Five-Year Review Report

For

Lehigh Portland Cement Company

Mason City, Iowa

September 2007

Prepared by:

Region VII

United States Environmental Protection Agency
Kansas City, Kansas

Approved by: **Date:**

Cecilia Tapia

Cecilia Tapia, Director
Superfund Division

9/20/07

Table of Contents

List of Abbreviations

ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
E&E	Ecology and Environment
EPA	Environmental Protection Agency
IDEQ	Iowa Department of Environmental Quality
IDNR	Iowa Department of Natural Resources
IDOT	Iowa Department of Transportation
IGWAL	Iowa Ground Water Action Level
MCL	Maximum Contaminant Level
mg/l	Milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance Plan
OSWER	Office of Solid Waste and Emergency Response
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SMCL	Secondary Maximum Contaminant Level
TDS	Total Dissolved Solid
TSS	Total Suspended Solid
UECA	Uniform Environmental Covenants Act
ug/l	Micrograms per liter

Executive Summary

The second five-year review of the Lehigh Portland Cement Company site (Site) located in Mason City, Iowa, has been completed. The Site is located at 700 25th Street on the north side of Mason City in Cerro Gordo County, Iowa. The Site is situated in the northern half of Section 32, Township 97 North, Range 20 West, and the eastern half of the northern half of Section 32, Township 97 North, Range 20 West. The Site is bordered by 25th Street on the south, State Highway 65 on the east and northeast, the Chicago Rock Island and Pacific Railroad and Calmus Creek on the west. Rural and agricultural areas lie to the east and west of the Site. The Lime Creek Nature Center is to the northeast. Calmus Creek flows to the Winnebago River which is north and east of the Site.

The Lehigh Portland Cement Company (Lehigh) has manufactured cement since 1911. The process of manufacturing cement generates large quantities of waste kiln dust. Kiln dust is the waste produced from the process of heating the raw materials. The cement kiln dust at this Site has an alkaline pH value and produces hydroxides when combined with water. Limestone was quarried from several areas on the Site, and over time the quarries partially filled with water following the suspension of quarrying operations. Lehigh disposed of cement kiln dust in several on-site piles and in the Area C Pond.

Problems were identified in 1981 when results of testing the Blue Waters Pond on-site indicated alkaline waters. Lehigh had installed an overflow control structure on the pond which allowed water from the pond to be discharged directly to Calmus Creek to eliminate possible back-flooding of equipment. In 1984, an Iowa Department of Natural Resources (IDNR) investigation determined an alkaline discharge of the pond into Calmus Creek via a tile drain outlet southeast of the plant had contaminated the creek. Lehigh retained a consultant in 1985 to conduct a hydrogeological study of the Site including installation of three groundwater monitoring wells. In 1987, an Environmental Protection Agency (EPA) report concluded on-site contamination existed and contaminants were migrating to groundwater and Calmus Creek.

In 1989, a remedial investigation/feasibility study was conducted by Lehigh. The results of the investigation indicated elevated pH levels and total dissolved solids, sulfates, and some inorganic constituents. In August 1990, the Site was placed on the National Priorities List (NPL). The adjacent Lime Creek Nature Center was investigated by Lehigh in fall 1990.

A Record of Decision (ROD) was signed in 1991 which selected a remedy for the Lehigh area and the Lime Creek Nature Center area. The remedy for the Lehigh area included dewatering ponds; treating pond water using neutralization; excavating; consolidating cement kiln dust from Blue Waters and Arch Ponds to within Area C Pond; constructing a clay cap over Area C Pond; capping the Cement Kiln Dust Reclamation Area; collecting shallow groundwater via sumps and a seep collection system; treating the groundwater in the on-site treatment system before on-site discharge; monitoring

groundwater, surface water, and treated discharge; and providing institutional controls including deed restrictions. The remedy for the Lime Creek Nature Center area included constructing a dam across Quarry Pond and draining the western portion of the pond, excavating cement kiln dust within the western portion of Quarry Pond and consolidating the cement kiln dust within an exhausted quarry east of the pond, constructing a clay cap over the exhausted quarry, consolidating cement kiln dust from all other areas in the Badlands Area, constructing a clay cap over the consolidated material, allowing Quarry Pond to refill, and monitoring groundwater and surface water. The ROD included cleanup levels for arsenic, lead, chromium, and pH.

In 1992, an Administrative Order was issued to Lehigh, the Potentially Responsible Party, to conduct the remedial design and remedial action. An Explanation of Significant Differences in 1993 included changes to the Iowa Ground Water Action Levels (IGWALs) when IDNR indicated the IGWAL for lead should be the Federal Safe Drinking Water Standard, Maximum Contaminant Level (MCL); and IDNR indicated the IGWAL for arsenic was technically infeasible for this Site, and the action level for this Site would be the MCL. The Site was withdrawn from the NPL in 1993. The remedial action began in 1994.

The first five-year review was conducted in 2002. Lehigh, currently the Lehigh Cement Company, has continued to conduct quarterly groundwater monitoring. As part of this second five-year review, a site inspection was conducted by EPA, IDNR, and Lehigh on April 5, 2007. All of the capped areas and the groundwater monitoring wells in the Lehigh facility portion of the Site and the Lime Creek Nature Center were found to be well maintained. The Site was found to be protective of human health and the environment in the short term. An institutional control should be developed to prevent future exposure and to comply with the Iowa Uniform Environmental Covenants Act prior to the next five-year review. Because groundwater monitoring data have been consistent over the last five years, a recommendation of this report is for the sampling frequency to be reduced from the current quarterly monitoring to semiannual monitoring.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: **Lehigh Portland Cement Company**		
EPA ID *(from WasteLAN)*: **IAD005288634**		
Region: VII	**State: Iowa**	**City/County: Mason City/Cerro Gordo**

SITE STATUS	
NPL status: ☐ Final ☐ Deleted ☐**x** Other (specify) Final 1990 Withdrawn 1993	
Remediation status (choose all that apply):☐Under Construction☐Operating ☐**x**Complete	
Multiple OUs? ☐ YES ☐**x** NO	**Construction completion date: 09 / 30 / 2003**
Has site been put into reuse? ☐ YES ☐**x** NO	

REVIEW STATUS	
Reviewing agency: ☐**x** EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author title: Remedial Project Manager	**Author affiliation:** EPA Region VII
Review period: 10 / 2006 to 09 / 2007	
Date(s) of site inspection: 04 / 05 /2007	
Type of review: ☐**x** Statutory ☐ Policy (☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)	
Review number: ☐ 1 (first) ☐**x** 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU #___ ☐ Actual RA Start at OU#____ ☐ Construction Completion ☐**x** Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 09 / 27 / 2002	
Due date *(five years after triggering action date)*: 09 / 27 / 2007	

Five-Year Review Summary

Issues:

The institutional control for the Lehigh Cement Company property may be ineffective to prevent future exposure to contamination.

No institutional control is in place to prevent exposure to contamination at the Lime Creek Nature Center portion of the Site, owned by Cerro Gordo County.

Recommendations and Follow-up Actions:

The Site property should continue to be maintained by the Lehigh Cement Company, and groundwater monitoring reports should continue to be submitted to EPA.

Because the groundwater data have been consistent over the last five years, it is a recommendation of this report for the frequency of groundwater sampling to be reduced from quarterly monitoring to semiannual monitoring.

An institutional control should be developed to prevent future exposure (to prohibit the construction, installation, maintenance, and use of wells for purposes of extracting water for human drinking purposes or for the irrigation of food or feed crops) and to comply with the Iowa Uniform Environmental Covenants Act for the Lehigh Cement Company property and the Lime Creek Nature Center property.

Protectiveness Statement:

All immediate threats at the Site have been addressed, and the remedy for the Site is protective of human health and the environment in the short term because there is no evidence of current exposure. However, in order for the remedy to remain protective in the long term, institutional controls must be put in place prior to the next five-year review to prevent future exposure by prohibiting the construction, installation, maintenance, and use of wells for purposes of extracting water for human drinking purposes or for the irrigation of food or feed crops.

Lehigh Portland Cement Company Superfund Site
Five-Year Review Report

I. Introduction

The Environmental Protection Agency (EPA), in cooperation with the Iowa Department of Natural Resources (IDNR), has conducted a five-year review of the Superfund remedial action implemented at the Lehigh Portland Cement Company Superfund site (Site) in the city of Mason City, Cerro Gordo County, Iowa.

The five-year review report is completed pursuant to section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA); section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Contingency Plan (NCP); and EPA/Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P, Comprehensive Five-Year Review Guidance (June 2001).

The purpose of the five-year review is to ensure the remedy at the Site remains protective of human health and the environment. The five-year review report identifies any deficiencies found and provides recommendations.

This five-year review is required by statute and is implemented consistent with CERCLA and the NCP. CERCLA section 121(c) as amended states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

NCP Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the second five-year review for the Site. The triggering action for this review is the first five-year review.

II. Site Chronology

Table 1 lists the chronology of events for the Site.

Table 1 Chronology of Site Events

Date	Event
1988	Proposal to National Priorities List
1988	Removal Assessment
1989	Notice Letters Issued
1989	Final Listing on NPL
1990	Remedial Investigation/Feasibility Study
1991	Record of Decision
1991	Administrative Order
1992	Remedial Design
1993	Explanation of Significant Differences
1993	Withdrawn From NPL
1994	Remedial Action
2002	First Five-Year Review
2003	Remedial Action Completion
March 2006	Groundwater Monitoring Report First Quarter 2006
June 2006	Groundwater Monitoring Report Second Quarter 2006
June 2006 – June 2007	National Pollutant Discharge Elimination System Monthly Monitoring Reports
December 2006	Groundwater Monitoring Report Third Quarter 2006
February 2007	Groundwater Monitoring Report Fourth Quarter 2006
November 29, 2006	Public Notice for Initiation of Five-Year Review
April 5, 2007	Five-Year Review Site Visit
May 2007	Groundwater Monitoring Report First Quarter 2007

III. Background

Physical Characteristics

The Site is located at 700 25th Street on the north side of Mason City in Cerro Gordo County, Iowa. The Site is situated in the northern half of Section 32, Township 97 North, Range 20 West, and the eastern half of the northern half of Section 32, Township 97 North, Range 20 West. The Site consists of the 150-acre Lehigh Portland Cement Company Plant and portions of the 410-acre Lime Creek Nature Center where large quantities of waste cement kiln dust—a by-product of Lehigh's cement manufacturing processes—were disposed. The Site is bordered by 25th Street on the south, State Highway 65 on the east and northeast, the Chicago Rock Island and Pacific Railroad on the west, and Calmus Creek on the west. Rural and agricultural areas lie to the east and west of the Site. Calmus Creek flows to the Winnebago River which is north and less than a mile east of the Site. The Lime Creek Nature Center is owned by Cerro Gordo

County and is an area for outdoor recreation which was opened to the public in 1984. The Lime Creek Nature Center is located immediately north of Mason City and is bounded by the Winnebago River to the north and east, U.S. Highway 65 to the west, and private owners to the south. The Lehigh plant is west of the Lime Creek Nature Center across Highway 65.

Land and Resource Use

The Mason City area is characterized by limestone and clay which are raw materials used in cement manufacturing. Limestone was quarried from several areas on the Site to depths where the bedrock became unsuitable for cement making. Over time the quarries filled with water following the suspension of quarrying operations. The 150-acre Site consisted of a cement manufacturing plant, associated buildings, and four abandoned limestone quarries and tailings piles. The abandoned quarries on the property were Blue Waters Pond, Arch Pond, and Area C Pond. Another pond—Cooling Waters Pond—is located west of the plant. This pond provides cooling water to the plant's rotary kiln and accepts warm water returned from the plant. The abandoned quarries were filled with water. Waste cement kiln dust was disposed of in the northern quarry (Area C Pond). Several piles of waste cement kiln dust surrounded the perimeter of this pond. The cement kiln dust was piled in other locations as well and could be seen mixed with soil on the Site. Some of the cement kiln dust piles had been graded and revegetated. As determined from chronologic photos in the site investigation, Blue Waters Pond existed by 1950, Arch Pond was an active quarry during the mid-to-late 1950s, and Area C was an active quarry during the late 1950s and beyond. Prior to 1969, the cement manufacturing process reincorporated most of its waste kiln dust back into the finished product. Unusable dust was disposed of on-site. Cement industry changes in the late 1960s led to a significant increase in the quantity of waste kiln dust generated. By 1969, operators in the cement industry concluded the high source of alkalis from the kiln dust caused degradation of the concrete. This was unacceptable to cement consumers. In response, Lehigh had to limit the amount of kiln dust in the product to achieve a less than 0.6 percent alkali content and large amounts of waste kiln dust had to be disposed.

The Blue Waters Pond was an abandoned flooded limestone quarry located west of U.S. Highway 65. The elevation of the water surface in Blue Waters Pond was controlled by a weir located at the southeastern corner of the pond. Water exiting the weir flowed through a buried culvert along the southeastern boundary of the Lehigh property and tied into an Iowa Department of Transportation (IDOT) tile drain which discharged into Calmus Creek. The weir was installed to ensure the water level in Arch Pond—an extension of Blue Waters Pond—would not rise above an elevation which would cause flooding of the plant's primary and secondary crusher equipment and product-loading facilities. Blue Waters Pond received water from precipitation, runoff from a 55-acre watershed, two IDOT tile drains which received water from the watershed, and from Arch Pond which contributed runoff and groundwater seepage from the eastern half of the plant area. Arch Pond was located west of Blue Waters Pond and was formed in an abandoned section of a limestone quarry along a haulage road. Arch Pond and portions of the old quarry in the area surrounding it were partially backfilled

with overburden, shot rock and kiln dust. Arch Pond received water from overflow from the Area C Pond flowing into the northern end of the pond and from surface runoff and leachate from two trenches along a secondary haulage road flowing into the western end of the pond. Water from Arch Pond flowed into Blue Waters Pond through a dike of inadequate integrity. A third reservoir—the Cooling Water Pond—was created by the installation of a small dam across Calmus Creek. This reservoir provided cooling water to the plant, the main bearings which support the rotary kiln used in the cement-making process, and accepted warm return water from the plant. No process water is used by the plant, and domestic water is provided by two 1,200-foot deep wells. Area C Pond located northwest of Blue Waters Pond was an abandoned limestone quarry which had been used for the disposal of waste kiln dust. Arch Pond received water pumped from Blue Waters Pond to eliminate overflow through the Blue Waters Pond weir.

Aerial photographs were used in combination with field reconnaissance to delineate watershed boundaries. Surface areas of three watersheds totaling 117.5 acres were calculated through planimetric means and were determined as (1) Area A, eastern half of main plant, 42.6 acres; (2) Area B, Blue Water Pond and vicinity, 54.9 acres; and (3) Area C, old kiln dust disposal area, 20 acres.

The Site geology consists of very mildly dipping, alternating limestone and dolostone layers of Devonian age. The Coralville Member of the Cedar Valley Formation was the principal unit mined for cement raw material at the pond site. This unit is overlain by the discontinuous Nora Member of the Shell Rock Formation. Soils of the Rockton series cover bedrock in most of the surrounding drainage areas. The Nora Member is a highly jointed dolostone and limestone which easily weathers to friable dolomitic sand. Most of the joints are near vertical and open with some calcite infilling. Hydrogeologically these fractures may act as a highly transmissive system for the flow of shallow groundwater. Joint spacing averages less than three feet, and exposed joints are highly weathered in the vicinity of Arch Pond along the western side of the Chicago and Northwestern Railroad right-of-way. Outcrops along the northwestern limits of Area C exhibit similar jointing and weathering patterns. The Coralville Member includes relatively nonfractured and nonweathered limestone and dolostone. As a result of its low joint density, it may act as a local, lower confining layer for groundwater circulating throughout joints in the Nora dolostone.

The soil survey data from the U.S. Department of Agriculture, Soil Conservation Service for Cerro Gordo County, indicate the soils in the drainage basins surrounding Blue Waters Pond are classified as principally belonging to the Rockton series with minor amounts in the Donnan and Bassett series. The Rockton series consist of well drained, moderately permeable soils on ridge crests, on sides of stream benches, and on the uplands. These soils formed in 20 to 40 inches of loamy sediment overlying limestone bedrock. The native vegetation was prairie grasses. Slope ranges from 0 to 9 percent. The A horizon uppermost is typically loam but in places is silt loam. The B horizon is loam, sandy clay loam, or clay loam. The C horizon is typically loam but ranges to sandy clay loam and clay loam. Hydrogeologic properties of the soil influence engineering characteristics. The soil has limited use for pond construction because of its

relatively high permeability and thin extent. Drainage is deep and the unit is not susceptible to surface flooding. Infiltration rates are high. As a result of the low slopes, runoff is limited to intense precipitation events under high soil moisture conditions. Frost action on this soil is low and its corrosiveness to concrete is low.

History of Contamination

The Lehigh Portland Cement Company began manufacturing cement at the Site in 1911 and is currently manufacturing hydraulic cement. The process of manufacturing cement generates large quantities of kiln dust which is a waste produced from the process of heating the raw materials. During the manufacturing of Portland cement, raw materials such as limestone and clay are quarried and then crushed, dried, and mixed in the correct proportions. This mixture is ground to a fine powder then burned in a sloping rotary kiln maintained at a temperature of about 2600-2800° to form a glassy *clinker*. The *clinker* is crushed, a small amount of gypsum is added, and the mixture is reground to form cement. Collection of the dust is difficult because it is entrained in large volumes of hot exhaust gases, and it often contains high concentrations of sodium and potassium alkalis which make it unacceptable for return to the cement-making process. The kiln dust was placed in piles on the Site, and a large quantity was disposed of in the Area C Pond.

The chemical composition of kiln dust is determined by the composition of the raw materials and the conditions the dust particles have encountered in the kiln. The major constituents of this Portland cement are calcium oxide, aluminum, silica, and iron oxide. Magnesium oxide, sodium, potassium, and sulfates are also present. Trace quantities of chromium, lead, zinc, and other metals may be present depending on the source of raw materials used to manufacture the cement. Waste kiln dust contains fine particles of cement composed of these constituents and fossil fuel combustion products. Waste kiln dust has highly corrosive properties and produces large quantities of hydroxides when combined with water. The kiln dust on-site has a pH value as high as 13.0 units. Corrosiveness is characterized by a pH level that is equal to or greater than 12.5 units. Kiln dust has been designated a special study waste under both the Resource Conservation and Recovery Act (RCRA) and CERCLA. Human or animal contact with such highly corrosive material causes chemical burns to exposed tissue. High pH levels in water limit the survivability of aquatic organisms including fish. It has been estimated a minimum of 136,000 tons of waste kiln dust have been disposed of on-site since 1981. No records are available for prior years.

Problems with the Site were first identified in 1981 during a chemical test of the Blue Waters Pond. The results of the test indicated the pond water was highly alkaline. Lehigh had installed an overflow control structure at the southeastern corner of Blue Waters Pond. The control structure had been constructed because IDOT altered drainage patterns in the area which resulted in large volumes of water entering Blue Waters Pond. The flow control structure allowed water from the pond to be discharged directly to Calmus Creek to eliminate possible back-flooding of equipment critical to Lehigh's operation.

In 1981, testing by the Iowa Department of Environmental Quality (IDEQ) of the Blue Waters Pond indicated the pond water was alkaline with a pH level of 10.6, in excess of the 9.0 pH level permitted by IDEQ for discharge into Class B streams. Lehigh was directed not to make use of its discharge weir which would release water into Calmus Creek. In 1982, Lehigh contracted with a consulting company to determine the sources of high pH level waters. The results identified three potential sources of which Arch Pond contributed the most significant quantities of high pH level water to Blue Waters Pond. The high pH level of Arch Pond was attributed predominantly to direct contact with cement kiln dust. The report summarizing the results recommended options to reduce or contain high pH level site waters. In order to contain the high pH level waters, Lehigh chose to transfer water from Blue Waters Pond to Area C Pond and retain the water behind two earthen dikes.

The Site includes areas of the Lime Creek Nature Center which are across Highway 65 from the plant area and also have deposits of cement kiln dust which were in contact with water. Portions of the current Lime Creek Nature Center were formerly owned by Lehigh. Lehigh transferred the property to Cerro Gordo County in 1979. During ownership, Lehigh mined limestone from the Site and replaced cement kiln dust within the exhausted quarries. The cement kiln dust was identifiable at three locations at the Lime Creek Nature Center including two exhausted quarries located on the western side and one area of surficial deposit along the eastern boundary of the Site referred to as the Badlands.

Initial Response

In 1984, the IDNR conducted a Comprehensive Work/Quality Assurance project at Calmus Creek which is located about 1,000 feet south and downgradient from the Blue Waters Pond. This investigation found a highly alkaline discharge from the Blue Waters Pond into Calmus Creek, via the tile drain outlet southeast of the Lehigh facility, contaminated Calmus Creek. The biological quality of Calmus Creek was found to have deteriorated because of effluents from Lehigh and Northwestern States Portland Cement Company sites. The Calmus Creek Water Quality Study by the University Hygienic Laboratory found in 1984 because of the deterioration of the chemical balance in Calmus Creek and the quarry ponds, the number and variety of fish and benthic organisms were substantially reduced downstream of the tile drain outlet southeast of the Lehigh facility. Calmus Creek discharges into the Winnebago River approximately 1,500 feet from the tile drain outlet.

Ecology and Environment (E&E) was hired by EPA in 1987 to conduct field work including sampling of kiln dust/sediment, surface water, and groundwater. The E&E investigation confirmed the on-site quarry ponds and groundwater were contaminated locally and had the potential to migrate off-site. Waste kiln dust was found to have a pH level of 13.0 units. The measured pH levels in on-site quarry ponds and monitoring wells ranged from 7.19 to 12.04. Other constituents of the kiln dust included arsenic, chromium, lead, zinc, and sulfates. In 1987, Lehigh hired R. E. Wright and Associates to present a plan for the elimination of the Blue Waters Pond discharge. The

project involved reducing or eliminating the volume of water with high alkalinity levels which seeps into Blue Waters Pond from Arch Pond by constructing a slurry wall between Arch Pond and Blue Waters Pond and a grout curtain. The second objective was to eliminate the runoff of storm water from Highway 65 which discharges into Blue Waters Pond in order to prevent future overflows. This was to be accomplished by redirecting the storm water drainage from Highway 65 to discharge into the 25th Street storm sewer. The third objective was to dispose of existing high alkaline water in Blue Waters Pond by pumping water through an irrigation system into Area C Pond. Due to the persistence of high pH values on-site and the results of the E&E study, the Site was evaluated for the National Priorities List (NPL). In 1988, the Site was proposed for the NPL and in 1990 was placed on the final NPL. The listing was vacated by order of the Court of Appeals in 1992, and the Site was withdrawn from the NPL in 1993.

Lehigh hired Layne GeoSciences in 1989 to perform the remedial investigation/ feasibility study (RI/FS) for the Site. Nine monitoring wells were initially installed, of which one is a nested well. The nested well consists of a shallow water table monitoring well and a deeper bedrock piezometer. IDNR requested two additional shallow monitoring wells be installed east of Highway 65 on Lehigh property to determine pH levels as well as any other inorganic contaminant movement eastward onto the Lime Creek Nature Center. In the June 1990 sampling, elevated pH levels, total dissolved solids (TDS), and similar contaminants as identified in prior studies were found in groundwater and surface water. The pH levels ranged from background to 11.44 in MW-9 with TDS 7,000 in this well. The pH level was higher in the ponds—13.0 in Arch Pond with TDS 11,000. In the July 1990 sampling, pH levels, TDS, and sulfates were elevated as well as inorganic constituents in some wells. MW-9 had a pH level of 11.43 and TDS of 9,700. Arch Pond had a pH level of 13.15 and TDS of 10,000. Sampling in October, November, and December 1990 resulted in similar findings.

In 1990 at the request of IDNR, Lehigh investigated the Lime Creek Nature Center as part of the RI/FS, installing four monitoring wells, sampling the existing well, and sampling the cement kiln dust and surface water on-site. Lehigh had formerly owned property at the nature center, and cement kiln dust had been disposed of in abandoned quarries on the nature center property. The areas of concern were a quarry pond on the western edge of the nature center and an area known as the Badlands which contained about 40 acres of cement kiln dust. The major concerns at the Lime Creek Nature Center were contaminated surface water and groundwater as a result of contact with waste cement kiln dust in the ponds and the Cement Kiln Dust Reclamation Area. Local groundwater and surface water were impacted by high pH levels and by an increase in TDS, elevated concentrations of potassium, sulfate, sodium, and other nonhazardous parameters. Trace amounts of arsenic, lead, and chromium were also detected. Levels of metals found in soil/sediment samples were not considered to be significantly different than background soils. Elevated pH levels were detected in Quarry Pond at a pH level of 9.5 and in MW-14 at a pH level of 10.4. The kiln dust at the Lime Creek Nature Center was a RCRA special study waste, not a RCRA hazardous waste. Water at the Site having a pH level exceeding 12.5 would exceed the RCRA criterion for corrosiveness and be considered a RCRA hazardous waste. Impacted groundwater was found to exist at the

Lime Creek Nature Center, but had not significantly migrated to the bedrock underlying and adjacent to the Site. The degree of impact was shown to lessen with depth. No significant off-site groundwater contamination was found. Groundwater flow on-site is southeastward to Calmus Creek or the Winnebago River. Potential pathways of groundwater migration were via the upper bedrock aquifer.

The RI determined the physical aspects of the groundwater flow at the Site. The wells defined the local groundwater flow, local variations in aquifer hydraulic properties, and groundwater quality as well as provided vertical groundwater gradient trends and vertical contaminant distribution.

Basis for Taking Action

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a Health Assessment for the Site which concluded the Site was a potential health concern because of the potential risk to human health resulting from possible exposure to hazardous constituents of cement kiln dust at concentrations that may result in adverse health effects. Human exposure to elevated pH levels may occur and may have occurred in the past via dermal contact; ocular contact; incidental ingestion of on-site soil, sediment, surface water, and groundwater; and via inhalation of dust.

A baseline risk assessment was conducted as part of the RI and assessed the hazardous substances, arsenic, lead, and chromium. The risk assessment included tabulation of the cancer risks associated with each chemical and the total pathway cancer risk for ingestion of contaminated groundwater. The primary complete exposure pathway was through groundwater. The total exposure pathway risk for ingestion of contaminated groundwater was 1.28×10^{-3}. The total cancer risk exceeded the goal of cancer risk below 1×10^{-6}.

The federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs) in the Record of Decision (ROD) included: arsenic, 0.05 milligrams per liter (mg/l); lead, 0.05mg/l; and chromium, 0.05mg/l. The Iowa Ground Water Action Levels (IGWAL), Chapter 133, were: 0.1 mg/l for chromium in the ROD, 0.05 mg/l for arsenic as changed in the Explanation of Significant Differences (ESD) because IDNR indicated the IGWAL for arsenic was technically infeasible for this Site, and 0.05 mg/l for lead as changed in the ESD in which IDNR indicated the IGWAL for lead should be the MCL.

National secondary drinking water regulations set limits for contaminants in drinking water which may affect the aesthetic qualities of drinking water, e.g., taste and odor. These Secondary Maximum Contaminant Levels (SMCLs) have been established for pH levels 6.5-8.5, sulfate 250 mg/l, and TDS 500 mg/l. Elevated levels in excess of the SMCLs have been identified in the groundwater and surface water at the Site. The elevated pH levels have been the primary concern associated with the Site. Levels of pH in excess of 12.5 have been found in the Site ponds, the level above which a liquid is considered a hazardous waste. Arch Pond had pH levels in excess of 13.0. Site groundwater pH levels have exceeded 13.0.

IV. Remedial Action

Remedy Selection

The remedial objectives related to insitu hydraulic isolation of the cement kiln dust deposit for the Site were established in the ROD. The objectives were: (1) establish inward hydraulic gradients around and beneath the cement kiln dust preventing off-site migration; (2) minimize saturation of (dewater) the waste cement kiln dust; (3) recover, treat, and discharge impacted groundwater; (4) assess the effectiveness of the remedial actions through long-term groundwater monitoring; and (5) installation of kiln dust dewatering wells if necessary to facilitate kiln dust dewatering in the Cement Kiln Dust Reclamation Area.

The ROD issued on June 28, 1991, selected a remedy including cement kiln dust isolation and capping, quarry drainage, and water treatment. Blue Waters Pond, Area C Pond, and Arch Pond were drained. Pumped water was treated using carbon dioxide (instead of acid) neutralization to reduce use of hazardous acid in the treatment. Discharge was to either Calmus Creek or the Winnebago River. Blue Waters Pond was dewatered, and drains were constructed directing water to a sump located in Arch Pond in order to dewater these areas as well as Area C Pond and the Cement Kiln Dust Reclamation Area. Clay caps were constructed over the waste cement kiln dust in the Area C Pond section and the Cement Kiln Dust Reclamation Area. The Lime Creek Nature Center remedial action included dewatering, removal/consolidation of cement kiln dust, and capping in the Badlands Area.

Remedy Implementation

On September 29, 1992, EPA issued a Unilateral Administrative Order to Lehigh Portland Cement Company. The order required Lehigh to conduct the remedial design and remedial action at the Site. The remedial design was approved in 1994.

The remedial action was completed in 1997 and included the following:

(1) After the drainage of the ponds, drainage pathways were constructed in the base of Blue Waters Pond and Area C Pond. These drainage pathways were connected to a sump which was excavated in the Arch Pond following sediment dredging. During this drainage, local shallow groundwater gradients reversed toward the quarries. Impacted shallow groundwater was drained from the sump and prevented from moving off-site.

(2) A clay cover was constructed over the Cement Kiln Dust Reclamation Area. The cap was graded so runoff was directed to the sump to allow blending of surface water with the impacted water prior to treatment. The cap was constructed to satisfy state landfill requirements and reduce long-term pumping costs from infiltration of water.

(3) Cement kiln dust in Area C Pond and the cement kiln dust sediment in Blue Waters Pond and Arch Pond were consolidated into the drained Area C Pond and covered with an engineered clay cap. This cap of the two cement kiln dust areas required approximately 80,000 cubic yards of clay-rich soil. The cap was finished with a seeded topsoil layer to facilitate runoff and to protect the clay.

(4) Three monitoring wells were installed around the Cement Kiln Dust Reclamation Area in order to assess the effects of pond drainage and the effectiveness of the clay cap.

(5) The overall effect of the remedy was the isolation of the contaminant source—the cement kiln dust—from interaction with surface and groundwater and the removal and treatment of impacted water in the ponds and shallow groundwater.

(6) The treated discharge to the Winnebago River was monitored to assure compliance with the National Pollutant Discharge Elimination System (NPDES) permit.

(7) The Lime Creek Nature Center remedial action included a temporary dam constructed to allow the southern area to be dewatered. Then waste cement kiln dust was removed from the Quarry Lake area to an exhausted quarry east of the lake, consolidated, and covered with a clay cap. The cement kiln dust in the Badlands Area of the Lime Creek Nature Center was consolidated into two areas which were then covered with a clay cap.

System Operation/Operation and Maintenance

The operation and maintenance (O&M) phase of the remedial action began when the operational and functional determination was made. The remedy has been completed, and groundwater and surface water monitoring and system inspections and maintenance have continued to assess the effectiveness of the remedial action. The major systems integral to the remedial action include a water collection sump, a water treatment facility, associated piping, and clay caps over the waste cement kiln dust. The remedial action components require periodic inspection and maintenance including repair and replacement.

A Notice to the Public was recorded by Lehigh Portland Cement Company in the Recorder's Office, Cerro Gordo County, state of Iowa on November 25, 1992, in accordance with the September 1992 Administrative Order. The Notice to the Public states the Site property is subject to the Administrative Order and the restrictions provided for therein.

An Easement Agreement was signed on October 12, 1993, between the county of Cerro Gordo, Iowa, and Lehigh Portland Cement Company. The county is the owner of

the Lime Creek Nature Center area. Lehigh Portland Cement Company obtained a perpetual right to enter the Lime Creek Nature Center area to implement the requirements of the remediation plan and to enter the property to:

> ...construct, install, maintain, repair, replace, remove and access underground and aboveground pipelines for the purpose of conveying various treated liquid substances from the Lehigh property over, under and across the Lime Creek property to the Winnebago River along the Easement Property, together with the right to excavate and refill ditches and trenches for the location of such pipeline(s) and main(s), and the further right to remove trees, bushes, undergrowth and other obstructions interfering with the location, construction and maintenance of such pipeline(s).

The Easement Agreement also states, "All the terms, conditions and obligation of this Easement Agreement shall run with the Lehigh Property and the Lime Creek Property."

An Access Agreement was signed on March 22, 1994, between Cerro Gordo County, Iowa, and Lehigh. Lehigh obtained access to Lime Creek property for purposes of construction and O&M of cleanup activities on the Lime Creek property to perform work contained in the Remedial Action Work Plan to comply with the Administrative Order.

Lehigh continues to submit quarterly groundwater monitoring reports and maintain the site-capped areas and the monitoring wells. Quarterly groundwater monitoring reports were submitted in May 2007, including groundwater monitoring data from March 2007, and in August 2007, which included groundwater monitoring data from June 2007. These data are included at the end of this report in Attachment 2. Attachment 2 also includes the latest monthly monitoring data for pH levels, TDS, and Total Suspended Solids (TSS) which are required for the NPDES permit.

V. Progress Since the Last Five-Year Review

This five-year review is the second five-year review for this Site. Since the last five-year review, Lehigh has conducted groundwater sampling including measuring water levels and obtaining water samples from 19 groundwater monitoring wells in accordance with the Quality Assurance Project Plan.

Based on current groundwater elevation data, an estimated 12 to 16 feet of cement kiln dust remain saturated within the Cement Kiln Dust Reclamation Area. The eastward groundwater flow gradient near the Cement Kiln Dust Reclamation Area is being maintained through operation of the Arch Pond pumping and treatment system. The Arch Pond sump pumping system appears to influence groundwater flow and captures water affected by the cement kiln dust. The pH level reduction treatment facility treats

water affected by the cement kiln dust. The Arch Pond sump pumping system and pH level reduction treatment facility have operated continuously beginning in 2002. Since that time, there has not been a marked change in water levels near the Cement Kiln Dust Reclamation Area.

Lehigh has submitted quarterly groundwater monitoring reports each year to assess groundwater at the Site and has maintained the remediated areas of the Site including the capped areas on the Lehigh facility and capped areas in the Lime Creek Nature Center which is now owned by Cerro Gordo County. In addition, the monthly monitoring data for pH levels, TDS, and TSS which are required for the NPDES permit have been submitted to EPA.

The O&M costs for the Site over the last five years (2002-2006) have been $417,554 including groundwater monitoring, $54,463; mowing and fertilizing, $99,342; operation of the CO_2 plant, $221,271; cleaning out the Arch Sump, $20,770; and consulting fees/reports, $21,708.

VI. Five-Year Review Process

Administrative Components/Community Involvement

The second five-year review has included the following team members: Catherine Barrett, EPA Remedial Project Manager; Robert Drustrup, IDNR Project Manager; Rita Dunn, Environmental Coordinator, Lehigh Cement Company; and the EPA Community Involvement Coordinator.

This five-year review consisted of the following activities: (1) a review of relevant documents (Attachment 1); (2) discussions among representatives of EPA, the state of Iowa, IDNR, and the Lehigh Cement Company; and (3) an April 5, 2007, site inspection conducted by Catherine Barrett, EPA; Robert Drustrup, IDNR; and Rita Dunn, Lehigh Cement Company.

A public notice regarding the initiation of the five-year review was placed in the *Mason City Globe Gazette* on November 29, 2006. At the end of the five-year review, a newspaper notice will indicate the availability of the five-year review report for viewing by the public. The five-year review report will be available in the Site information repository, the Mason City Public Library, 225 2nd Street, SE, Mason City, Iowa 50401; EPA Superfund Division Records Center, 901 North 5th Street, Kansas City, Kansas 66101; and the IDNR offices, Wallace State Office Building, 502 E. 9th Street, Des Moines, Iowa 50319.

Document Review

Section 121(d) of CERCLA, as amended by SARA, requires remedial actions comply with applicable or relevant and appropriate requirements (ARARs) or standards under federal or state environmental statutes or regulations. Several ARARs have been considered in the ROD for this Site.

If groundwater is used for water supply, drinking water must meet the MCL under the federal Safe Drinking Water Act. The national primary drinking water standards or MCLs for the Site contaminants designated as performance standards were as follows: (1) arsenic, 0.05 mg/l as changed in the ESD; (2) chromium, 0.05 mg/l as designated in the ROD; and (3) lead, 0.05 mg/l as changed in the ESD. The Iowa state-wide standards for groundwater pursuant to 567 Iowa Administrative Code 137 are the same as MCLs. The pH level range limits are 6.5-8.5. A pH level in excess of 12.5 is considered a hazardous waste.

The Iowa Rules for Determining Cleanup Actions and Responsible Parties, I.A.C., Chapter 567-133, are applicable and require remedial actions in the state of Iowa to address soil contamination which may adversely affect groundwater.

Section IX (Notice of Obligations to Successors-in-Title) of the September 30, 1992, Administrative Order issued to Lehigh required: (1) a certified copy of the Order; (2) a notice stating the property is subject to the Order and restrictions therein; and (3) a Restrictive Covenant prohibiting the construction, installation, maintenance, or use of any wells on the property for the purpose of extracting water for human drinking purposes or for the irrigation of food or feed crops be filed with the Cerro Gordo County Recorder. A Notice to the Public was recorded by Lehigh on November 30, 1992; however, the requirements of the Order designed to provide notice to subsequent owners of the property have not been met. No institutional controls were put in place with respect to the Lime Creek Nature Center.

Data Review

Quarterly groundwater monitoring has continued to be conducted by Lehigh Cement Company over the last five years. The groundwater monitoring has been assessing the effectiveness of the remedy in preventing migration of the contaminants. Lehigh Cement Company submits a quarterly report to EPA summarizing groundwater monitoring results and maintenance activities. The recent groundwater monitoring data submitted by the potentially responsible party are included in this document as Attachment 2. As shown in the tables in Attachment 2, groundwater monitoring well data have not shown great variability over the years since the last five-year review during 2002. The arsenic performance standard—50 micrograms per liter (ug/l)—was exceeded at 73.4 ug/l in MW-6D during June 2003. The chromium performance standard—50 ug/l— has not been exceeded over the last five years. The lead performance standard—50 ug/l—has not been exceeded during the last five years. The pH level performance standard—6.5-8.5—was exceeded during the last five years as follows: in MW-3S at 8.58

in December 2006; in MW-5S on 12 occasions with a range of 8.86 to 10.49; in MW-13S at 8.91 in December 2006; in MW-14S at 8.57, 10.63, and 8.71 all in 2006; in MW-16D during each sampling event with a range of 8.65 to 13.60; in MW-17S during each sampling event with a range of 8.7 to 13.02; and in MW-17D during each sampling event with a range of 8.68 to 13.84. Locations of monitoring wells are shown on a map which is located in Attachment 2.

The monthly monitoring data for pH levels, TDS, and TSS have been submitted by Lehigh as required by the NPDES permit for the facility discharge to the Winnebago River pipeline. The June and July 2007 NPDES monitoring data are included in Attachment 2. The NPDES monitoring data show a range in pH levels from 7.3 to 8.3 which is less than the limit of 12.5 for corrosiveness and less than the limit of 9.0 for discharge to class B Iowa streams.

The most recent quarterly groundwater monitoring report submitted in August 2007 included June 2007 monitoring data. There were no exceedances of the performance standards for the metals, arsenic, chromium, and lead. The pH level limits were exceeded in wells MW-5S, MW-14S, MW-16D, MW-17S, and MW-17D. Wells MW-16D, MW-17S, and MW-17D are located near the Cement Kiln Dust Reclamation Area. Exceedances of pH levels result because groundwater levels are present in the bottom of the cement kiln dust. MW-14S is located in an area previously reclaimed. The reason for the exceedance in MW-5S is unknown. The June 2007 data are included in Attachment 2.

Site Inspection

On April 5, 2007, a site inspection was conducted by: Catherine Barrett, Remedial Project Manager, EPA; Bob Drustrup, State Project Manager, IDNR; and Rita Dunn, Environmental Coordinator, Lehigh Cement Company. The purpose of the inspection was to assess the maintenance of the Site including the capped areas, the groundwater monitoring wells, and the institutional controls.

The site inspection began when representatives of EPA, IDNR, and Lehigh met at the Site property on 25th Street off Highway 65 in Mason City, Iowa. The representative for Lehigh drove the group to the Cement Kiln Dust Reclamation Area north of the Lehigh Plant area. The Cement Kiln Dust Reclamation Area cap was characterized by thick vegetation. The Blue Waters Pond area could be seen to the east of the Cement Kiln Dust Reclamation Area cap. The group then proceeded to the Arch Pond area, viewed the CO_2 treatment plant area, and proceeded to the Area C Quarry Cap; the Area C Quarry Cap area had a thickly vegetated cover. The group then drove further in a northeast direction to the Quarry Lake Capping Area. The Quarry Lake Capping Area appeared to be maintained well. Next the group proceeded to the Badlands Capping Area in the Lime Creek Nature Center where the cap was well maintained.

Site photographs taken during the April 5, 2007, site inspection are attached to this report as Attachment 3. Photographs are included of (1) the Lehigh Cement

Site photographs taken during the April 5, 2007, site inspection are attached to this report as Attachment 3. Photographs are included of (1) the Lehigh Cement Company facility, (2) the Cement Kiln Dust Reclamation Area, (3) the Arch Pond area, (4) the Area C Quarry Cap, (5) the Quarry Lake Capping Area, and (6) the Lime Creek Nature Center Badlands Capping Area.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Implementation of Institutional Controls and Other Measures

A Notice to the Public was recorded in 1992 in the Recorder's Office, Cerro Gordo County, Mason City, Iowa. The Notice to the Public states the Site property is subject to the Administrative Order signed in September 1992 and the restrictions provided for therein.

An Easement Agreement entered into in 1993 by Lehigh Portland Cement Company and Cerro Gordo County allows entry to the Lime Creek Nature Center to:

> ...construct, install, maintain, repair, replace, remove and access underground and above ground pipelines for the purpose of conveying various treated liquid substances from the Lehigh Property over, under and across the Lime Creek Property to the Winnebago River along the Easement Property, together with the right to excavate and refill ditches and trenches for the location of such pipeline(s) and main(s), and the further right to remove trees, bushes, undergrowth and other obstructions interfering with the location, construction and maintenance of such pipeline(s).

The terms, conditions, and obligation of the Easement Agreement run with the Lehigh Property and the Lime Creek Nature Center Property.

The Lehigh Cement Company continues to own the property which is the facility area, and the Lime Creek Nature Center is owned by Cerro Gordo County. There are no current or planned changes in land use.

Remedial Action Performance – The remedy has been shown to be effective. The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate the remedy continues to be appropriate. The quarterly groundwater monitoring and monthly NPDES data continue to be conducted by Lehigh, and the monitoring data are submitted to EPA. All capped areas of the Lehigh facility area and the Lime Creek Nature Center are maintained by the Lehigh Cement Company.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

Changes in Standards and To Be Considered Standards – No new standards have been introduced which would be more stringent or which would affect the protectiveness at the Site except the lead MCL was changed to 15 ug/l and the arsenic MCL was changed to 10 ug/l. Groundwater monitoring data concentrations have not been above the recently changed MCLs for arsenic and lead during the last five years.

Changes in Exposure Pathways – No changes in the Site conditions that affect exposure pathways were identified as part of this five-year review. There are no current or planned changes in land use. No new contaminants, sources, or routes of exposure were identified as part of this five-year review. There is no indication hydrologic or geologic conditions are not adequately characterized. The contaminant levels in the groundwater are consistent with expectations at the time of the ROD.

Changes in Toxicity and Other Contaminant Characteristics – Toxicity and other factors for contaminants of concern have not changed.

Changes in Risk Assessment Methodologies – There are no changes in risk assessment methodologies since the time of the ROD approval which call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

Technical Assessment Summary

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. According to the documents reviewed and the site inspection, the remedy continues to be appropriate and protective. ARARs for groundwater contamination are MCLs. There have been no changes in the risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

The Notice to the Public on file with the Cerro Gordo County Recorder does not operate to impose necessary restrictions on future land use to protect against future exposure to contamination at the Site. In addition, there is no institutional control in place that would protect against future exposure to contamination at the Lime Creek Nature Center.

IX. Recommendations and Follow-up Actions

Because groundwater monitoring data have shown little change over the last five years, it is a recommendation for the frequency of groundwater sampling to be reduced from quarterly monitoring to semiannual monitoring.

A Restrictive Environmental Covenant should be developed for this Site to prevent future exposure and to comply with the Iowa Uniform Environmental Covenant Act (UECA) for the Lehigh property and the Lime Creek Nature Center prior to the next five-year review.

X. Protectiveness Statement

The results of the five-year review indicate the remedy is protective of human health and the environment in the short term because there is no evidence of current exposure. In order for the remedy to remain protective in the long term, institutional controls restricting groundwater use to prevent future exposure and complying with the Iowa UECA should be put in place prior to the next five-year review. The remedy has been shown to be effective. Groundwater monitoring and maintenance of the Site's capped areas, neutralization system, and monitoring wells continue to be conducted by Lehigh Cement Company to ensure continued protectiveness.

XI. Next Review

This is the second five-year review for this Superfund Site. The next five-year review for this Site will be conducted in the year 2012.

ATTACHMENTS

ATTACHMENT 1

List of Documents Reviewed

"Record of Decision, Lehigh Portland Cement Site, Mason City, Iowa" prepared by the Iowa Department of Natural Resources, June 28, 1991

"Administrative Order for Remedial Design and Remedial Action – Lehigh Portland Cement Company Site, Mason City, Iowa" Docket No. VII-92-F-0031, September 30, 1992

"Explanation of Significance Differences for the Lehigh Portland Cement Company Superfund Site, Mason City, Iowa" prepared by EPA, January 8, 1993

"Five-Year Review Report, Lehigh Portland Cement Company Site, Mason City, Iowa" prepared by EPA, September 27, 2002

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy Colby Associates for Lehigh Cement Company, 1st quarter 2006 – March 2006

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy Colby Associates for Lehigh Cement Company, 2nd quarter 2006 – June 2006

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy Colby Associates for Lehigh Cement Company, 3rd quarter 2006 – December 2006

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy Colby Associates for Lehigh Cement Company, 4th quarter 2006 – February 2007

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy Colby Associates for Lehigh Cement Company, 1st quarter 2007 – May 2007

"Quarterly Groundwater Sampling Report for Lehigh Cement Company, Mason City, Iowa" prepared by Yaggy-Colby Associates for Lehigh Cement Company, 2nd quarter 2007 – August 2007

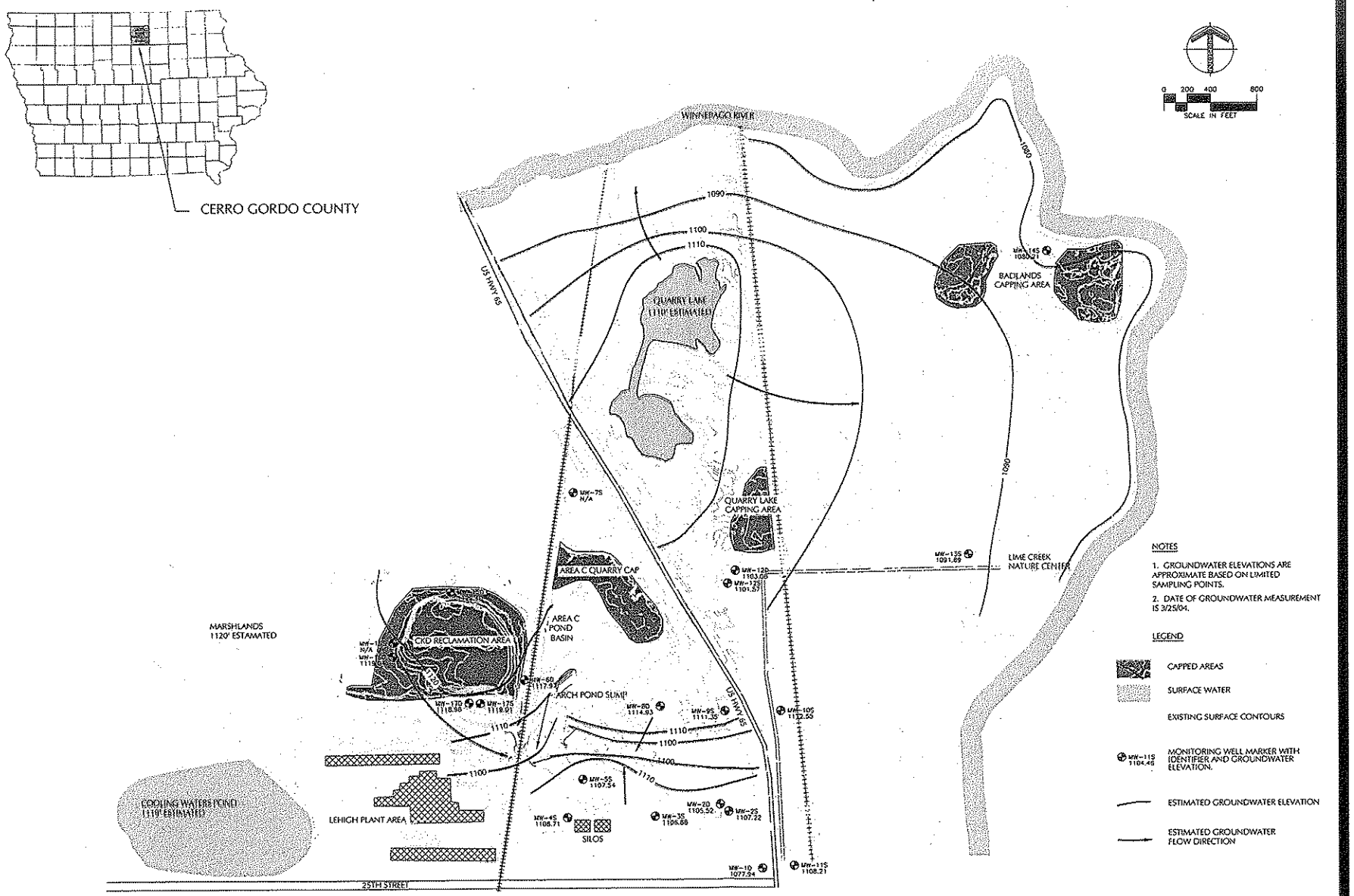
"Lehigh Cement Company, Mason City, Iowa, Treatment Facility, NPDES Monthly Reports" prepared by Lehigh Cement Company, June 2006 through July 2007

ATTACHMENT 2

Site Figure

Site Tables

Pubic Notice to Initiate Five Year Review



YAGGY COLBY ASSOCIATES

ENGINEERS • ARCHITECTS
SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS

QUARTERLY GROUNDWATER SAMPLING REPORT

LEHIGH CEMENT COMPANY
MASON CITY, IOWA

ESTIMATED GROUNDWATER FLOW MAP

PROJECT NO. 9476
FILE SITE MAP FEB 2007.DWG
DATE FEBUARY, 2007
DRAWN BY T.MADDEN
CHECKED BY
REVISIONS

SHEET NUMBER

FIGURE 1

OF SHEETS

Table 1
Groundwater Elevations
Lehigh Cement Company
Mason City, Iowa

Well	Top of Casing Elevation	Screened Depth Interval	Screened Elevation Interval	Depth to Groundwater																			
				Dec-90	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	1117.63	47'-57'	1070.63'-1060.63'	51.13	26.22	27.63	25.56	28.30	30.65	33.00	29.69	34.14	31.2	33.13	32.73	28.46	37.30	30.62	35.46	32.67	31.74	30.60	29.69	33.66	39.69
MW-2S	1119.12	8'-18'	1111.12'-1101.12'	7.12	11.62	12.13	11.77	11.33	11.80	12.92	10.77	9.93	12.9	12.6	8	11.93	10.82	9.49	8.30	8.83	11.90	10.30	10.00	11.50	11.90
MW-2D	1119.52	28'-38'	1091.52'-1081.52'	10.52	12.64	13.88	14.89	14.11	14.20	15.49	14.60	12.08	14.91	14.7	9.78	8.89	13.58	12.55	11.10	12.56	14.17	13.14	12.51	13.59	14.00
MW-3S	1121.20	8'-18'	1113.20'-1103.20'	8.700	13.45	14.90	13.81	13.43	13.73	15.15	10.25	10.92	15.58	14.1	8.38	10.33	12.53	9.74	8.93	12.44	14.48	10.90	12.20	14.83	14.32
MW-4S	1124.64	17'-27'	1107.64'-1097.64'	12.64	15.11	16.94	15.72	13.33	13.35	15.97	14.82	12.02	16.31	15.6	10.56	12.65	14.97	12.73	11.75	15.33	15.38	13.01	13.60	16.00	15.93
MW-5S	1131.53	17'-27'	1114.53'-1104.53'	14.83	23.28	26.15	22.94	22.87	23.75	25.27	23.99	21.86	25.17	23.82	20.38	21.28	24.32	20.42	20.82	24.22	24.66	21.21	21.81	24.30	23.99
MW-6D	1143.58	47'-47'	1116.58'-1096.58'	22.18	24.37	24.78	25.00	24.42	24.58	24.49	24.67	22.90	24.61	39.95	22.29	22.83	24.80	24.15	22.32	24.50	25.13	25.30	23.16	24.84	25.61
MW-7S	1133.30	8'-18'	1125.30'-1115.30'	11.60	12.25	Not Measured - Obstruction in Well																			
MW-8D	1154.63	36'-56'	1118.63'-1098.63'	33.33	36.21	37.40	38.18	38.73	39.08	39.49	39.45	38.28	39.66	39	37.67	38.02	38.62	38.55	35.95	38.91	39.38	38.68	36.71	39.16	39.70
MW-9S	1140.78	25'-35'	1115.78'-1105.78'	21.98	29.16	29.36	29.49	29.29	29.36	29.67	29.02	28.58	29.49	29.3	24.76	28.30	29.35	28.85	27.93	28.62	29.51	29.27	28.93	29.12	29.43
MW-10S	1135.77	12'-22'	1123.77'-1113.77'	17.17	22.96	23.57	23.39	23.28	23.24	23.25	23.26	21.31	23.23	Dry	Dry	21.63	23.01	22.27	19.87	22.4	23.26	22.95	21.86	22.99	23.22
MW-11S	1118.86	18'-28'	1100.86'-1090.86'	8.36	10.26	11.39	11.12	10.74	11.45	12.19	11.65	8.63	11.5	14.4	6.13	7.69	9.61	6.45	6.45	9.53	10.19	7.84	8.45	10.44	10.65
MW-12S	1129.52	21'-31'	1108.52'-1098.52'	30.72	27.63	29.32	31.31	31.98	30.43	30.93	32.18	29.60	28.74	32.00	28.08	25.05	26.88	29.12	26.07	26.06	26.92	29.52	25.66	27.72	27.95
MW-12D	1129.89	41'-51'	1088.89'-1078.89'	23.69	28.02	29.70	29.53	28.86	31.59	30.92	29.29	22.82	31.6	29.35	19.04	20.55	26.12	24.58	19.58	28.13	29.03	23.85	24.05	27.69	26.81
MW-13S	1127.08	32'-42'	1095.08'-1085.08'	42.58	32.27	32.07	31.34	30.46	29.42	31.52	28.63	26.12	30.32	33	9.53	24.98	33.26	29.86	10.42	24.97	28.31	32.07	13.97	34.26	35.19
MW-14S	1106.48	26'-36'	1080.48'-1070.48'	26.08	26.34	25.64	24.99	25.13	25.49	25.34	24.20	25.13	25.78	26.25	26	25.40	24.83	24.67	25.55	26.27	25.64	25.91	26.25	26.68	26.27
MW-15D	1149.77	25'-35'	1124.77'-1104.77'	NA	23.81	25.67	26.53	25.38	25.82	26.62	27.60	23.55	26.15	27.42	22.59	23.29	25.35	24.66	21.61	24.99	25.25	24.97	22.99	25.99	27.37
MW-16S	1149.48	5'-40'	1144.48'-1109.48'	NA	26.52	Not Measured - Obstruction in Well																			
MW-16D	1149.56	47'-57'	1102.56'-1092.56'	NA	28.23	28.91	29.46	28.81	28.83	29.59	30.09	27.74	29.53	29.92	27.13	27.75	29.42	29.61	26.91	29.38	29.86	29.61	27.82	29.77	30.52
MW-17S	1132.43	5'-20'	1127.43'-1112.43'	NA	11.49	11.89	12.47	11.78	11.85	12.47	12.73	10.96	12.46	12.6	10.38	10.90	12.42	12.67	10.45	12.47	12.97	12.67	11.12	12.75	13.42
MW-17D	1132.45	16'-28'	1114.45'-1104.45'	NA	11.60	11.97	12.47	11.77	11.83	12.55	12.90	10.92	12.57	12.6	10.38	10.96	12.47	12.72	10.45	12.52	12.97	12.68	11.10	12.78	13.47

Well	Top of Casing Elevation	Screened Depth Interval	Screened Elevation Interval	Ground Water Elevation																			
					Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	1117.63	47'-57'	1070.63'-1060.63'	1066.50	1091.41	1090.00	1092.07	1089.33	1086.98	1084.63	1087.94	1083.49	1086.43	1084.5	1084.9	1089.17	1080.33	1087.01	1082.17	1084.96	1085.89	1087.03	1087.94	1083.97	1077.94
MW-2S	1119.12	8'-18'	1111.12'-1101.12'	1112.00	1107.50	1106.99	1107.35	1107.79	1107.32	1106.20	1108.35	1109.19	1106.22	1106.52	1111.12	1107.19	1108.30	1109.63	1110.82	1110.29	1107.22	1108.82	1109.12	1107.62	1107.22
MW-2D	1119.52	28'-38'	1091.52'-1081.52'	1109.00	1106.88	1105.64	1104.63	1105.41	1105.32	1104.03	1104.92	1107.44	1104.61	1104.82	1109.74	1110.63	1105.94	1106.97	1108.42	1106.96	1105.35	1106.38	1107.01	1105.93	1105.52
MW-3S	1121.2	8'-18'	1113.20'-1103.20'	1112.50	1107.75	1106.30	1107.39	1107.77	1107.47	1106.05	1110.95	1110.28	1105.62	1107.1	1112.82	1110.87	1108.67	1111.46	1112.27	1108.76	1106.72	1110.30	1109.00	1106.37	1106.88
MW-4S	1124.64	17'-27'	1107.64'-1097.64'	1112.00	1109.53	1107.70	1108.92	1111.31	1111.29	1108.67	1109.82	1112.62	1108.33	1109.04	1114.08	1111.99	1109.67	1111.91	1112.89	1109.31	1109.26	1111.63	1111.04	1108.64	1108.71
MW-5S	1131.53	17'-27'	1114.53'-1104.53'	1116.70	1108.25	1105.38	1108.59	1108.66	1107.78	1106.26	1107.54	1109.67	1106.36	1107.71	1111.15	1110.25	1107.21	1111.11	1110.71	1107.31	1106.87	1110.32	1109.72	1107.23	1107.54
MW-6D	1143.58	47'-47'	1116.58'-1096.58'	1121.40	1119.21	1118.80	1118.58	1119.16	1119.00	1119.09	1118.91	1120.68	1118.97	1103.63	1121.29	1120.75	1118.78	1119.43	1121.26	1119.08	1118.45	1118.28	1120.42	1118.74	1117.97
MW-7S	1133.30	8'-18'	1125.30'-1115.30'	1121.70	1121.05	Not Measured - Obstruction in Well																			
MW-8D	1154.63	36'-56'	1118.63'-1098.63'	1121.80	1118.42	1117.23	1116.45	1115.90	1115.55	1115.14	1115.18	1116.35	1114.97	1115.63	1116.96	1116.61	1116.01	1116.08	1118.68	1115.72	1115.25	1115.95	1117.92	1115.47	1114.93
MW-9S	1140.78	25'-35'	1115.78'-1105.78'	1118.80	1111.62	1111.42	1111.29	1111.49	1111.42	1111.11	1111.76	1112.20	1111.29	1111.48	1116.02	1112.48	1111.43	1111.93	1112.85	1112.16	1111.27	1111.51	1111.85	1111.66	1111.35
MW-10S	1135.77	12'-22'	1123.77'-1113.77'	1118.60	1112.81	1112.40	1112.38	1112.49	1112.53	1112.52	1112.51	1114.46	1112.54	Dry	Dry	1114.14	1112.76	1113.50	1115.90	1113.37	1112.49	1112.82	1113.91	1112.78	1112.55
MW-11S	1118.86	18'-28'	1100.86'-1090.86'	1110.50	1108.60	1107.47	1107.74	1108.12	1107.41	1106.67	1107.21	1110.23	1107.36	1104.46	1112.73	1111.17	1109.25	1112.41	1112.41	1109.33	1108.67	1111.02	1110.41	1108.42	1108.21
MW-12S	1129.52	21'-31'	1108.52'-1098.52'	1098.80	1101.89	1100.20	1098.21	1097.54	1099.09	1098.59	1097.34	1099.92	1100.78	1097.52	1101.44	1104.47	1102.64	1100.40	1103.45	1103.46	1102.60	1100.00	1103.86	1101.80	1101.57
MW-12D	1129.89	41'-51'	1088.89'-1078.89'	1106.20	1101.87	1100.19	1100.36	1101.01	1098.30	1098.97	1100.60	1107.07	1098.29	1100.54	1110.85	1109.34	1103.77	1105.31	1110.31	1101.76	1100.86	1106.04	1105.84	1102.20	1103.08
MW-13S	1127.08	32'-42'	1095.08'-1085.08'	1084.50	1094.81	1095.01	1095.74	1096.62	1097.66	1095.56	1098.45	1100.96	1096.76	1094.08	1117.55	1102.10	1093.82	1097.22	1116.66	1102.11	1098.77	1095.01	1113.11	1092.82	1091.89
MW-14S	1106.48	26'-36'	1080.48'-1070.48'	1080.40	1080.14	1080.84	1081.49	1081.35	1080.99	1081.14	1082.28	1081.35	1080.7	1080.23	1080.48	1081.08	1081.65	1081.81	1080.93	1080.21	1080.84	1080.57	1080.23	1079.80	1080.21
MW-15D	1149.77	25'-35'	1124.77'-1104.77'	NA	1125.96	1124.10	1123.24	1124.39	1123.95	1123.15	1122.17	1126.22	1123.62	1122.35	1127.18	1126.48	1124.42	1125.11	1128.16	1124.78	1124.52	1124.80	1126.78	1123.78	1122.40
MW-16S	1149.48	5'-40'	1148.48'-1109.48'	NA	1122.96	Not Measured - Obstruction in Well																			
MW-16D	1149.56	47'-57'	1102.56'-1092.56'	NA	1121.33	1120.65	1120.10	1120.75	1120.73	1119.97	1119.47	1121.82	1120.03	1119.64	1122.43	1121.81	1120.14	1119.95	1122.65	1120.18	1119.70	1119.95	1121.74	1119.79	1119.04
MW-17S	1132.43	5'-20'	1127.43'-1112.43'	NA	1120.94	1120.54	1119.96	1120.65	1120.58	1119.96	1119.70	1121.47	1119.97	1119.83	1122.05	1121.53	1120.01	1119.76	1121.98	1119.96	1119.46	1119.76	1121.31	1119.68	1119.01
MW-17D	1132.45	16'-28'	1114.45'-1104.45'	NA	1120.85	1120.48	1119.98	1120.68	1120.62	1119.90	1119.55	1121.53	1119.88	1119.85	1122.07	1121.49	1119.96	1119.73	1122.00	1119.93	1119.48	1119.77	1121.35	1119.67	1118.98

1. Depth to water was measured on the dates indicated in feet below top of casing using an electronic water level indicator.
2. Goundwater elevations were calculated using originally surveyed top of casing elevations.
3. NA - Well not yet installed.

Table 2
Total Arsenic
Lehigh Cement Company
Mason City, Iowa

Well	Arsenic, Total (ug/L) Performance Standard: 50 ug/L																				
	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Apr-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	2.2	<1.30	<1.30	<1.3	<1.3	1.47	<1.3	1.38	<1.3	<1.0	1.70	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	1.42	<1.0	<1.0
MW-2S	2.4	<1.30	<1.30	<1.3	2.19	<1.3	2.47	<1.3	<1.3	<1.0	2.80	<1.0	1.60	4.90	<1.0	<1.0	<1.0	<1.0	1.93	3.36	1.06
MW-2D	2.0	4.1	<1.30	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.0	1.20	<1.0	<1.0	<1.0	13.00	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-3S	5.7	2.1	<1.30	<1.3	20.8	<1.3	<1.3	<1.3	<1.3	<1.0	2.60	<1.0	<1.0	<1.0	1.80	<1.0	1.26	<1.0	1.18	1.18	2.15
MW-4S	3.2	<1.30	<1.30	2.5	6.99	<1.3	<1.3	<1.3	<1.3	<1.0	2.80	<1.0	<1.0	<1.0	4.30	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-5S	35.6	7.1	12.3	13.9	19.4	11	10.9	8.35	9.65	7.60	4.50	8.10	7.20	6.10	13.20	3.60	4.71	3.90	3.69	4.08	2.63
MW-6D	**69.9**	14.4	8.4	12.6	18.6	5.91	6.92	**73.4**	7.9	1.2	3.4	<1.0	1.9	1.4	4.9	<1.0	3.1	1.83	4.11	2.37	2.50
MW-8D	3.4	3.4	5.8	<1.3	7.99	1.67	<1.3	7.27	4.00	<1.0	1.40	<1.0	2.20	1.20	1.20	<1.0	<1.0	<1.0	3.55	1.74	<1.0
MW-9S	2.0	<1.30	<1.30	<1.3	2.37	<1.3	<1.3	<1.3	1.85	<1.0	2.40	<1.0	1.50	<1.0	<1.0	<1.0	<1.0	<1.0	1.34	<1.0	<1.0
MW-10S	NS	NS	NS	NS	NS	NS	NS	<1.3	NS	NS	NS	<1.0	1.20	<1.0	1.00	<1.0	n/a	<1.0	1.14	1.45	<1.0
MW-11S	2.0	<1.30	<1.30	<1.3	3.59	<1.3	<1.3	<1.3	<1.3	<1.0	1.80	<1.0	<1.0	<1.0	1.30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-12S	5.1	3.1	2.98	2.5	1.46	<1.3	2.26	<1.3	<1.3	4.70	3.20	<1.0	1.70	<1.0	<1.0	<1.0	<1.0	<1.0	1.53	<1.0	<1.0
MW-12D	4.7	<1.30	<1.30	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.0	1.60	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-13S	8.9	<1.30	<1.30	2.1	5.43	3.4	3.87	1.57	<1.3	6.60	2.30	1.40	2.30	1.50	<1.0	<1.0	<1.0	<1.0	2.10	1.06	1.20
MW-14S	4.0	<1.30	<1.30	4.6	2.65	4.46	<1.3	1.41	4.59	<1.0	2.60	1.20	7.00	<1.0	<1.0	2.80	5.33	4.62	5.65	6.49	4.66
MW-15D	2.0	<1.30	<1.30	2.0	<1.3	1.85	<1.3	<1.3	<1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0
MW-16D	2.8	11.5	34.7	16.3	33.4	16.6	12.4	4.31	<1.3	<5.0	<2.0	<5.0	<5.0	<1.0	<1.0	<10.0	<1.0	<1.0	<1.0	1.21	1.48
MW-17S	35.6	3.9	12.5	15.1	9.95	10.63	5.58	4.91	5.81	2.00	2.30	<1.0	2.40	4.20	2.90	<1.0	2.09	<1.0	<1.0	3.58	1.11
MW-17D	49.7	17.6	13.3	10.5	28.1	<1.3	14.4	<1.3	8.38	<5.0	<1.0	<1.0	<15.0	<1.0	<1.0	<10.0	<1.0	11.20	5.04	5.04	<1.0

Notes:
1. Bold font indicates exceedence of Performance Standard.

Table 3
Total Chromium
Lehigh Cement Company
Mason City, Iowa

Well	Chromium (ug/L) Performance Standard: 50 ug/L																				
	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Apr-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	9	<1	1.5	<1.6	<1.6	1.6	1.60	<1.6	<1.6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-2S	<1.0	<1	<1	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-2D	4.1	1.1	1.8	<1.6	<1.6	<1.6	<1.6	<1.6	1.90	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-3S	4.6	1.2	1.7	<1.6	19	<1.6	<1.6	<1.6	2.70	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-4S	4	<1	2.8	<1.6	6.8	<1.6	2.1	1.7	<1.6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-5S	7.6	3.3	3.6	5.2	10	<1.6	5.9	<1.6	1.70	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-6D	10.4	4.8	5.9	9.1	12	<1.6	4.8	5.1	4.9	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-8D	6.5	4.5	15.9	<1.6	15	4.8	<1.6	14	12	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-9S	5.1	<1	1.7	<1.6	<1.6	<1.6	1.6	<1.6	3.00	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-10S	NS	NS	NS	NS	NS	NS	NS	<1.6	NS	NS	NS	<20	<20	<20	<20	<20	n/a	<20	<20	<20	<20
MW-11S	8.1	<1	2.6	1.6	6.1	2	2.4	<1.6	1.90	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-12S	6	3.9	2.6	<1.6	<1.6	<1.6	6.4	3.1	2.8	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-12D	15.3	1.1	3	<1.6	1.9	2.2	2.8	<1.6	<1.6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-13S	22.9	1.4	6.3	4.2	7.4	3.8	9.5	5.7	1.9	29.0	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-14S	13.8	2.1	4.8	9.1	7.4	7.1	4.2	6.2	11.1	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-15D	4.7	<1	<1	<1.6	2.4	<1.6	<1.6	<1.6	<1.6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
MW-16D	19.2	<1	9.1	1.8	6.2	5	6.1	<1.6	2.20	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20
MW-17S	33	6.7	16.1	17	21	16	13	8.7	13.2	<20	<20	<20	<20	23.0	<20	<20	<20	<20	<20	<20	<20
MW-17D	18.5	1.5	<1	<1.6	<1.6	2.1	4.6	<16	2.70	<20	<20	<20	<10	<20	<20	<20	<20	<20	<20	<20	<20

Notes:
1. Bold font indicates exceedence of Performance Standard.

Table 4
Total Lead
Lehigh Cement Company
Mason City, Iowa

	Lead (ug/L) Performance Standard: 50 ug/L																			
Well	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-03	Jun-04	Sep-04	Dec-04	Apr-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	3.8	<1.00	1.2	<1	<1	1.41	2.07	1.01	<1.00	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-2S	1.9	<1.00	<1.23	<1	1.1	2.28	3.01	<1.00	<1.00	<4.0	<4.0	<4.0	6.8	19.3	<4.0	4.2	4.1	5.60	4.79	<4.0	<4.0
MW-2D	1.7	2.3	1.7	<1	<1	5.37	<1.00	<1.00	<1.00	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-3S	1.0	<1.00	<1.00	<1	**50.9**	1.1	1.3	<1.00	2.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.5	<4.0	<4.0	<4.0	<4.0
MW-4S	3.6	1.3	3.5	2.97	9.37	1.8	2.17	<1.00	2.1	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-5S	4.6	5.9	6.42	6.35	12.2	1.59	5.92	1.75	1.70	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-6D	19.9	21.6	13.9	28.1	40.4	<1	10.7	17.7	17.3	<4.0	<4.0	<4.0	5.0	<4.0	<4.0	6.3	5.7	<4.0	6.5	<4.0	<4.0
MW-8D	2.8	9.3	12.6	1.54	15.0	4.06	2.08	13.2	13.3	<4.0	<4.0	<4.0	4.7	4.9	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-9S	5.0	1.7	2.09	2.26	1.89	1.36	2.22	4.14	4.75	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-10S	NS	NS	NS	NS	NS	NS	NS	<1.00	NS	NS	NS	<4.0	15.4	<4.0	<4.0	<4.0	n/a	<4.0	<4.0	<4.0	<4.0
MW-11S	5.6	1.5	1.64	1.48	7.1	1.03	1.61	<1.00	1.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	7.5
MW-12S	8.9	9.0	1.64	3.34	1.99	1.21	6.88	3.78	3.44	7.70	<4.0	<4.0	5.7	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-12D	16.8	<1.00	3.71	<1	2.1	2.28	1.97	<1.00	<1.00	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-13S	15.7	<1.00	6.65	5	8.9	12.9	9.79	3.51	2.14	17.70	<4.0	<4.0	4.7	<4.0	<4.0	4.2	4.2	<4.0	<4.0	<4.0	<4.0
MW-14S	25.6	<1.00	3.94	9.6	8.14	20.8	4.82	5.07	16.70	<4.0	<4.0	<4.0	16.1	<4.0	<4.0	9.8	12.6	10.70	8.93	<4.0	8.23
MW-15D	4.0	4.9	3.62	1.16	8.19	3.18	3.02	1.39	1.36	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-16D	6.5	<1.00	<1.00	<1	<1	<1	<1.00	<1.00	<1.00	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<8.0	<4.0	<4.0	<4.0	<4.0	<4.0
MW-17S	**67.7**	16.3	30.8	36.4	47.9	31.5	17.4	16.9	27.8	7.1	<4.0	<4.0	24.6	39.1	17.6	13.2	7.7	8.10	7.40	<4.0	<4.0
MW-17D	14.6	<1.00	<1.00	<1	<1	<1	3.22	6.31	<1.00	<4.0	<4.0	34.3	<4.0	<4.0	<4.0	<8.0	<4.0	4.01	28.20	<4.0	<4.0

Notes:
1. Bold font indicates exceedence of Performance Standard.

Table 5
pH
Lehigh Cement Company
Mason City, IA

Well	pH Performance Standard: 6.5 to 8.5																					
	May-92	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Apr-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	7.48	7.29	7.25	7.2	7.63	6.85	7.62	6.89	7.79	7.82	7.4	7.92	7.09	7.63	7.56	7.45	7.60	7.82	7.72	7.95	7.64	8.26
MW-2S	8.25	6.70	7.03	7.14	7.3	7.02	7.02	6.78	6.95	7.44	7.6	8.72	7.14	7.25	7.67	7.34	7.11	7.25	7.55	7.51	7.39	7.61
MW-2D	7.26	7.37	7.08	7.17	7.39	7.16	7.29	7.24	7.62	7.36	7.4	8.62	6.83	7.47	7.55	7.47	7.5	7.62	7.7	7.77	7.61	7.81
MW-3S	7.78	**9.18**	7.62	7.53	7.6	7.16	7.55	7.39	7.22	7.2	7.6	6.83	7.34	7.85	9.06	7.43	7.8	8.03	7.84	7.75	7.97	**8.58**
MW-4S	7.55	7.41	7.32	8.47	7.72	7.2	7.55	7.27	7.28	7.35	7.6	8.6	7.13	8.1	7.87	7.71	7.88	8.43	7.98	7.84	7.8	8.29
MW-5S	**10.33**	**10.2**	**9.13**	**9.15**	**9.14**	**8.92**	**9.12**	**8.86**	8.45	**8.93**	**9.1**	8.31	**9.08**	**9.49**	**9.42**	**9.2**	**9.67**	**9.27**	**9.3**	7.36	**10.06**	**10.49**
MW-6D	7.78	**10.58**	**8.97**	8.45	**8.58**	8.37	7.24	8.08	7.73	6.81	8.10	8.61	7.77	8.21	8.19	8.07	7.99	**9.52**	7.99	8.15	7.9	8.47
MW-8D	**9.75**	8.33	7.56	7.39	7.61	7.47	7.46	7.23	7.29	7.36	7.6	8.78	7.06	7.82	7.83	7.88	7.85	8.00	8.29	8.19	8.10	8.23
MW-9S	**9.48**	7.15	6.4	6.82	7.31	6.77	8.49	6.89	6.84	6.89	7.10	8.25	6.57	7.12	7.13	7.19	7.13	7.22	7.43	7.27	7.22	7.55
MW-10S	7.80	NS	NS	NS	NS	NS	NS	NS	6.94	NS	NS	NS	7.85	n/s	7.1	7.4	7.3	n/s	7.93	7.73	7.65	8.22
MW-11S	7.19	7.34	6.99	7.05	7.66	7.37	7.72	7.55	6.95	7.91	7.4	8.41	6.54	7.49	7.35	7.54	7.64	7.99	7.97	7.89	7.89	8.02
MW-12S	7.62	7.26	7.02	7.4	7.96	7.15	7.65	7.33	7.27	7.29	7.70	7.68	6.81	7.85	8.03	7.93	8.16	8.09	8.27	**8.56**	8.04	8.46
MW-12D	7.30	7.55	7.22	7.32	7.78	7.62	7.6	8.06	7.15	7.56	8	8.1	7.23	8.19	7.96	8.16	8.26	8.32	8.25	8.25	8.48	8.36
MW-13S	7.58	7.15	7.07	6.97	7.48	7.21	7.74	7.49	7.11	7.63	7.4	7.74	6.76	7.58	7.25	7.63	7.62	8.22	8.03	8.2	7.8	**8.91**
MW-14S	**9.85**	**9.73**	7.11	7.85	7.94	7.33	7.9	7.76	7.51	7.71	8.2	7.75	7.43	8.08	8.35	8.22	7.39	8.48	**8.57**	**10.63**	8.12	**8.71**
MW-15D	DNE	6.51	6.58	6.78	6.92	6.9	7.14	6.67	6.66	6.62	7.1	8.25	6.5	6.96	6.87	6.96	7.04	7.28	7.25	7.34	7.18	7.38
MW-16D	DNE	**12.71**	**12.3**	**12.72**	**11.88**	**12.49**	**13.35**	**12.35**	**12.1**	**13.03**	**12.4**	**8.65**	**12.31**	**13.57**	**12.06**	**11.26**	**13.12**	**13.60**	**13.02**	**10.96**	**12.54**	**13.39**
MW-17S	DNE	**12.25**	**10.6**	**11.29**	**11.41**	**10.61**	**11.15**	**10.34**	**10.91**	**11.64**	**12.4**	**8.7**	**11.96**	**12.59**	**12.27**	**12.5**	**12.1**	**13.02**	**12.5**	**11.98**	**12.41**	**12.96**
MW-17D	DNE	**13.70**	**13.64**	**12.91**	**12.47**	**12.94**	**13.88**	**12.75**	**13.01**	**13.84**	**12.6**	**8.68**	**13.32**	**13.53**	**13.52**	**13.7**	**13.62**	**13.72**	**13.54**	**13.81**	**13.61**	**13.73**

Notes:
1. Bold font indicates exceedence of Performance Standard.

Table 6
Specific Conductance
Lehigh Cement Company
Mason City, Iowa

Well	Specific Conductance (umhos/cm)																				
	Dec-95	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Mar-04	Jun-04	Sep-04	Dec-04	Apr-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	Dec-06
MW-1D	830	1181	490	650	600	700	600	600	550	900	940	812	8	828	816	848	863	840	833	770	821
MW-2S	8580	1768	850	1050	1000	850	800	1050	1125	1200	1500	1651	1635	1639	1716	1809	1833	1805	1836	1829	1744
MW-2D	2070	2010	1010	1225	1100	1150	1150	1150	1000	1800	1800	1604	1629	1661	1668	1593	1643	1655	1621	1638	1654
MW-3S	1140	1072	460	600	600	550	410	500	700	720	970	833	959	681	1060	869	906	653	959	1006	1045
MW-4S	570	1541	900	1100	1000	1050	1000	1000	950	1500	1600	1456	1456	1479	1487	1544	1497	1495	1441	1435	1515
MW-5S	2660	1360	740	950	350	1000	1000	500	925	1500	1200	1199	1363	1278	1167	1385	1222	1146	1110	1295	1696
MW-6D	6240	2412	1460	1900	1700	2000	1700	1375	1100	2200	1800	1655	1583	1687	1450	1406	1730	1450	1357	1355	1535
MW-8D	1290	1716	870	1350	1200	1400	1000	1000	900	1400	1500	1347	1314	1439	1525	1482	1335	1273	1316	1305	1345
MW-9S	1560	2359	1020	1450	1300	1450	1400	1225	950	1700	1500	1446	1543	1534	1124	1375	1639	1480	1564	1778	1654
MW-10S	NS	NS	NS	NS	NS	NS	NS	525	NS	NS	NS	770	n/s	1120	780	852	n/s	747	729	911	983
MW-11S	930	1510	510	600	650	800	600	550	650	980	1000	890	879	1067	913	854	872	840	855	837	962
MW-12S	760	1005	460	750	600	850	700	550	450	970	890	889	807	755	762	816	826	819	769	786	751
MW-12D	560	690	280	400	325	600	240	350	275	480	520	501	526	501	527	538	553	521	522	531	516
MW-13S	640	966	400	550	335	750	480	400	400	730	750	679	672	807	529	710	707	702	660	655	686
MW-14S	690	924	350	500	470	750	440	450	375	590	670	669	645	605	681	1206	671	629	1074	657	645
MW-15D	2340	1932	1530	700	1100	1100	1300	925	1075	1800	1300	1676	1890	1892	1760	1699	1579	1439	1355	1761	1788
MW-16D	8580	13400	9400	9000	1200	10000	16000	6500	12000	23000	9300	1819	18830	13140	3950	11040	12530	6480	3270	8380	13290
MW-17S	4760	2470	1370	1650	1500	1700	1300	1400	1375	4200	3900	2680	2870	1940	2410	1980	3080	1830	1590	2590	2960
MW-17D	32160	21120	13450	10500	19600	11000	17000	18000	16000	19000	10000	1511	19990	19510	19990	19220	19980	15330	19620	17530	16190

Notes:
1. Bold font indicates exceedence of Performance Standard.

SAMPLING EVENT
LEHIGH CEMENT COMPANY
MARCH 2007

	FIELD MEASUREMENTS				LAB MEASUREMENTS		
WELL #	SWL T.O.C.	pH	conductivity MS	T °C	Arsenic mg/l	Lead mg/l	Chromium mg/l
MW-1D	35.30	7.69	0.696	11.7	<0.00100	<0.00400	<0.00500
MW-2S	7.77	7.81	1.465	8.3	<0.00100	<0.00400	<0.00500
MW-2D	11.85	7.61	1.641	11.4	<0.00100	<0.00400	<0.00500
MW-3S	8.20	8.25	0.545	8.5	<0.00100	<0.00400	<0.00500
MW-4S	11.38	8.08	1.431	10.8	<0.00100	<0.00400	<0.00500
MW-5S	19.79	9.59	1.057	10.7	0.00217	<0.00400	<0.00500
MW-6D	23.28	8.26	1.440	14.4	**0.00343**	**0.00554**	<0.00500
MW-8D	38.81	8.21	1.275	14.4	0.00133	<0.00400	<0.00500
MW-9S	28.70	7.60	1.414	14.5	<0.00100	<0.00400	<0.00500
MW-10S	22.40	7.77	0.892	13.8	<0.00100	<0.00400	<0.00500
MW-11S	6.07	8.13	0.873	15.0	<0.00100	<0.00400	<0.00500
MW-12S	27.96	7.63	0.786	13.1	<0.00100	<0.00400	<0.00500
MW-12D	16.06	8.34	0.496	11.9	<0.00100	<0.00400	<0.00500
MW-13S	29.21	7.89	0.801	15.7	0.00102	<0.00400	<0.00500
MW-14S	24.10	8.59	0.475	12.6	0.00135	<0.00400	<0.00500
MW-15D	24.04	7.37	1.415	11.4	<0.00100	<0.00400	<0.00500
MW-16D	28.50	13.08	6.18	16.2	<0.00100	<0.00400	<0.00500
MW-17S	11.65	12.68	1.857	11.3	<0.00100	0.00475	<0.00500
MW-17D	11.66	13.56	13.41	13.1	<0.00100	<0.00400	<0.00500

SAMPLING EVENT
LEHIGH CEMENT COMPANY
JUNE 2007

	FIELD MEASUREMENTS				LAB MEASUREMENTS		
WELL #	SWL T.O.C.	pH	conductivity MS	T °C	Arsenic mg/l	Lead mg/l	Chromium mg/l
MW-1D	34.79	7.56	0.817	13.1	<0.00100	<0.00400	<0.0200
MW-2S	10.25	7.42	1.544	12.8	<0.00100	0.00579	<0.0200
MW-2D	12.85	7.55	1.657	12.0	<0.00100	<0.00400	<0.0200
MW-3S	12.61	8.20	0.798	14.5	<0.00100	0.00540	<0.0200
MW-4S	13.83	7.90	1.398	14.9	<0.00100	<0.00400	<0.0200
MW-5S	21.75	9.76	1.286	14.4	0.00173	<0.00400	<0.0200
MW-6D	22.90	8.13	1.283	14.1	0.00215	0.00524	<0.0200
MW-8D	37.82	8.01	1.307	14.2	<0.00100	<0.00400	<0.0200
MW-9S	29.11	7.38	4.980	14.7	<0.00100	<0.00400	<0.0200
MW-10S	22.30	7.47	0.803	14.0	<0.00100	<0.00400	<0.0200
MW-11S	9.32	8.14	0.833	15.8	<0.00100	<0.00400	<0.0200
MW-12S	24.03	8.29	0.807	11.8	<0.00100	<0.00400	<0.0200
MW-12D	25.98	8.25	0.508	12.1	<0.00100	<0.00400	<0.0200
MW-13S	13.02	8.12	0.636	14.8	<0.00100	<0.00400	<0.0200
MW-14S	26.45	8.63	0.613	13.8	0.00313	0.00811	<0.0200
MW-15D	22.92	7.25	1.634	11.6	<0.00100	<0.00400	<0.0200
MW-16D	27.60	11.67	3.03	14.9	<0.00100	<0.00400	<0.0200
MW-17S	10.92	12.51	1.952	13.2	<0.00100	**0.00858**	<0.0200
MW-17D	10.87	13.94	19.99	12.5	**0.00970**	<0.00400	<0.0200

LEHIGH PORTLAND CEMENT COMPANY
MASON CITY, IOWA
TREATMENT FACILITY
NPDES PERMIT NUMBER 17-50-1-13

MONTH OF June, 2007

	FACILITY DISCHARGE						WINNEBAGO RIVER		FLOW METER READING
DATE	FLOW (MGD)	M-T-D FLOW (MGD)	pH FIELD	pH LAB	TDS G/L	TSS MG/L	FLOW (CFS)	DATE	(@ 08:00)
								Prev. mo. e	91.045
1	0.675	0.67					620.0	1	91.720
2	0.665	1.34						2	92.385
3	0.540	1.88						3	92.925
4	0.595	2.47	8.3	8.4	1	6.0	581.0	4	93.520
5	0.585	3.06					576.0	5	94.105
6	0.000	3.06						6	94.105
7	0.455	3.52					523.0	7	94.560
8	0.452	3.97						8	95.012
9	0.490	4.46						9	95.502
10	0.000	4.46					406.0	10	95.502
11	0.000	4.46						11	95.502
12	0.000	4.46						12	95.502
13	0.000	4.46					320.0	13	95.502
14	0.000	4.46						14	95.502
15	0.080	4.54	7.3	7.3	4	39.0		15	95.582
16	0.174	4.71						16	95.756
17	0.000	4.71					261.0	17	95.756
18	0.224	4.94	7.4	7.4	4	39.0		18	95.980
19	0.370	5.30					279.0	19	96.350
20	0.000	5.30						20	96.350
21	0.000	5.30					261.0	21	96.350
22	0.000	5.30						22	96.350
23	0.160	5.47					244.0	23	96.510
24	0.000	5.47						24	96.510
25	0.140	5.61					236.0	25	96.650
26	0.220	5.83	7.6	7.8	2	22.0		26	96.870
27	0.000	5.83						27	96.870
28	0.100	5.93					174.0	28	96.970
29	0.264	6.19					166.0	29	97.234
30	0.000	6.19						30	97.234

TOTAL	6.19		30.6	30.9	11	106	4647
AVERAGE	0.21		7.65	7.73	2.75	26.50	357
MAXIMUM	0.675		8.3	8.4	4	39	620
MINIMUM	0		7.3	7.3	1	6	166
30-DAY AVG. FLOW		0.21	MGD				
MAX. DAILY FLOW		0.67	MGD				

CC: REW, VAS, MFL, EHM, RSW

LEHIGH PORTLAND CEMENT COMPANY
MASON CITY, IOWA
TREATMENT FACILITY
NPDES PERMIT NUMBER 17-50-1-13

MONTH OF July, 2007

	FACILITY DISCHARGE						WINNEBAGO RIVER		FLOW METER READING
DATE	FLOW (MGD)	M-T-D FLOW (MGD)	pH FIELD	pH LAB	TDS G/L	TSS MG/L	FLOW (CFS)	DATE	(@ 08:00)
								Prev. mo. e	97.234
1	0.000	0.00					143.0	1	97.234
2	0.000	0.00						2	97.234
3	0.041	0.04					124.0	3	97.275
4	0.222	0.26						4	97.497
5	0.400	0.66	7.9	7.9	1	24.0	117.0	5	97.897
6	0.309	0.97						6	98.206
7	0.000	0.97					103.0	7	98.206
8	0.000	0.97						8	98.206
9	0.000	0.97					112.0	9	98.206
10	0.000	0.97						10	98.206
11	0.000	0.97	Vaporizer out of service for repairs.				97.0	11	98.206
12	0.000	0.97						12	98.206
13	0.000	0.97						13	98.206
14	0.000	0.97					67.0	14	98.206
15	0.000	0.97						15	98.206
16	0.000	0.97					58.0	16	98.206
17	0.000	0.97					62.0	17	98.206
18	0.100	1.07	7.7	7.7	1	25.0		18	98.306
19	0.370	1.44					114.0	19	98.676
20	0.279	1.72					87.0	20	98.955
21	0.000	1.72						21	98.955
22	0.000	1.72						22	98.955
23	0.000	1.72					58.0	23	98.955
24	0.298	2.02	7.6	7.7	1	18.0		24	99.253
25	0.000	2.02					50.0	25	99.253
26	0.000	2.02						26	99.253
27	0.314	2.33						27	99.567
28	0.000	2.33					114.0	28	99.567
29	0.000	2.33						29	99.567
30	0.000	2.33					81.0	30	99.567
31	0.000	2.33						31	99.567
TOTAL	2.33		23.2	23.3	3	67	1387		
AVERAGE	0.08		7.7	7.8	1.1	22.33	92		
MAXIMUM	0.4		7.9	7.9	1	25	143		
MINIMUM	0		7.6	7.7	1	18	50		

30-DAY AVG. FLOW 0.08 MGD
MAX. DAILY FLOW 0.40 MGD

CC: REW, VAS, MFL, EHM, RSW

To publish in the Mason City *Globe Gazette*.

U.S. Environmental Protection Agency (EPA) Region 7
and
Iowa Department of Natural Resources (IDNR)
begin
Second Five-Year Review for the
Lehigh Portland Cement Company Superfund Site

EPA and IDNR have begun the second Five-Year Review at the Lehigh Portland Cement Company Superfund site. The review is required by the Superfund law to make sure the cleanup continues to protect human health and the environment.

The Administrative Record is available at the following locations during normal business hours:

Mason City Public Library
225 Second St. SE
Mason City, Iowa

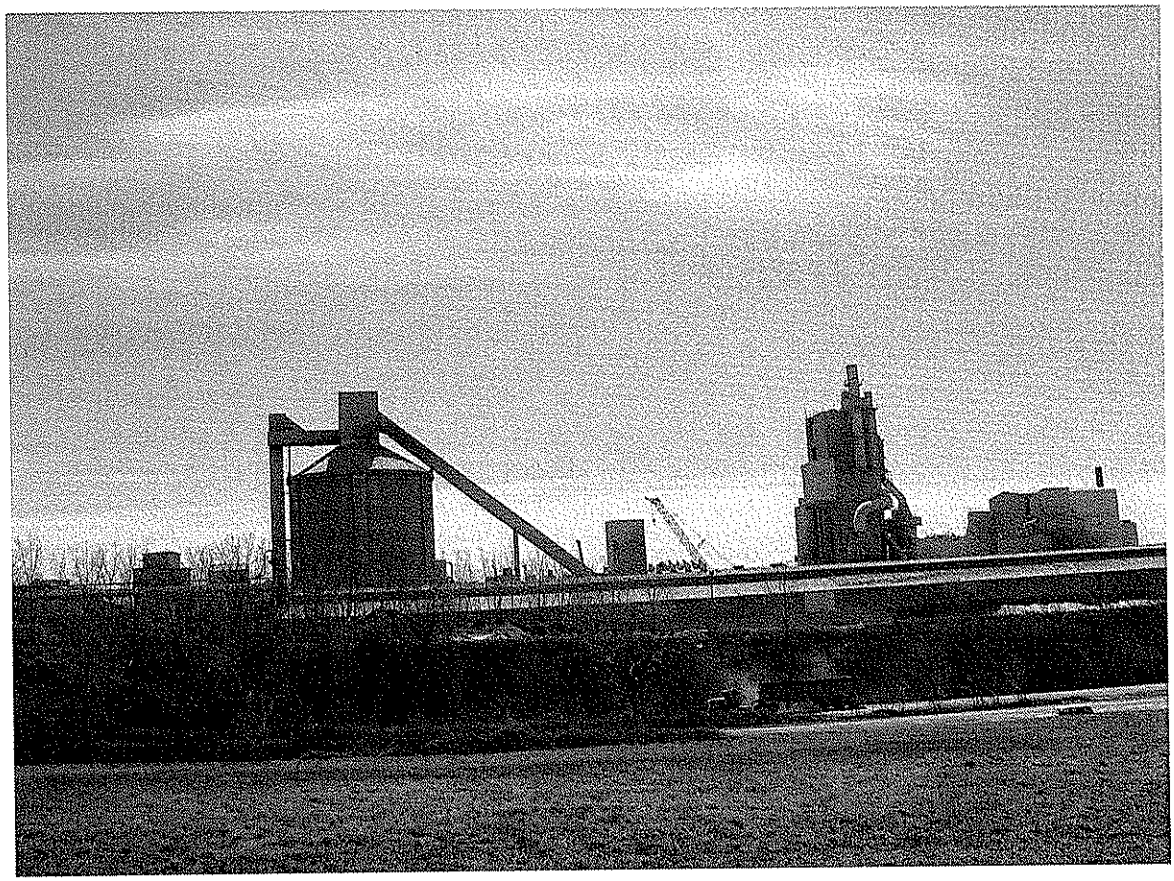
EPA Records Center
901 N. Fifth St.
Kansas City, Kan.

For more information, please contact:

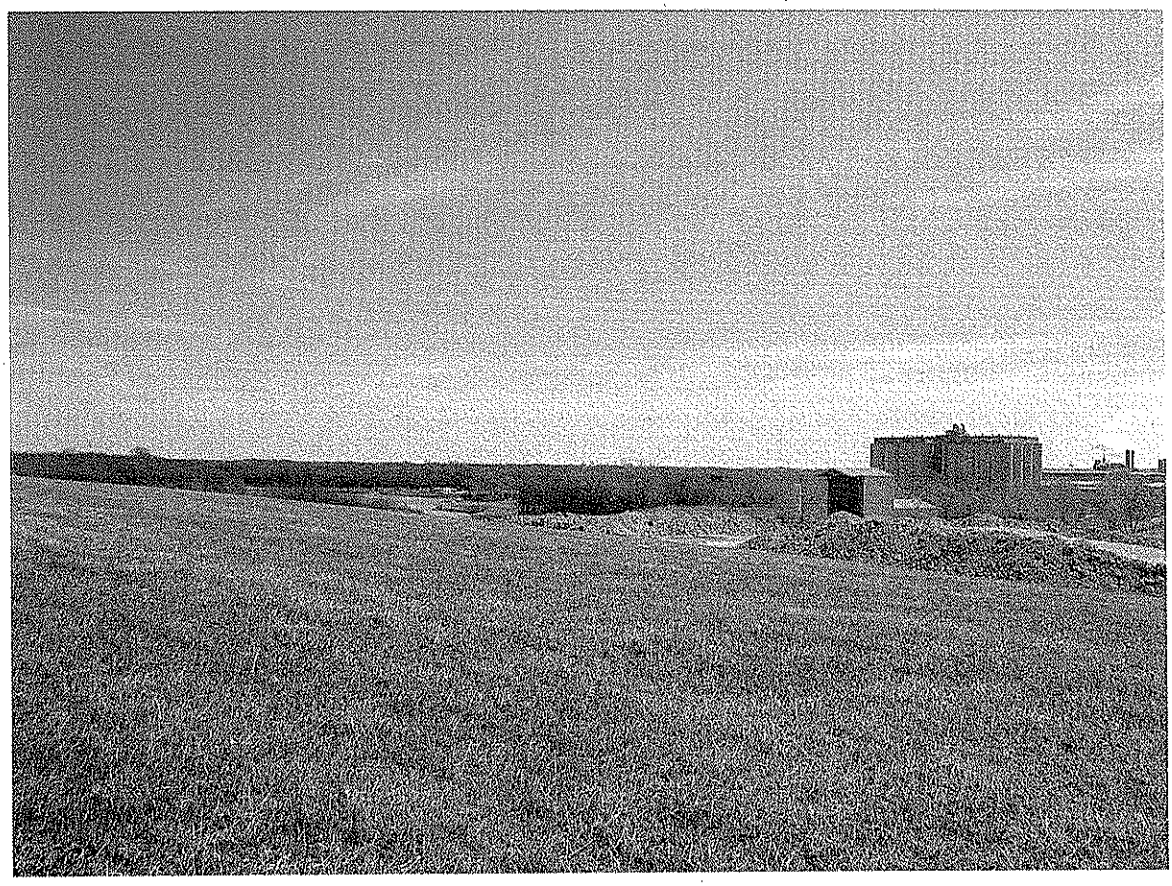
Fritz Hirter
Community Involvement Coordinator
U.S. EPA Region 7
901 N. Fifth St.
Kansas City, KS 66101
Toll Free: (800) 223-0425
e-mail: hirter.fritz@epa.gov

ATTACHMENT 3

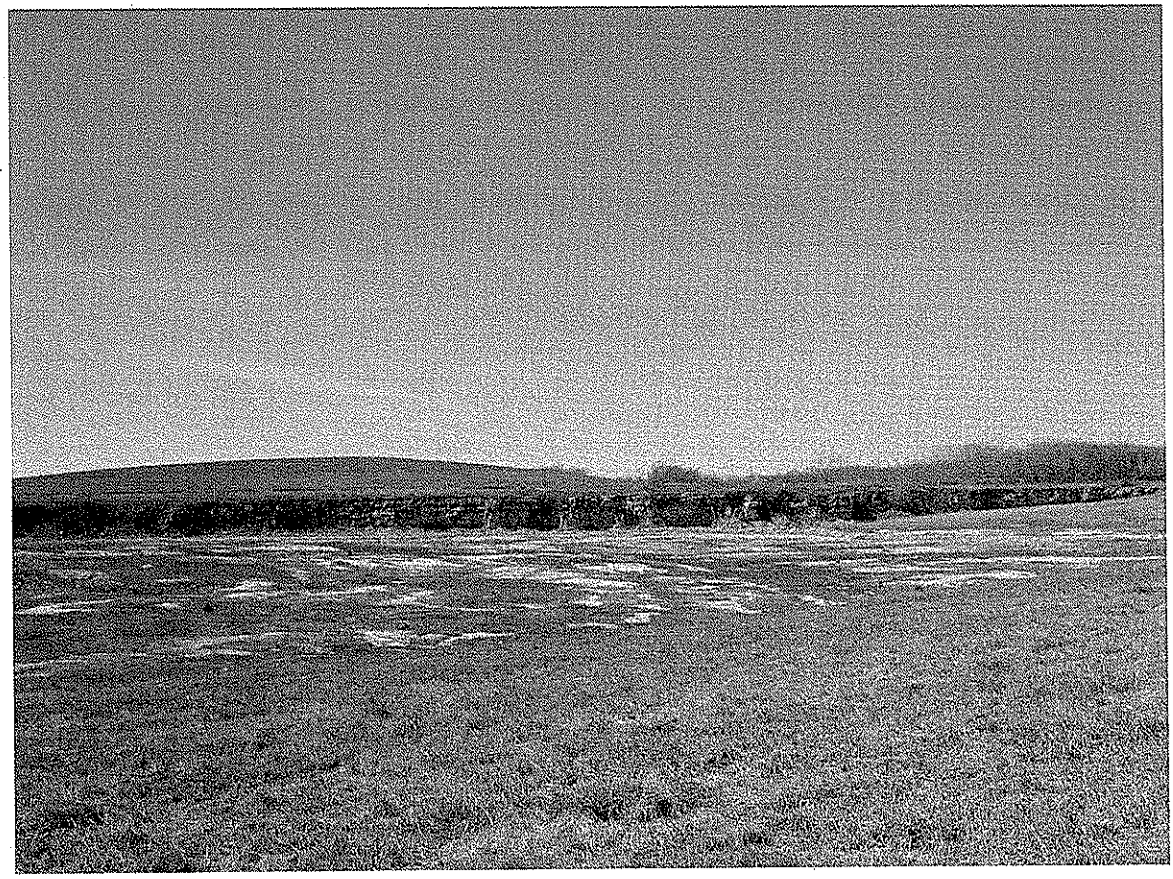
Site Photographs



Lehigh Cement Company Facility



Cement Kiln Dust Reclamation Area



Arch Pond Area

Area C Quarry Cap

Quarry Lake Capping Area

Lime Creek Nature Center
Badlands Capping Area