.

    Ecology Response: Typo corrected.

47. Table 2 on Page 6 of 46, and Table 4 on Page 8 of 46: Both Table 2: Effluent Limits and Table 4 Wastewater Effluent Outfalls list three outlets as outfalls. The existing permit lists a single outfall (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W) that corresponds to the streambank diffuser outfall to the creek. These Tables, and elsewhere, should list the diffuser as the single outfall.

    Ecology Response: Updated to indicated one outfall but three points of compliance at the sampling ports for the three valves.

48. Page 6 of 46: Table 2 Effluent Limits - Flow. Need to add footnote that flow values are estimated values, and that flow metering will be implemented. The permit should allow for re-evaluation of flow limits based on actual flow measurements.

    Ecology Response: Added to existing note (c).

49. Page 7 of 46, Section S1.B. Mixing Zone Authorization: The description of the mixing zone size - width and length - are not consistent with the calculation and description of the mixing zone in the draft Fact Sheet page 28.

    Ecology Response: Thank you for catching this. It is our shell language updated with the description in the Fact Sheet.

50. Page 7 of 46, third paragraph, second sentence: Add space after "30" and before "feet".

    Ecology Response: Thank you for catching this typo. Number deleted when description was updated.

51. Page 8 of 46: Based on existing permit, Lehigh believes this should be listed as "Outfall #1 (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W)", but as written, a space is needed after "TZOutlet 1" and "(Latitude ….)", and bold formatting is arbitrary.

    Ecology Response: These are the effluent points of compliance so will remain in the permit identified as such. The formatting was corrected.

52. Page 9 of 46; footnote b, last sentence: The sentence needs clarification. As written it does not make sense.

    Ecology Response: Clarified, provides optional manual composite sampling when mechanical is not available.

53. Page 12 of 46, Table 7: Receiving Water Study: First sentence states "As specified in Special Conditions S8." The "Minimum Sampling Frequency" listed here in Table 7 is once/2-weeks while discharging. But Special Conditions S8 states "collect at least ten receiving water samples". Please revise Table 7 Frequency to be consistent with Special Conditions S8, and equal to 10 samples over life of permit (i.e. twice per year).

    Ecology Response: Frequency updated to indicated as specified in Special Condition S8.

54. Page 13 of 46, Table 7: Receiving Water Study: Table 7 lists "Bis(2-Ethylhexl) Phthalate" and "Ethylbenzene" as parameters for receiving water study. But neither of these analytes are being, or need to be, collected for the treatment system effluent. These analytes should be deleted.

    Ecology Response: This is a substantive comment. Please submit during the public comment period..

55. Page 14 of 46, Table 8, row 4: Capitalize m in manganese to be consistent with rest of table formatting

    Ecology Response: Typo corrected.

56. Page 15 of 46, section header: Font size of "field measurement" in the Section S2.C. header needs to be consistent with rest of the header text.

    Ecology Response: Formatting error corrected.

57. Page 15 of 46, third bullet, first sub bullet: Bullet 3.a. references monitoring of dissolved oxygen. Dissolved oxygen is not a monitored analyte. This bullet does not apply and should be deleted.

    Ecology Response: Permit shell standard text removed.

58. Page 15 of 46, third bullet, third sub bullet: Bullet 3.c. references monitoring of chlorine. Chlorine is not a monitored analyte. This bullet does not apply and should be deleted.

    Ecology Response: Permit shell standard text removed.

59. Page 15 of 46, fourth bullet: Bullet 4 references continuous temperature monitoring devices. Temperature monitoring frequency is the same as analyte sampling in Table 5, and is not continuous. This bullet does not apply and should be deleted.

    Ecology Response: Permit shell standard text removed.

60. Page 24 of 46, Table 9, rows 1: The word "sample" should be "sampler"; after "manual composite" the word "sampling" should be inserted.

    Ecology Response: Change made.

61. Page 24 of 46, Table 9, rows 2: There will only be a single outfall, and so this Task should read "Install flowmeter in outfall."

    Ecology Response: Changed to indicate that flowmeter is required for each point of compliance.

62. Page 25 of 46, First bullet: Bullet 1 states references "S2 Table 8". This should be Table 7.

    Ecology Response: Text corrected.

63. Page 25 of 46, Bullet 2.f.: Bullet states permittee must collect "at least 10 receiving water samples" and references parameters in "S2 Table 8". The reference should be to Table 7, and the frequency in Table 7 needs to be changed to a minimum of 10 sample events, to be consistent with this section.

Ecology Response: Text corrected. S2 Table 8 frequency corrected to identify the frequency identified in S8.

64. Page 25 of 46, Bullet 3: Bullet 3 first sentence states "Submit sediment, chemical, and biological data…" This section is for receiving water study, for which no sediment or biological samples will be collected. These two words should be deleted.

    Ecology Response: Text corrected.

65. Page 26 of 46, S9. Sediment Monitoring: This section needs to reference S2 Table 8 - Sediment Study parameter list.

    Ecology Response: The sediment study parameters list required for the sediment sampling and analysis plan is identify in the Sediment Cleanup Users' Manual (SCUM) and in consultation with the Toxics Cleanup Program. These parameters in S2 Table 8 are in addition to the SCUM requirements. Please consult with TCP on the Sediment Sampling an Analysis Plan (SAP). Test was added to the Table 9 text to clarify.

66. Page 26 of 46, S9.B Second paragraph, first sentence: References "biological data". Table 8 - Sediment Study parameter list does not contain any biological sampling. This reference to "biological data" should be deleted.

    Ecology Response: The biological data required for the baseline sediment sampling is identified in the SCUM manual referenced in Permit S9. The data in S2 Table 8 is in addition to the data required by the TCP program for base line sampling.

67. Page 34 of 46, last paragraph, last sentence: Capitalize a in appendix.

    Ecology Response: Typo corrected.

Table 4 - Proposed Permit Content Comments

68. Page 6 of 46: Table 2 Effluent Limits - Flow. Need to add footnote that flow values are estimated values, and that flow metering will be implemented. The permit should allow for re-evaluation of flow limits based on actual flow measurements.

    Ecology Response: Ecology will use the actual flow to calculate the RPA in the next permit cycle. Note was added to indicated that these are estimated until the flow meter(s) are in place.

69. Page 6 of 46: Table 2 Effluent Limits - The point of compliance is not explicitly described, particularly in light of the next section S1.B Mixing zone authorization. Based on the draft Fact Sheet, the new copper and mercury limits are based on an RPA that uses the mixing zone, and the limits listed are consistent with meeting water quality criteria at the mixing zone boundary. Yet the limits for arsenic, chromium, lead, and manganese are not. The existing permit explicitly states in footnote b to the table of effluent limits that "Ecology may propose alternative final effluent limits based upon the results of the effluent mixing study required under Special Condition 7 (S7) and other factors."

Using the RPA analysis provided in the draft Fact Sheet the effluent limits for arsenic, for example, should be 27.27 ug/L for average monthly, and 40 ug/L for maximum daily.

Ecology Response: This is a substantive comment. Please submit during the public comment period.

70. Page 8 of 46, S2. Monitoring Requirements: Neither here, nor in the draft Fact Sheet, is there an explanation of why the monitoring frequency has been increased to weekly from monthly. The draft Fact Sheet makes reference to "variability of batch discharge", but the treatment system does not batch discharge. The system is a continuous passive treatment and gravity discharge system when intermittently discharging. The reason it does not discharge all the time is because, as a groundwater treatment system, groundwater levels fall below the discharge outlet during dry parts of the year.

    The frequency of monitoring in Table 4 is therefore based on a fundamental misunderstanding of how the treatment system functions. There are over 10 years of monthly, or more frequent monitoring data, and nothing in that lengthy period of monitoring indicates that monitoring at a greater frequency will provide any better understanding of the system, but will quadruple the cost of monitoring. The cost of monitoring is to be considered in this decision based on the draft Fact Sheet page 38 A Wastewater Monitoring.

    Ecology Response: This is a substantive comment. Please submit during the public comment period.

71. Page 8 of 46, S2. Monitoring Requirements: Table 4 Wastewater Effluent Parameters include a number of additional constituents that the draft Fact Sheet and RPA analysis clearly indicate there is no reasonable potential for an exceedance. This includes ammonia, nickel, hexavalent chromium, zinc, temperature, BTEX, hardness, and alkalinity. There is no explanation or rational technical evaluation provided for why these constituents are included. As an example of why inclusion of these is an error, the temperature of groundwater treated and discharged will always be relatively constant and well below the temperature limits for the creek.

    Ecology Response: Text was added to III. Monitoring Requirements identifying that Ecology will use this data in the next permit reissuance along with the receiving water to run an updated reasonable potential analysis.

72. Page 10 of 46, Table 5 Wastewater Effluent Outfalls: To be consistent with the existing permit, system operation, and future requirements, this should be a single outfall, listed as "Outfall #1" (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W).

    Ecology Response: Ecology added text clarifying that these are the effluent points of compliance.

End of comments and responses.

Lehigh Hanson
HEIDELBERGCEMENT Group

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January 29, 2021

Diana Washington, P.E.
Senior Water Quality Engineer/Permit Manager
Water Quality Program
Washington Department of Ecology
4601 North Monroe Street
Spokane, Washington 99205
dwas461@ecy.wa.gov

Sent via email

Subject: Response to Entity Review of Draft Permit and Fact Sheet for NPDES Permit WA0045586 for Lehigh Cement Company Closed Cement Kiln Dust Pile Site
Metaline Falls, Washington

Dear Ms. Washington:

Lehigh Cement Company (Lehigh) appreciates the opportunity to review for factual mistakes and errors the proposed Fact Sheet and National Pollutant Discharge Elimination System (NPDES) Permit No. WA0045586 for the groundwater treatment system at Lehigh's Closed Cement Kiln Dust Pile Site located in Metaline Falls, Washington (the Site).

Attached please find tables of comments for the Fact Sheet and Permit, separated by editorial/formatting errors and errors of content.

There are several specific items Lehigh would like to mention because they result in cascading errors in either, or both, the draft Fact Sheet or Permit:

- The description of multiple outfalls is incorrect. The existing 2006 permit lists a single outfall because the treatment system does not discharge through a pipe to the creek, but discharges to the subsurface through a diffuser and flows through the subsurface to the creek as a single source. The description of discharge should be described as a single outfall, Outfall #1 (Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W), that is a diffuser. Because of the apparent misunderstanding of how the system performs and discharges, we have provided a revised Figure 3 and Discharge Outfall description (Attachment A), for use in the Fact Sheet on pages 12 and 13 of 64.

- The description of the treatment system as performing "batch discharge", or batch treatment, is incorrect. The treatment system performs continuous passive treatment, and discharges intermittently when groundwater levels have risen to the point that discharge is possible. When the system does not discharge, it is because, as a passive groundwater treatment system,

groundwater levels are below the gravity drain outlet. We have provided an updated Figure 4 that illustrates that the three outlets convey treated water to the streambank through a diffuser.

- The increased frequency of monitoring, changing from monthly to weekly, has no technical evaluation to provide a rationale for this decision. Lehigh believes that this increase is in part the result of the misunderstanding of how the treatment system functions. There are over 10 years of monthly, or more frequent, monitoring data that clearly support the performance of the system. For this reason, Lehigh requests that the monitoring frequency remain monthly.

- The assessment of the mixing zone analysis and reasonable potential analysis (RPA) calculation needs to be extended to all effluent constituents. The draft Fact Sheet authorizes the mixing zone and performs an RPA calculation that provides effluent limits for copper and mercury that would meet water quality criteria at the boundary of this mixing zone. But this analysis was not extended to the remaining constituents, even though the existing 2006 permit explicitly states that ***"Ecology may propose alternative final effluent limits based upon the results of the effluent mixing study..."*** Ecology should calculate the effluent limits for the remaining constituents based on the mixing zone and RPA in the same manner that copper and mercury effluent limits were calculated.

Lehigh understands that Ecology may view some of the comments on content to be beyond the scope of this entity review, but these have been provided because they are perceived by Lehigh to be errors or mistakes or derived from errors or mistakes. Lehigh has the expectation that if any of these raise questions from Ecology, that a meeting could occur prior to release for public comment to allow for resolution, and thus reduce the need for extensive comments during the public comment period.

This entity review package includes the following items:

- Fact Sheet Revised Figures 3 and 4 for pages 12 and 14
- Fact Sheet Revised Discharge Outfall description page 13
- Table 1 – DRAFT Fact Sheet editorial and formatting error comments;
- Table 2 – DRAFT Fact Sheet content error comments;
- Table 3 – DRAFT Permit editorial and formatting error comments; and
- Table 4 – DRAFT Permit content error comments.

Please let Greg Ronczka (972.657.4301; Gregory.Ronczka@lehighhanson.com) and Dave Parkinson at Geosyntec Consultants (206.496.1446; dparkinson@geosyntec.com) know if you require any additional information.

Sincerely,

Gregory Ronczka
Lehigh Cement Company

Attachments: Revised Discharge Outfall description as Attachment A;
Revised Figures 3 and 4;
Table 1 – DRAFT Fact Sheet editorial and formatting error comments;
Table 2 – DRAFT Fact Sheet content error comments;
Table 3 – DRAFT Permit editorial and formatting error comments; and
Table 4 – DRAFT Permit content error comments.

Attachment A

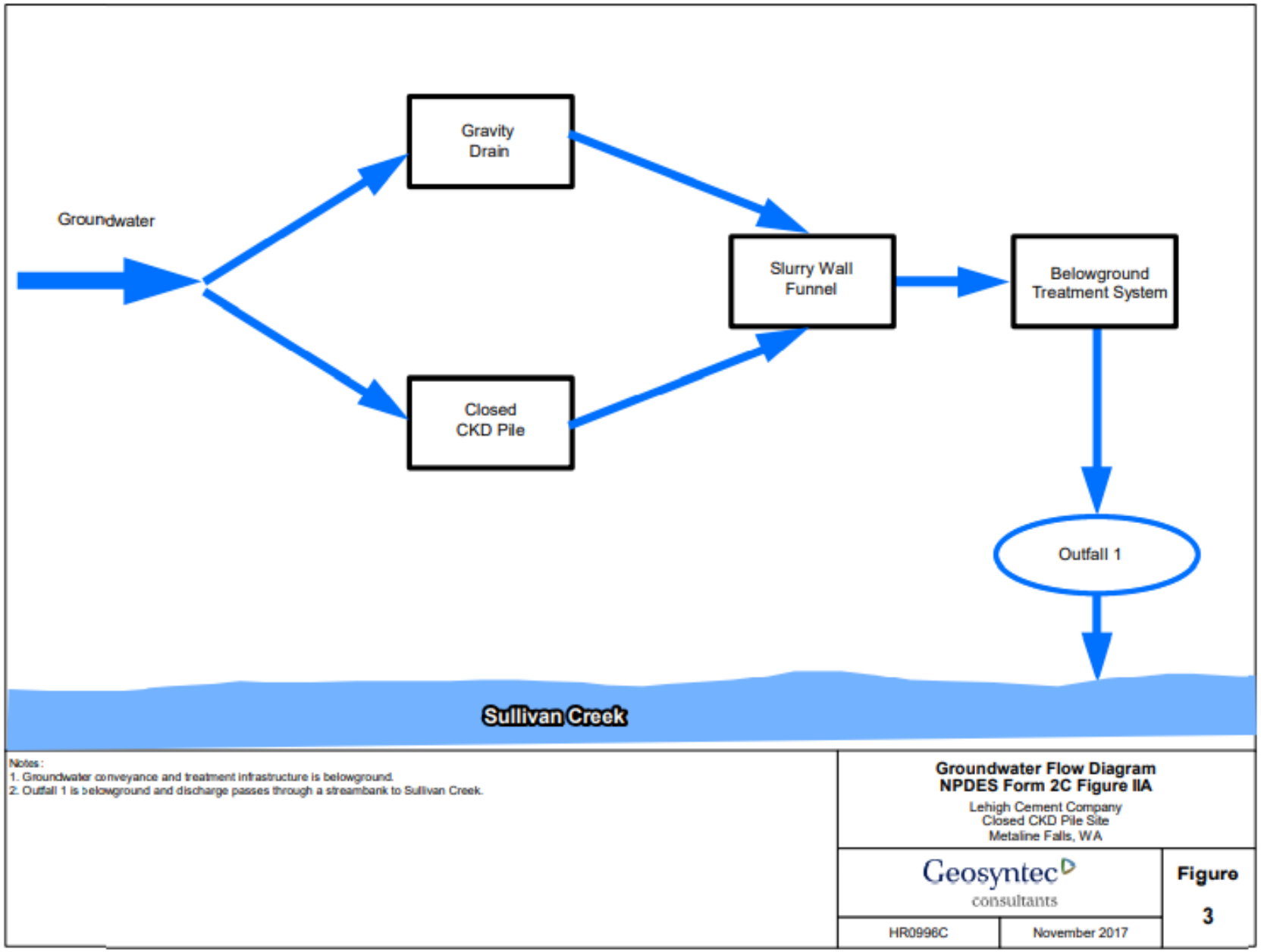
Provided below suggested track changes to the description of the Discharge Outfall on page 13 of 64.

Discharge outfall
The treated effluent flows through the subsurface intermittently ~~into~~ toward Sullivan Creek through a diffuser (i.e., gabion baskets) within ~~three outfalls to~~ the streambank stabilization structure then into the creek via gravity (Figure 4). The mixing study submitted with the permit application assumed that the ~~sheet flow~~diffuser ~~of effluent through the bank into the creek~~ imparts no horizontal momentum to the creek.

~~An additional outfall to the Creek exists east of the treatment site. Lehigh indicated in the engineering report that the outfall carries only precipitation and does not encounter the contaminated groundwater or the CDK pile materials. The proposed permit will require Lehigh to monitor both outfalls from the site to verify the findings.~~

Commented [DP1]: See updated version for use as Figure 4.

Commented [DP2]: There is no second outfall. This captured precipitation is entirely transported to the treatment system and discharges through Outfall #1. See updated Figure 3, submitted with the permit renewal package.


Gravity Drain
Groundwater
Slurry Wall Funnel
Belowground Treatment System
Closed CKD Pile
Outfall 1
Sullivan Creek
Notes:
1. Groundwater conveyance and treatment infrastructure is belowground.
2. Outfall 1 is belowground and discharge passes through a streambank to Sullivan Creek.
Groundwater Flow Diagram
NPDES Form 2C Figure IIA
Lehigh Cement Company
Closed CKD Pile Site
Metaline Falls, WA
Geosyntec consultants
Figure
3
HR0996C
November 2017

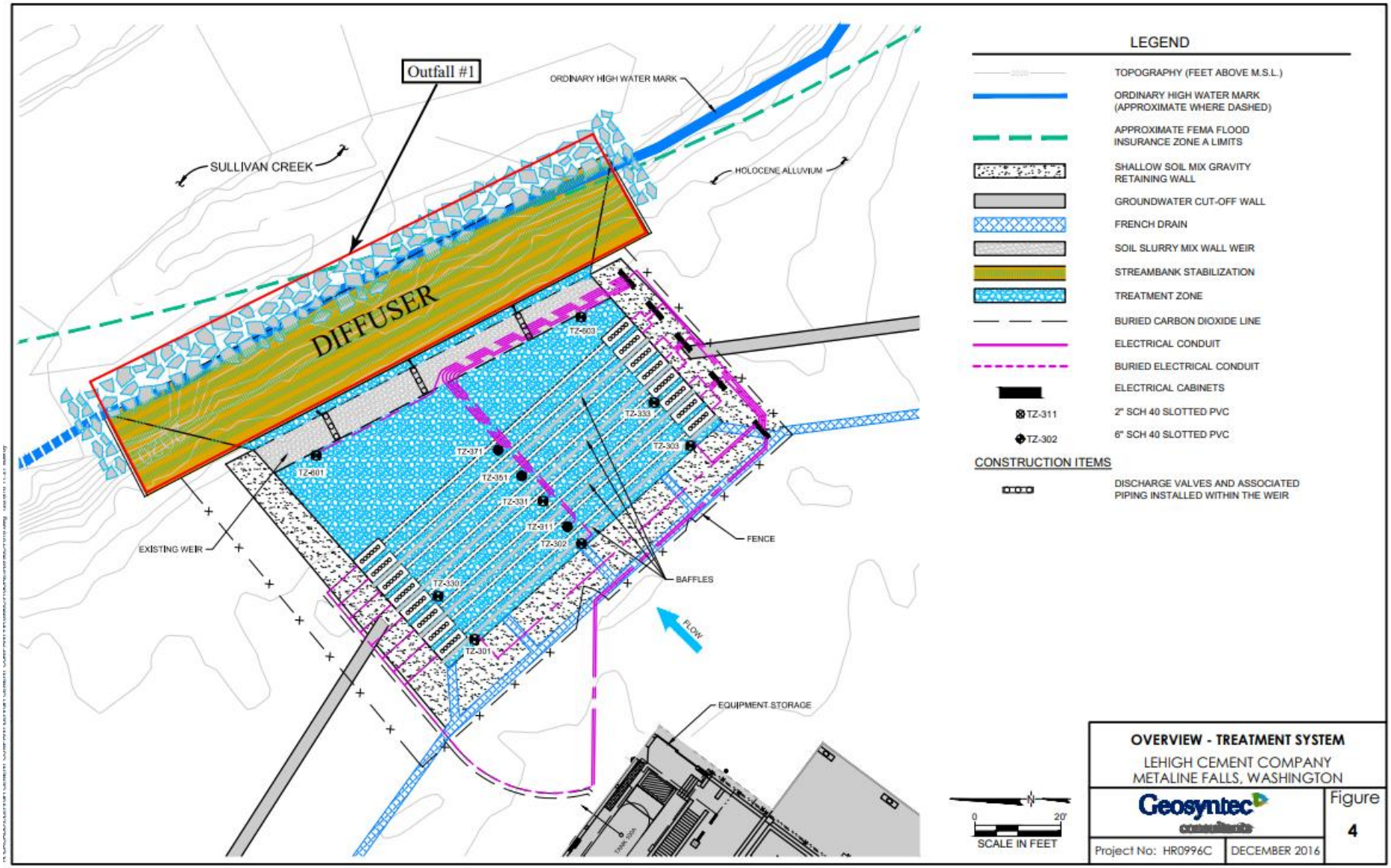

Outfall #1
ORDINARY HIGH WATER MARK
SULLIVAN CREEK
HOLOCENE ALLUVIUM
DIFFUSER
TZ-603
TZ-333
TZ-303
TZ-371
TZ-351
TZ-331
TZ-311
TZ-302
TZ-601
TZ-330
TZ-301
EXISTING WEIR
FENCE
BAFFLES
FLOW
EQUIPMENT STORAGE
LEGEND
TOPOGRAPHY (FEET ABOVE M.S.L.)
ORDINARY HIGH WATER MARK (APPROXIMATE WHERE DASHED)
APPROXIMATE FEMA FLOOD INSURANCE ZONE A LIMITS
SHALLOW SOIL MIX GRAVITY RETAINING WALL
GROUNDWATER CUT-OFF WALL
FRENCH DRAIN
SOIL SLURRY MIX WALL WEIR
STREAMBANK STABILIZATION
TREATMENT ZONE
BURIED CARBON DIOXIDE LINE
ELECTRICAL CONDUIT
BURIED ELECTRICAL CONDUIT
ELECTRICAL CABINETS
TZ-311 2" SCH 40 SLOTTED PVC
TZ-302 6" SCH 40 SLOTTED PVC
CONSTRUCTION ITEMS
DISCHARGE VALVES AND ASSOCIATED PIPING INSTALLED WITHIN THE WEIR
N
0 20'
SCALE IN FEET
OVERVIEW - TREATMENT SYSTEM
LEHIGH CEMENT COMPANY
METALINE FALLS, WASHINGTON
Geosyntec
Figure 4
Project No: HR0996C
DECEMBER 2016

Table 1 - Fact Sheet Editorial Comments	
Fact Sheet for NPDES Permit	
Comment Location	**Comment**
Page 1 of 64, seventh paragraph, second sentence	WQBEl needs to be spelled out on first use - "Water Quality Based Effluent Limits (WQBEL)', and the "l' should be capitalized.
Page 4 of 64	Appendix F needs to be added to Table of Contents
Page 6 of 64, Table 1, rows three and four	Contact at the Facility, and Responsible Official should be: **Greg Ronczka, MPH, P.G.** **Vice President - Environment & Sustainability** **300 E. John Carpenter Freeway** **Irving, TX 75062** **(972) 657-4301**
Page 7 of 64 Figure 1	Image of site on left side of figure has text: "Lehigh Cement Closed Kiln Dust Pile (KDP)" This should be "....Closed **Cement** Kiln Dust Pile (**CKD**)". As defined on first page of Fact Sheet.
Page 8 of 64, third paragraph, second sentence	Confusing sentence reads: "Lehigh submitted a Notification of Dangerous Waste Activities to Ecology (Form 2) informing them that they would be..." This needs clarification - rephrase to say "Lehigh submitted a ..... to Ecology stating that Lehigh would be generating..."
Page 10 of 64	Figure 2 title says "Closed CDK Pile Site Layout"; this should say "Closed **CKD** Pile...."
Page 11 of 64, last paragraph, first sentence	Mentions "kiln dust" - this has been defined as cement kiln dust (CKD) previously and should be referred to here as **CKD**.
Page 11 of 64, last bullet on page	Bullet states that "A subsurface recirculation system to lower pH to 7 standard units." There is presently no recirculation system; there was no mention of a recirculation system in the clean-up action. This bullet should be deleted.
Page 12 of 64, Figure 3	This figure is from 2006, and does not represent the site as it currently is configured. An updated flow diagram was provided in the NPDES Permit Application, and is attached as Figure 3 for use here. The key item is that there is no "Outfall 2". All flow from the gravity drain is routed to the treatment system.
Page 12 of 64, first paragraph, first sentence	Replace "CDK" with "**CKD**".
Page 12 of 64, first paragraph, second sentence	Replace "dissolve" with "**dissolved**"
Page 12 of 64, first paragraph, last sentence	The Fact Sheet states "...before batch discharge to the creek." The groundwater treatment system is not a batch treatment system. It treats passively and continuously, and discharges intermittently. In addition, treated groundwater flows through the three outlets to a single diffuser in the stream bank (Outfall #1 in the existing permit), and then discharges through subsurface flow to the creek.
Page 13 of 64, second paragraph, first sentence	There is no "additional outfall". The draft Permit makes no mention of an "additional outfall". There was a designed second outfall that would have collected surface discharge from the CKD pile, but there has never been any flow to this system. It has been permanently closed and stormwater, should there ever be any, will be directed to the treatment system (see Attachment A).

Table 1 - Fact Sheet Editorial Comments	
Fact Sheet for NPDES Permit	
Comment Location	**Comment**
Page 13 of 64, second paragraph, second sentence	Sentence contains "CDK"; this should be changed to "**CKD**" (see Attachment A).
Page 15 of 64, first paragraph, first sentence	There should be a period after "EIM", and "the" should be capitalized to begin a second sentence.
Page 16-17 of 64, Table 5 Wastewater Characterization	The average values calculated for constituent data from "Discharge Data Provided by Lehigh" (manganese, arsenic, chromium, and lead) do not include non-detect results. Based on the 2018 Ecology Permit Writer's Manual, Section 3.3.5, one half the detection limit for non-detect values should be used to calculate these average values.
Page 18 of 64, Table 7: Violations	This table lists violations at TZOutlet-1, TZOutlet-2, and TZOutlet-3; but the existing permit lists only a single outfall. In addition, footnote d to Effluent Limitations table in the existing permit states ***"The daily discharge means the discharge of a pollutant measured during a calendar day"*** and ***"For other units of measurement, the daily discharge is the average measurement of the pollutant over the day."*** Therefore, multiple exceedances on the same date should represent a single exceedance. This will reduce the number of exceedances to: pH - 18; Total Arsenic - 78; Total Chromium - 1; Total Lead - 21; Total Manganese - 13.
Page 18 of 64, Table 7: Violations	Combined number of pH exceedances listed is 25, but Appendix F only lists 23 combined exceedances. Combined number of total arsenic exceedances listed is 118, but Appendix F lists 117 combined exceedances.
Page 20 of 64, A. Design Criteria	The end of the first sentence of this paragraph states "...Ecology does not have an engineering report that specifies the design criteria for the wastewater treatment plant at this facility." This is incorrect, a Final Engineering Design Report was submitted to Ecology on June 30, 2006. This statement also appears to be in conflict with statements on page 13 second paragraph that references "the engineering report", and on page 19 in Section III Proposed Permit Limits.
Page 25 of 64, Table 10	Reference to a "Side Channel" in rows 3, 4 and 7 are not consistent with Figure 5 of the mixing zone on page 29. We believe these references to a "side channel" are based on the original mixing zone configuration when an island existed in the creek. This island no longer exists, and it appears that the mixing zone calculation takes that change into affect, and therefore this Table 10 needs to be updated in order to be consistent.

Table 1 - Fact Sheet Editorial Comments	
Fact Sheet for NPDES Permit	
Comment Location	**Comment**
Page 26 of 64, first paragraph, third sentence	Sentence references, with respect to mixing zone model, "mixing in two parts, the side channel and the main channel". We believe this should be changed to "mixing in the main channel", as the mixing zone discussion on page 28 and Figure 5 on page 29 illustrate.
Page 29 of 64, last paragraph, last sentence	Sentence beginning "All indigenous fish…" does not make sense. It references aquatic species must be "waters of the state". Please review and revise.
Page 31 of 64, last paragraph, last two sentences	These sentences state that "Lehigh is planning to modify discharge…… Prior to modification Lehigh will be required….to demonstrate the change in mixing will not result in an exceedance…." Lehigh has no plans to modify discharge. Modifications that are planned are internal to the treatment system and would include a flow meter, but this will not modify discharge. Please either clarify the planned modifications or delete reference to planned modifications to discharge.
Page 37 of 64, Table 14	The Average Weekly limits listed for Copper and Mercury are actually based on Figure D4, Maximum Daily Limits.
Page 37 of 64, first paragraph, first sentence	Sentence states that "…the effluent will increase the pH…". Reference to worksheets in Appendix D clearly indicate that the reason the minimum pH is being raised by Ecology is because the calculation results in a **decrease** in pH at the mixing zone boundary of greater than 0.5 standard pH units.
Page 38 of 64, Section A, first paragraph, first sentence	Sentence references the proposed permit as requiring Lehigh to monitor "RCRA 8" metals. The proposed permit does not require monitoring RCRA 8 metals. Please make consistent with the permit.
Page 38 of 64, Section A, second paragraph, second sentence	The sentence references "…variability of the batch discharge…" The system does not batch discharge. When intermittently discharging, the treatment and discharge are continuous. Please delete reference to "batch discharge".
Page 38 of 64, Section A, third paragraph, second sentence	Again references "batch discharged" - the system, when intermittently discharging, treatment and discharge are continuous.
Page 39 of 64, third paragraph, second sentence	The word "requiring" should be changed to "require".

Table 2 - Fact Sheet Content Comments	
Fact Sheet for NPDES Permit	
Comment Location	**Comment**
Page 1 of 64, sixth paragraph, last sentence	The sentence reads *"Contact with groundwater results in a change to the pH of the groundwater, which also has an impact on the mobilization of the metals in naturally occurring minerals in the vadose and saturated zone."* The words "vadose and" should be deleted. The pH of groundwater has no impact on naturally occurring minerals in the vadose zone.
Page 2 of 64, first paragraph, last sentence	"...three discharges." See text provided in Attachment A. There is a single diffuser Outfall that presently has three outlets connected to it. It should be stated here there will be a single Outfall location.
Page 11 of 64 fourth paragraph first sentence	Lehigh takes issue with the statement that "...portions of the groundwater collection system that are not effective." There is no indication that the groundwater collection system is not effective.
Page 12 of 64, second paragraph, first sentence	The system does not produce significant volume of solids to require a solids management plan.
Page 13 of 64, first paragraph, first sentence	The draft Fact Sheet states that the system flows "...into Sullivan Creek through three outfalls to the streambank stabilization structure into the creek via gravity (Figure 4)." The system does not discharge to the creek through three outfalls. The system discharges to Sullivan Creek through a diffuser that represents a single Outfall. There are three outlets connected to the streambank diffuser that then discharges via subsurface flow to the creek. As the existing permit issued in 2006 makes clear, the system represents a single outfall (see revised Figure 4, and Attachment A).
Page 26 of 64 Item #5, last paragraph	Ecology makes the statement that a reasonable potential analysis was performed for each pollutant. But Appendix D which provides results of the RPA does not provide the result for Human Health Criteria for arsenic or chromium, as it does for other constituents. The RPA for arsenic, using the mixing zone results that Ecology used for all other constituents, results in an Average Monthly Effluent Limit for arsenic of 27.27 ug/L, and a Maximum Daily Effluent Limit for arsenic of 40 ug/L. These values can be used by Ecology because the existing permit clearly states as a footnote to the Table of Effluent Limitations that ***"Ecology may propose alternative final effluent limits based upon the results of the effluent mixing study required under Special Condition 7 (S7) and other factors."***
Page 36 of 64, first paragraph second and third sentences	The statements here from Ecology indicate that effluent limits for arsenic, chromium, lead, and manganese will be carried forward from the existing permit. But as pointed out above, the existing permit allows for alternative final effluent limits based on the results of the mixing zone analysis, which Ecology has approved. The RPA using the mixing zone results in an arsenic average monthly effluent limit of 27.27 ug/L. Lehigh requests Ecology revise the sentence here to reflect that.
Page 36 of 64, second paragraph	The approval of the mixing zone, and using the RPA worksheets, results in compliance, and therefore this paragraph can be deleted.

Table 2 - Fact Sheet Content Comments	
Fact Sheet for NPDES Permit	
Comment Location	**Comment**
Page 37 of 64, Table 14	This table lists "Proposed Effluent Limits: Outfall #1". Lehigh requests that these proposed effluent limits reflect the use of the mixing zone and RPA
Page 37 of 64, Table 14	The proposed effluent limits include chromium. After 11 years of monitoring, and 129 reported results there have been three exceedances of the chromium limit, all from the same monitoring date in the first quarter of 2010. The treatment system has been in compliance for chromium for 10 years. Lehigh requests that chromium monitoring be reduced to annual or once per permit cycle, which the RPA analysis confirms.
Page 38 of 64, Section A. Wastewater Monitoring	Wastewater monitoring includes several additional constituents (hexavalent chromium, zinc, and nickel) that do not represent a reasonable potential to exceed water quality criteria based on Ecology's RPA analysis. Lehigh requests that these be removed from draft effluent monitoring. In addition, hexavalent chromium monitoring would in fact not be technically compatible with 24-hr composite sampling requirement because of the maximum 24-hr hold requirements.
Page 38 of 64, Section A, second paragraph, second sentence	The sentence states that the proposed frequency of monitoring takes into account the cost of monitoring. Quadrupling the monitoring frequency will have an enormous impact on cost, without any demonstrated benefit.

Table 3 - Proposed Permit Editorial Comments	
Waste Discharge Permit	
Location	**Comment**
Page 1 of 46	Facility location - Reads "Route 3,1Metaline Falls"; change to "Route 31, Metaline Falls"
Page 1 of 46	Capitalize d in dust
Table 2 on Page 6 of 46, and Table 4 on Page 8 of 46	Both Table 2: Effluent Limits and Table 4 Wastewater Effluent Outfalls list three outlets as outfalls. The existing permit lists a single outfall (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W) that corresponds to the streambank diffuser outfall to the creek. These Tables, and elsewhere, should list the diffuser as the single outfall.
Page 6 of 46	Table 2 Effluent Limits - Flow. Need to add footnote that flow values are estimated values, and that flow metering will be implemented. The permit should allow for re-evaluation of flow limits based on actual flow measurements.
Page 7 of 46, Section S1.B. Mixing Zone Authorization	The description of the mixing zone size - width and length - are not consistent with the calculation and description of the mixing zone in the draft Fact Sheet page 28.
Page 7 of 46, third paragraph, second sentence	Add space after "30" and before "feet".
Page 8 of 46	Based on existing permit, Lehigh believes this should be listed as "Outfall #1 (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W)", but as written, a space is needed after "TZOutlet 1" and "(Latitude ....)", and bold formatting is arbitrary.
Page 9 of 46; footnote b, last sentence	The sentence needs clarification. As written it does not make sense.
Page 12 of 46, Table 7: Receiving Water Study	First sentence states "As specified in Special Conditions S8." The "Minimum Sampling Frequency" listed here in Table 7 is once/2-weeks while discharging. But Special Conditions S8 states "collect at least ten receiving water samples". Please revise Table 7 Frequency to be consistent with Special Conditions S8, and equal to 10 samples over life of permit (i.e. twice per year).
Page 13 of 46,, Table 7: Receiving Water Study	Table 7 lists "Bis(2-Ethylhexl) Phthalate" and "Ethylbenzene" as parameters for receiving water study. But neither of these analytes are being, or need to be, collected for the treatment system effluent. These analytes should be deleted.
Page 14 of 46, Table 8, row 4	Capitalize m in manganese to be consistent with rest of table formatting
Page 15 of 46, section header	Font size of "field measurement" in the Section S2.C. header needs to be consistent with rest of the header text.
Page 15 of 46, third bullet, first sub bullet	Bullet 3.a. references monitoring of dissolved oxygen. Dissolved oxygen is not a monitored analyte. This bullet does not apply and should be deleted.
Page 15 of 46, third bullet, third sub bullet	Bullet 3.c. references monitoring of chlorine. Chlorine is not a monitored analyte. This bullet does not apply and should be deleted.

Table 3 - Proposed Permit Editorial Comments	
Waste Discharge Permit	
Location	**Comment**
Page 15 of 46, fourth bullet	Bullet 4 references continuous temperature monitoring devices. Temperature monitoring frequency is the same as analyte sampling in Table 5, and is not continuous. This bullet does not apply and should be deleted.
Page 24 of 46, Table 9, rows 1	The word "sample" should be "sampler"; after "manual composite" the word "sampling" should be inserted.
Page 24 of 46, Table 9, rows 2	There will only be a single outfall, and so this Task should read "Install flowmeter in outfall."
Page 25 of 46, First bullet	Bullet 1 states references "S2 Table 8". This should be Table 7.
Page 25 of 46. Bullet 2.f.	Bullet states permittee must collect "at least 10 receiving water samples" and references parameters in "S2 Table 8". The reference should be to Table 7. and the frequency in Table 7 needs to be changed to a minimum of 10 sample events, to be consistent with this section.
Page 25 of 46, Bullet 3	Bullet 3 first sentence states "Submit sediment, chemical, and biological data…." This section is for receiving water study, for which no sediment or biological samples will be collected. These two words should be deleted.
Page 26 of 46, S9. Sediment Monitoring	This section needs to reference S2 Table 8 - Sediment Study parameter list.
Page 26 of 46, S9.B Second paragraph, first sentence	References "biological data". Table 8 - Sediment Study parameter list does not contain any biological sampling. This reference to "biological data" should be deleted.
Page 34 of 46, last paragraph, last sentence	Capitalize a in appendix.

Table 4 - Proposed Permit Content Comments	
Waste Discharge Permit	
Location	**Comment**
Page 6 of 46	Table 2 Effluent Limits - Flow. Need to add footnote that flow values are estimated values, and that flow metering will be implemented. The permit should allow for re-evaluation of flow limits based on actual flow measurements.
Page 6 of 46	Table 2 Effluent Limits - The point of compliance is not explicitly described, particularly in light of the next section S1.B Mixing zone authorization. Based on the draft Fact Sheet, the new copper and mercury limits are based on an RPA that uses the mixing zone, and the limits listed are consistent with meeting water quality criteria at the mixing zone boundary. Yet the limits for arsenic, chromium, lead, and manganese are not. The existing permit explicitly states in footnote b to the table of effluent limits that ***"Ecology may propose alternative final effluent limits based upon the results of the effluent mixing study required under Special Condition 7 (S7) and other factors. "*** Using the RPA analysis provided in the draft Fact Sheet the effluent limits for arsenic, for example, should be 27.27 ug/L for average monthly, and 40 ug/L for maximum daily.
Page 8 of 46, S2. Monitoring Requirements	Neither here, nor in the draft Fact Sheet, is there an explanation of why the monitoring frequency has been increased to weekly from monthly. The draft Fact Sheet makes reference to "variability of batch discharge", but the treatment system does not batch discharge. The system is a continuous passive treatment and gravity discharge system when intermittently discharging. The reason it does not discharge all the time is because, as a groundwater treatment system, groundwater levels fall below the discharge outlet during dry parts of the year. The frequency of monitoring in Table 4 is therefore based on a fundamental misunderstanding of how the treatment system functions. There are over 10 years of monthly, or more frequent monitoring data, and nothing in that lengthy period of monitoring indicates that monitoring at a greater frequency will provide any better understanding of the system, but will quadruple the cost of monitoring. The cost of monitoring is to be considered in this decision based on the draft Fact Sheet page 38 A Wastewater Monitoring.
Page 8 of 46, S2. Monitoring Requirements	Table 4 Wastewater Effluent Parameters include a number of additional constituents that the draft Fact Sheet and RPA analysis clearly indicate there is no reasonable potential for an exceedance. This includes ammonia, nickel, hexavalent chromium, zinc, temperature, BTEX, hardness, and alkalinity. There is no explanation or rational technical evaluation provided for why these constituents are included. As an example of why inclusion of these is an error, the temperature of groundwater treated and discharged will always be relatively constant and well below the temperature limits for the creek.
Page 10 of 46, Table 5 Wastewater Effluent Outfalls	To be consistent with the existing permit, system operation, and future requirements, this should be a single outfall, listed as "Outfall #1" (at Latitude: 48° 51' 40" N, Longitude: 117° 22' 0" W).

Attachment G1

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
5/11/2020	TZOutlet-3	8		0.026	0.026	v	0.026	v	0.0027	0.0027		0.0027		0.0069	0.0069	v	0.0069	v	0.11	0.11		0.1100	
4/14/2020	TZOutlet-3	7.5		0.032	0.032	v	0.032	v	0.0027	0.0027		0.0027		0.0077	0.0077	v	0.0077	v	0.15	0.15		0.1500	
3/12/2020	TZOutlet-3	7.8		0.022	0.022	v	0.022	v	0.0024	0.0024		0.0024		0.0068	0.0068	v	0.0068		0.13	0.13		0.1300	
2/11/2020	TZOutlet-3	8		0.026	0.026	v	0.026	v	0.0022	0.0022		0.0022		0.0091	0.0091	v	0.0091	v	0.16	0.16		0.1600	
1/15/2020	TZOutlet-3	6.8		0.016	0.016	v	0.016	v	0.0068	0.0068		0.0068		0.023	0.023	v	0.0230		1.4	1.4		1.4000	
9/20/2019	TZOutlet-1	6.4		0.011	0.010	v	0.011	v	<0.002	0.001		0.0010		0.00123	0.000865		0.0012		3.3	2.95	v	3.3000	v
9/20/2019	TZOutlet-2	6.38	v	0.009					<0.002					<0.001					2.6				
7/8/2019	TZOutlet-2	8.02		0.008	0.008	v	0.008	v	<0.002	0.001		0.0010		0.00438	0.00438		0.0044		0.436	0.436		0.4360	
5/15/2019	TZOutlet-3	9.8	v	0.076	0.076	v	0.076	v	0.0044	0.0044		0.0044		0.0095	0.0095	v	0.0095	v	0.032	0.032		0.0320	
4/16/2019	TZOutlet-3	6.4	v	0.018	0.018	v	0.018	v	0.003	0.003		0.0030		0.0049	0.0049		0.0049		0.21	0.21		0.2100	
3/20/2019	TZOutlet-3	7.4		0.039	0.039	v	0.039	v	0.0038	0.0038		0.0038		0.0051	0.0051	v	0.0051	v	0.21	0.21		0.2100	
2/6/2019	TZOutlet-3	7.3		0.026	0.026	v	0.026	v	0.0047	0.0047		0.0047		0.008	0.008	v	0.0080	v	0.28	0.28		0.2800	
1/16/2019	TZOutlet-3	7.5		0.019	0.019	v	0.019	v	0.0043	0.0043		0.0043		0.0057	0.0057	v	0.0057	v	0.33	0.33		0.3300	
12/13/2018	TZOutlet-3	7		0.012	0.012	v	0.012	v	0.003	0.003		0.0030		0.0089	0.0089	v	0.0089	v	0.37	0.37		0.3700	
7/26/2018	TZOutlet-1	7.1		0.050	0.050	v	0.050	v	0.0049	0.0049		0.0049		0.0092	0.0092	v	0.0092	v	0.43	0.43		0.4300	
6/21/2018	TZOutlet-1	7		0.017	0.017	v	0.017	v	0.0033	0.0033		0.0033		0.005	0.005	v	0.0050		0.4	0.4		0.4000	
5/24/2018	TZOutlet-1	7.5		0.020	0.020	v	0.020	v	0.0031	0.0031		0.0031		0.0066	0.0066	v	0.0066	v	0.23	0.23		0.2300	
4/27/2018	TZOutlet-1	7.3		0.020	0.020	v	0.020	v	0.0016	0.0016		0.0016		0.0042	0.0042		0.0042		0.2	0.2		0.2000	
3/5/2018	TZOutlet-1	6.5		0.015	0.015	v	0.015	v	0.0027	0.0027		0.0027		0.0015	0.0015	v	0.0015		0.72	0.72		0.7200	
2/21/2018	TZOutlet-1	9.2	v	0.034	0.034	v	0.034	v	0.0024	0.0024		0.0024		0.0028	0.0028		0.0028		0.13	0.13		0.1300	
1/16/2018	TZOutlet-1	7.3		0.028	0.028	v	0.028	v	0.0021	0.0021		0.0021		0.0036	0.0036		0.0036		0.23	0.23		0.2300	
12/28/2017	TZOutlet-1	7.5		0.011	0.011	v	0.011	v	0.0011	0.0011		0.0011		0.0039	0.0039		0.0039		0.56	0.56		0.5600	
11/29/2017	TZOutlet-1	7.3		0.013	0.013	v	0.013	v	0.0008	0.0008		0.0008		0.0026	0.0026		0.0026		0.43	0.43		0.4300	
3/8/2017	TZOutlet-1	7.75		0.011	0.011	v	0.011	v	0.00081	0.00081		0.0008		<0.00040	0.0002		0.0002		0.13	0.13		0.1300	
2/15/2017	TZOutlet-1	6.98		0.015	0.015	v	0.015	v	0.0014	0.0014		0.0014		0.0034	0.0034		0.0034		0.35	0.35		0.3500	
1/4/2017	TZOutlet-1	7.72		0.012	0.012	v	0.012	v	0.0012	0.0012		0.0012		0.0044	0.0044		0.0044		0.17	0.17		0.1700	
12/7/2016	TZOutlet-1	6.9		0.050	0.050	v	0.050	v	0.00093	0.00093		0.0009		0.0071	0.0071	v	0.0071	v	0.92	0.92		0.9200	
10/9/2016	TZOutlet-1	6.85		0.010	0.010	v			0.0012	0.00126667				0.0022	0.003				0.42	0.4			
10/9/2016	TZOutlet-2	7.35		0.012			0.012	v	0.0015			0.0015		0.0042			0.0042		0.21			0.2100	
10/9/2016	TZOutlet-3	6.95		0.009					0.0011					0.0026					0.57				
1/20/2016	TZOutlet-2	9.08	v	0.026	0.026	v	0.026	v	0.0027	0.0027		0.0027		0.0031	0.0031		0.0031		0.17	0.17		0.1700	
5/14/2014	TZOutlet-2	7.71		0.032	0.032	v	0.032	v	0.0018	0.0018		0.0018		0.0048	0.0048		0.0048		0.278	0.278		0.2780	
4/17/2014	TZOutlet-2	7.48		0.018	0.018	v	0.018	v	0.0016	0.0016		0.0016		0.0055	0.0055	v	0.0055	v	0.271	0.271		0.2710	
3/17/2014	TZOutlet-2	7.66		0.011	0.011	v	0.011	v	0.00074	0.00074		0.0007		0.0023	0.0023		0.0023		0.196	0.196		0.1960	

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
2/11/2014	TZOutlet-2	7.21		0.002	0.002		0.002		<0.0004	0.0002		0.0002		0.00077	0.00077		0.0008		0.0539	0.0539		0.0539	
1/13/2014	TZOutlet-2	8.54	v	0.005	0.005	v	0.005	v	0.00068	0.00068		0.0007		0.0017	0.0017		0.0017		0.449	0.449		0.4490	
12/17/2013	TZOutlet-2	8.02		0.002	0.002		0.002		0.00047	0.00047		0.0005		0.00096	0.00096		0.0010		0.203	0.203		0.2030	
11/20/2013	TZOutlet-2	7.51		0.006	0.006	v	0.006	v	0.00069	0.00069		0.0007		0.0021	0.0021		0.0021		0.617	0.617		0.6170	
10/29/2013	TZOutlet-2	7.78		0.005	0.005	v	0.005		0.00053	0.00053		0.0005		0.0017	0.0017		0.0017		0.852	0.852		0.8520	
9/23/2013	TZOutlet-2	7.17		0.011	0.010	v	0.011	v	0.0005	0.00047		0.0005		0.0011	0.0012		0.0011		1.03	0.843		1.0300	
9/23/2013	TZOutlet-3	7.98		0.009					0.00044					0.0013					0.656				
4/17/2013	TZOutlet-3	7.43		0.013	0.013		0.013	v	0.0016	0.0016		0.0016		0.0072	0.0072		0.0072		0.418	0.418		0.4180	
3/13/2013	TZOutlet-1	9.04	v	0.020	0.013	v	0.020	v	0.00091	0.00103667		0.0009		0.0036	0.00366667		0.0036		0.0538	0.6336		0.0538	
3/13/2013	TZOutlet-2	7.4		0.012					0.001					0.0033					0.447				
3/13/2013	TZOutlet-3	7.23		0.007					0.0012					0.0041					1.4				
2/14/2013	TZOutlet-1	9.12	v	0.010	0.008	v	0.010	v	0.001	0.00088667		0.0010		0.0034	0.00306667		0.0034		0.0321	0.6447		0.0321	
2/14/2013	TZOutlet-2	7.78		0.008					0.00089					0.003					0.632				
2/14/2013	TZOutlet-3	7.53		0.006					0.00077					0.0028					1.27				
1/14/2013	TZOutlet-1	7.33		0.004	0.004				<0.00040	0.0002				0.0023	0.00179333				0.495	0.45166667			
1/14/2013	TZOutlet-2	7.6		0.004					<0.00040					0.0022					0.433				
1/14/2013	TZOutlet-3	7.79		0.005			0.005		<0.00040			0.0002		0.00088			0.0009		0.427			0.4270	
Jul-12	TZOutlet-1	8.03		0.010	0.011	v			0.00066	0				0.0057	0				0.133	0			
Jul-12	TZOutlet-1	7.38		0.012			0.012	v	0.0013			0.0013		0.0053			0.0053	v	0.798			0.7980	
6/18/2012	TZOutlet-1	7.74		0.007	0.007	v	0.007	v	0.00056	0.00038		0.0006		0.0038	0.0026		0.0038		0.391	0.7705		0.3910	
6/4/2012	TZOutlet-1	7.33		0.006		v	0.006	v	<0.00040			0.0002		0.0014			0.0014		1.15			1.1500	
5/5/2012	TZOutlet-1	8.33		0.006	0.006	v			<0.00040	0.0002				0.002	0.001405				0.134	0.3355			
5/5/2012	TZOutlet-2	8.05		0.006			0.006	v	<0.00040			0.0002		0.00081			0.0008		0.537			0.5370	
4/17/2012	TZOutlet-1	8.31		0.007	0.007	v	0.007	v	<0.00040	0.0002		0.0002		0.0018	0.00135		0.0018		0.0842	0.4441		0.0842	
4/17/2012	TZOutlet-2	8.15		0.006					<0.00040					0.0009					0.804				
4/4/2012	TZOutlet-1	8.4		0.007	0.007	v	0.007	v	<0.00040	0.0002		0.0002		0.0011	0.0011		0.0011		0.171	0.171		0.1710	
3/19/2012	TZOutlet-1	8.14		0.004	0.004		0.004		<0.00040	0.0002		0.0002		0.00088	0.000725		0.0009		0.348	0.509		0.3480	
3/6/2012	TZOutlet-1	8.05		0.004			0.004		<0.00040			0.0002		0.00057			0.0006		0.67			0.6700	
2/7/2012	TZOutlet-2	7.02		0.005	0.005		0.005		<0.00040	0.0002		0.0002		0.00042	0.00042		0.0004		0.87	0.87		0.8700	
1/18/2012	TZOutlet-2	7.84		0.004	0.004		0.004		<0.00040	0.0002		0.0002		<0.00040	0.0002		0.0002		0.663	0.644		0.6630	
1/4/2012	TZOutlet-2	7.66		0.004			0.004		<0.00040			0.0002		<0.00040			0.0002		0.625			0.6250	

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
12/19/2011	TZOutlet-1	7.05		0.004	0.004		0.004		<0.0004	0.0002		0.0002		0.00046	0.00033		0.0005		1.15	0.869		1.1500	
12/5/2011	TZOutlet-1	7.53		0.003			0.003		<0.0004			0.0002		<0.0004			0.0002		0.588			0.5880	
10/19/2011	TZOutlet-3	6.36	v	0.007	0.007		0.007	v	0.00068	0.0006		0.0007		0.00097	0.000795		0.0010		3.1	3.29	v	3.1000	v
10/7/2011	TZOutlet-3	6.65		0.006		v	0.006	v	0.00052			0.0005		0.00062			0.0006		3.48			3.4800	v
9/26/2011	TZOutlet-2	7.93		0.005	0.007	v			< 0.0004	0.000475				0.0014	0.002335				0.372	0.534			
9/26/2011	TZOutlet-3	7.84		0.007			0.007	v	< 0.0004			0.0002		0.00074			0.0007		0.72			0.7200	
9/8/2011	TZOutlet-2	7.75		0.007		v	0.007	v	0.00075			0.0008		0.0036			0.0036		0.522			0.5220	
8/28/2011	TZOutlet-2	7.76		0.007	0.007	v	0.007	v	0.0009	0.000825		0.0009		0.0061	0.0058		0.0061	v	0.386	0.543		0.3860	
8/10/2011	TZOutlet-2	7.33		0.006		v	0.006	v	0.00075			0.0008		0.0055			0.0055	v	0.7			0.7000	
7/28/2011	TZOutlet-1	6.69		0.007	0.007	v	0.007	v	0.00047	0.000245		0.0005		0.0016	0.00076167		0.0016		1.03	1.27166667		1.0300	
7/28/2011	TZOutlet-2	6.88		0.006					<0.0004					0.00058					1.17				
7/28/2011	TZOutlet-3	6.96		0.006					<0.0004					<0.0004					1.1				
7/13/2011	TZOutlet-1	6.65		0.008		v	0.008	v	<0.0004			0.0002		0.0015			0.0015		1.15			1.1500	
7/13/2011	TZOutlet-2	6.67		0.007					<0.0004					0.00049					2.01				
7/13/2011	TZOutlet-3	6.79		0.007					<0.0004					<0.0004					1.17				
6/28/2011	TZOutlet-1	6.38		0.011	0.008	v	0.011	v	0.00052	0.00034		0.0005		0.0023	0.00095167		0.0023		1.4	2.205		1.4000	
6/28/2011	TZOutlet-2	6.32		0.008					0.00047					0.00077					2.58				
6/28/2011	TZOutlet-3	6.28	v	0.006					0.00045					<0.0004					2.66				
6/16/2011	TZOutlet-1	6.47		0.012		v	0.012	v	<0.0004			0.0002		0.0016			0.0016		1.61			1.6100	
6/16/2011	TZOutlet-2	6.38	v	0.007					<0.0004					0.00064					2.51				
6/16/2011	TZOutlet-3	6.66		0.004					<0.0004					<0.0004					2.47				
5/23/2011	TZOutlet-1	7.72		0.006	0.006	v			0.00063	0.00027167				0.0019	0.00073333				0.335	0.61033333			
5/23/2011	TZOutlet-2	7.58		0.007			0.007	v	<0.0004			0.0002		0.00073			0.0007		0.679			0.6790	
5/23/2011	TZOutlet-3	7.73		0.005					<0.0004					<0.0004					0.965				
5/12/2011	TZOutlet-1	7.83		0.005		v			<0.0004					0.00079					0.22				
5/12/2011	TZOutlet-2	7.81		0.006			0.006	v	<0.0004			0.0002		0.00058			0.0006		0.578			0.5780	
5/12/2011	TZOutlet-3	8.04		0.005					<0.0004					<0.0004					0.885				
4/25/2011	TZOutlet-1	7.62		0.005	0.004				<0.0004	0.0002				0.00047	0.00053833				0.22	0.561			
4/25/2011	TZOutlet-2	7.47		0.005					<0.0004					0.0009					0.482				
4/25/2011	TZOutlet-3	7.61		0.005			0.005		<0.0004			0.0002		<0.0004			0.0002		0.771			0.7710	

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
4/11/2011	TZOutlet-1	7.72		0.003					<0.0004					0.00084					0.406				
4/11/2011	TZOutlet-2	7.6		0.004					<0.0004					0.00062					0.635				
4/11/2011	TZOutlet-3	7.73		0.005			0.005		<0.0004			0.0002		<0.0004			0.0002		0.852			0.8520	
3/29/2011	TZOutlet-1	7.31		0.002	0.004				<0.0004	0.00029667				0.00051	0.00035167				0.93	1.16766667			
3/29/2011	TZOutlet-2	7.29		0.003					0.00051					0.00055					0.923				
3/29/2011	TZOutlet-3	7.41		0.005			0.005		0.00047			0.0005		<0.0004			0.0002		1.09			1.0900	
3/15/2011	TZOutlet-1	7.01		0.003					<0.0004					<0.0004					1.53				
3/15/2011	TZOutlet-2	7.27		0.003					<0.0004					<0.0004					0.893				
3/15/2011	TZOutlet-3	7.41		0.004			0.004		<0.0004			0.0002		0.00045			0.0005		1.64			1.6400	
2/16/2011	TZOutlet-1	6.92		0.002	0.003				0.00048	0.000415				0.00045	0.000525				1.15	1.214			
2/16/2011	TZOutlet-2	6.99		0.003					<0.0004					<0.0004					1.01				
2/16/2011	TZOutlet-3	7.18		0.004			0.004		0.00041			0.0004		<0.0004			0.0002		1.32			1.3200	
2/1/2011	TZOutlet-1	7.42		0.004					0.001					0.0019					1.27				
2/1/2011	TZOutlet-2	7.4		0.003					<0.0004					<0.0004					0.954				
2/1/2011	TZOutlet-3	7.36		0.005			0.005		<0.0004			0.0002		<0.0004			0.0002		1.58			1.5800	
1/20/2011	TZOutlet-1	7.29		0.004	0.004				<0.0004	0.00048333				0.0008	0.00091333				1.23	1.04366667			
1/20/2011	TZOutlet-2	7.25		0.004					<0.0004					<0.0004					0.925				
1/20/2011	TZOutlet-3	7.22		0.005			0.005		<0.0004			0.0002		<0.0004			0.0002		1.23			1.2300	
1/6/2011	TZOutlet-1	7.36		0.004					<0.0004					0.00058					1.05				
1/6/2011	TZOutlet-2	7.05		0.004					0.0019					0.0035					0.747				
1/6/2011	TZOutlet-3	7.54		0.005			0.005	v	<0.0004			0.0002		<0.0004			0.0002		1.08			1.0800	
12/30/2010	TZOutlet-1	7.19		0.003	0.005	v			0.00041	0.00048833				0.00083	0.00080333				0.812	1.0415			
12/30/2010	TZOutlet-2	7.27		0.008			0.008	v	0.00012			0.0001		0.0018			0.0018		1.08			1.0800	
12/30/2010	TZOutlet-3	7.49		0.006					<0.0004					0.0004					1.17				
12/9/2010	TZOutlet-1	7.39		0.004					<0.0004					0.0005					0.957				
12/9/2010	TZOutlet-2	7.4		0.006					0.0018					0.00084					1.16				
12/9/2010	TZOutlet-3	7.56		0.007			0.007	v	<0.0004			0.0002		0.00045			0.0005		1.07			1.0700	
11/22/2010	TZOutlet-1	7.13		0.004	0.007	v			0.00072	0.00065167				0.0013	0.00114833				0.831	1.03316667			
11/22/2010	TZOutlet-2	7.18		0.005					0.00049					0.0011					1.04				
11/22/2010	TZOutlet-3	7.35		0.008			0.008	v	<0.0004			0.0002		0.00079			0.0008		1.02			1.0200	
11/8/2010	TZOutlet-1	6.78		0.011					0.0007					0.0019					1.54				

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
11/8/2010	TZOutlet-2	7.3		0.008			0.008	v	0.0016			0.0016		0.0016			0.0016		0.789			0.7890	
11/8/2010	TZOutlet-3	7.31		0.007					<0.0004					<0.0004					0.979				
10/29/2010	TZOutlet-1	6.3		0.006	0.007	v			<0.0004	0.0006				0.0006	0.00052667				2.42	2.58666667	v		
10/29/2010	TZOutlet-2	6.35	v	0.006			0.006	v	<0.0004			0.0002		0.0005			0.0005		2.15			2.1500	
10/29/2010	TZOutlet-3	6.42		0.006					<0.0004					0.00056					1.77				
10/12/2010	TZOutlet-1	6.47	v	0.010			0.010	v	<0.002			0.0010		<0.001			0.0005		3.53			3.5300	v
10/12/2010	TZOutlet-2	6.47		0.007					<0.002					<0.001					2.59				
9/8/2010	TZOutlet-1	6.79		0.010	0.010	v	0.010	v	<0.002	0.001		0.0010		0.00278	0.00164		0.0028		2.45	2.32	v	2.4500	v
9/8/2010	TZOutlet-2	6.54		0.009					<0.002					<0.001					2.19				
8/20/2010	TZOutlet-1	6.61		0.010	0.010	v			<0.002	0.001				<0.001	0.00218				2.08	1.79			
8/20/2010	TZOutlet-2	6.79		0.011			0.011	v	<0.002			0.0010		0.00366			0.0037		1.94			1.9400	
8/4/2010	TZOutlet-1	7.16		0.011			0.011	v	<0.002			0.0010		0.00315			0.0032		1.28			1.2800	
8/4/2010	TZOutlet-2	6.85		0.009					<0.002					0.00141					1.86				
7/23/2010	TZOutlet-2	6.53		0.009	0.009	v	0.009	v	<0.002	0.001		0.0010		0.00216	0.00216		0.0022		1.8	1.8		1.8000	
6/29/2010	TZOutlet-1	9.07	v	0.017	0.010	v	0.017	v	<0.002	0.001		0.0010		0.00733	0.005155	v	0.0073		0.0538	0.73571667		0.0538	
6/29/2010	TZOutlet-2	9.03		0.013					<0.002					0.00799					0.0585				
6/29/2010	TZOutlet-3	7.41		0.009					<0.002					0.00539					0.821				
6/10/2010	TZOutlet-1	6.78		0.009			0.009	v	<0.002			0.0010		0.00523			0.0052	v	0.641			0.6410	
6/10/2010	TZOutlet-2	6.51		0.008					<0.002					0.00358					1.08				
6/10/2010	TZOutlet-3	6.44	v	0.006					<0.002					0.00141					1.76				
5/26/2010	TZOutlet-1	7.75		0.004	0.005	v			<0.002	0.001				0.00163	0.002735				0.276	0.47116667			
5/26/2010	TZOutlet-2	7.75		0.005			0.005	v	<0.002			0.0010		0.00219			0.0022		0.363			0.3630	
5/26/2010	TZOutlet-3	7.62		0.005					<0.002					0.00231					0.692				
5/10/2010	TZOutlet-1	7.73		0.005					<0.002					0.00267					0.292				
5/10/2010	TZOutlet-2	7.83		0.006			0.006	v	<0.002			0.0010		0.00468			0.0047		0.469			0.4690	
5/10/2010	TZOutlet-3	7.81		0.005					<0.002					0.00293					0.735				
4/15/2010	TZOutlet-1	7.51		0.005	0.005				<0.002	0.001				0.00236	0.0015				0.594	0.66966667			
4/15/2010	TZOutlet-2	7.41		0.006			0.006	v	<0.002			0.0010		0.00238			0.0024		0.998			0.9980	
4/15/2010	TZOutlet-3	7.39		0.005					<0.002					0.00126					1				
4/1/2010	TZOutlet-1	7.94		0.005					<0.002					<0.002					0.448				
4/1/2010	TZOutlet-2	8		0.004					<0.002					<0.002					0.385				

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
4/1/2010	TZOutlet-3	8.06		0.005			0.005	v	<0.002			0.0010		<0.002			0.0010		0.593			0.5930	
3/24/2010	TZOutlet-1	7.98		0.005	0.004		0.005		<0.002	0.00655		0.0010		0.00225	0.00169		0.0023		0.282	0.44666667		0.2820	
3/24/2010	TZOutlet-2	8.28		0.003					<0.002					<0.001					0.298				
3/24/2010	TZOutlet-3	8.1		0.004					<0.002					0.00192					0.688				
3/4/2010	TZOutlet-1	8.18		0.006			0.006	v	0.0135			0.0135	v	0.00239			0.0024		0.401			0.4010	
3/4/2010	TZOutlet-2	7.94		0.003					0.0113					0.00134					0.469				
3/4/2010	TZOutlet-3	8.02		0.004					0.0115					0.00174					0.542				
2/18/2010	TZOutlet-1	7.77		0.002	0.003				<0.001	0.00106833				0.00125	0.00080833				0.791	0.80206667			
2/18/2010	TZOutlet-2	7.63		0.002					<0.001					<0.001					0.733				
2/18/2010	TZOutlet-3	7.6		0.004			0.004		<0.001			0.0010		0.0016			0.0016		0.835			0.8350	
2/4/2010	TZOutlet-1	7.94		0.003					<0.001					<0.001					1.27				
2/4/2010	TZOutlet-2	8.18		0.001					0.00141					<0.001					0.0434				
2/4/2010	TZOutlet-3	7.81		0.005			0.005		<0.001			0.0010		<0.001			0.0005		1.14			1.1400	
1/26/2010	TZOutlet-1	7.54		0.003	0.003				<0.001	0.001				<0.001	0.0005				1.65	1.5315			
1/26/2010	TZOutlet-2	7.63		0.003					<0.001					<0.001					0.999				
1/26/2010	TZOutlet-3	7.76		0.005			0.005		<0.001			0.0010		<0.001			0.0005		0.96			0.9600	
1/12/2010	TZOutlet-1	7.3		0.003					<0.001					<0.001					2.13				
1/12/2010	TZOutlet-2	7.43		0.003					<0.001					<0.001					1.58				
1/12/2010	TZOutlet-3	7.45		0.004			0.004		<0.001			0.0010		<0.001			0.0005		1.87			1.8700	
12/16/2009	TZOutlet-1	7.03		0.003	0.003				<0.001	0.001				0.00108	0.00059667				2.48	1.86666667			
12/16/2009	TZOutlet-2	7.12		0.002					<0.001					<0.001					1.75				
12/16/2009	TZOutlet-3	7.26		0.003			0.003		<0.001			0.0010		<0.001			0.0005		1.64			1.6400	
12/2/2009	TZOutlet-1	7.02		0.001					<0.001					<0.001					1.18				
12/2/2009	TZOutlet-2	7.01		0.003					<0.001					<0.001					2.18				
12/2/2009	TZOutlet-3	7.19		0.005			0.005		<0.001			0.0010		<0.001			0.0005		1.97			1.9700	
11/19/2009	TZOutlet-1	6.91		<0.001	0.003				<0.001	0.001				<0.001	0.0005				0.76	0.7775			
11/19/2009	TZOutlet-2	7.03		0.002					<0.001					<0.001					1.44				
11/19/2009	TZOutlet-3	7.27		0.004			0.004		<0.001			0.0010		<0.001			0.0005		1.41			1.4100	
11/4/2009	TZOutlet-1	7.43		0.002					<0.001					<0.001					0.102				
11/4/2009	TZOutlet-2	7.53		0.002					<0.001					<0.001					0.464				
11/4/2009	TZOutlet-3	8.81		0.009			0.009	v	<0.001			0.0010		<0.001			0.0005		0.489			0.4890	

Sample Date	Location ID	pH (SU)	pH Limit 6.5-8.5	Arsenic, total (mg/L)	Arsenic average monthly	Arsenic Average Monthly Limit 0.005 mg/L	Arsenic Maximum Daily (mg/L)	Arsenic Maximum Daily Limit (0.005 mg/L)	Chromium, total (mg/L)	Chromium Average Monthly (mg/L)	Chromium Average Monthly Limit 0.010 mg/L	Chromium Maximum Daily (mg/L)	Chromium Max Daily Limit 0.010 mg/L	Lead, total (mg/L)	Lead Average Monthly (mg/L)	Lead Average Monthly Limit 0.005 mg/L	Lead maximum day	Lead Maximum Daily Limit 0.005 mg/L	Manganese, total (mg/L)	Manganese Average Monthy	Manganese Average Monthly Limit 2.24 mg/L	Manganese Maximum Daily (mg/L)	Manganese Maximum Daily Limit 2.24 mg/L
10/22/2009	TZOutlet-1	6.99		0.001	0.002				<0.001	0.001				<0.001	0.0005				1.43	1.28333333			
10/22/2009	TZOutlet-2	6.99		0.002					<0.001					<0.001					0.984				
10/22/2009	TZOutlet-3	7.17		0.005			0.005		<0.001			0.0010		<0.001			0.0005		1.72			1.7200	
10/8/2009	TZOutlet-1	6.99		0.001					<0.001					<0.001					0.866				
10/8/2009	TZOutlet-2	7.07		0.001					<0.001					<0.001					1.17				
10/8/2009	TZOutlet-3	7.19		0.003			0.003		<0.001			0.0010		<0.001			0.0005		1.53			1.5300	
9/30/2009	TZOutlet-1	7.36		0.001	0.003				<0.001	0.001				<0.001	0.0005				2.4	1.90466667			
9/30/2009	TZOutlet-2	7.4		0.001					<0.001					<0.001					1.42				
9/30/2009	TZOutlet-3	7.49		0.005			0.005		<0.001			0.0010		<0.001			0.0005		1.82			1.8200	
9/10/2009	TZOutlet-1	7.08		0.002					<0.001					<0.001					0.388				
9/10/2009	TZOutlet-2	6.84		0.002					<0.001					<0.001					2.53				
9/10/2009	TZOutlet-3	6.83		0.005			0.005		<0.001			0.0010		<0.001			0.0005		2.87			2.8700	v
8/24/2009	TZOutlet-1	6.52		0.002	0.006	v			< 0.001	0.001				0.00157	0.00139				2.28	6.39833333	v		
8/24/2009	TZOutlet-2	6.51		0.001					< 0.001					< 0.001					3.96				
8/24/2009	TZOutlet-3	6.43	v	0.009			0.009	v	< 0.001			0.0010		0.00107			0.0011		4.73			4.7300	v
8/12/2009	TZOutlet-1	6.37	v	0.006					< 0.001					0.00182					8.96				
8/12/2009	TZOutlet-2	6.3		0.006					< 0.001					0.00156					9.08				
8/12/2009	TZOutlet-3	6.14	v	0.011			0.011	v	< 0.001			0.0010		0.00182			0.0018		9.38			9.3800	v
7/30/2009	TZOutlet-1	7.52		0.002	0.004				< 0.001	0.001				< 0.001	0.00070333				0.986	1.522			
7/30/2009	TZOutlet-2	7.33		0.003					< 0.001					< 0.001					1.48				
7/30/2009	TZOutlet-3	7.14		0.006			0.006	v	< 0.001			0.0010		0.00111			0.0011		2.1			2.1000	
	Count	209	18	208	78	63	107	77	74	78	0	107	1	141	78	17	107	16	209	78	5	107	8
	min	6.14																					
	max	9.8					0.076					0.0135					0.023					9.38	
	median	7.39		0.00575	0.00829833		0.0072		0.00105	0.001		0.001		0.0019	0.00194667		0.0017		0.852	0.5385		0.663	
	mean	NA		0.008	0.013		0.012		0.002	0.001		0.001		0.003	0.003		0.003		1.136	0.823		0.987	
	90th percenti	NA			0.0266		0.026			0.00316		0.00282			0.00713		0.00684			1.82		1.952	