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# FINAL
# Analysis of Groundwater Monitoring Data Submitted by the American Portland Cement Alliance

## Response to EPA Contract No. 68-W-99-001
## WA 231

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**Analysis of Groundwater Monitoring Data**
**Submitted by the American Portland Cement Alliance**

# I. Introduction

This report contains summaries of the information gathered from the document *Cement Kiln Dust Groundwater Monitoring Summary*, produced by the American Portland Cement Alliance (APCA), dated October 2001.

## A. Overview

Eighteen reports were evaluated. Tetra Tech EM Inc. (Tetra Tech) attempted to determine whether claims made within each facility report were justified by the data and methods found within. Tetra Tech also looked for general characteristics of groundwater quality related to potential influences from cement kiln dust (CKD) activities at each facility. This process consisted of detailed review of geographical information (i.e., site maps and descriptions), geological/hydrogeological investigations, historical information, sampling methods, analytical methods and analytical result interpretation.

The cement kiln dust groundwater reports reviewed herein include 18 facilities owned by 10 companies, spanning 10 states. The purpose of this review is to determine, if possible, the relative influence CKD landfill facilities have on groundwater. Tetra Tech reviewed groundwater data and compared them to government MCL and HBN regulatory values. In most cases, the reports submitted by the APCA were not detailed enough to make any meaningful determinations. However, Tetra Tech has provided a descriptive summary of all available data. The following summaries include information pertaining to:

- Groundwater constituents measured
- Instances where groundwater concentrations exceeded MCL and HBN standards
- Background information of individual site (if available)
- Overall quality of available report (content, evidence to justify conclusions, etc.)

In general, a reasonable review/assessment of the influence of CKD facilities cannot be made with respect to these file reports. In order to provide reasonable reviews of groundwater studies at CKD facilities, Tetra Tech recommends that the submitted investigative reports include, at minimum, the following:

- Site map with monitoring well and source area locations should be included with the report
- Groundwater flow direction or groundwater elevations
- Geologic information
- Monitoring well information – i.e., depths screened, specifics of construction
- Brief site history is suggested – historical property use, use of surrounding area, past environmental assessments conducted, regulatory history
- Lab and field QC samples (MS/MSD, duplicate samples, rinsate samples, blank samples) should be collected and results listed
- Analytical methods stated and should be EPA approved methods (SW 846)



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- Sample collection methods should be stated
- Filtered or not filtered metals samples collected should be stated
- Detection limits should be considerably less than the MCLs
- There should be a consistent list of base line substances to analyze so there is some consistency between sites. Some sites are not analyzing for substances they perhaps should be.
- If statistical models are being used there should be support of the models and not a conclusion statement alone
- If there were soil samples collected from the sources areas one the property the data should presented to determine and assess the groundwater analyses

Examples of reports that did meet most or all of these criteria include Lebec, California and Midlothian, Texas. The remaining reports appeared to be either partial sections or abstracts with data tables. More information is required to adequately review these documents.

Based on the limited information available, Tetra Tech can report the following observations:

- Several facilities indicated elevated levels of antimony, arsenic, beryllium, cadmium, lead, selenium, thallium and some others
- A significant number of the reports are inconsistent with regard to sampled constituent (i.e., parameter)
- A number of reports do not include parameters of potential interest to the EPA (various metals and inorganics)

### B. Summary of Available Data

The following tables show how the available data compare across all facilities. Because adequate information was not made available, there is no comparison between background (or upgradient) constituent concentrations and downgradient samples. Some comparisons are made within individual site reports (next section). These tables also indicate what constituents were sampled at each site (shown by "NA").

Table 1. MCL Summary. This table reports all exceedances by facility, each constituent that was not sampled, and those that were sampled but were found to be below MCL standards. Note that in some cases analytical detection limits are greater than MCL standards.

Table 2. HBN Summary. This table reports all exceedances by facility, each constituent that was not sampled, and those that were sampled but were found to be below HBN standards. Note that in some cases analytical detection limits are greater than HBN standards.



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Table 1. MCL Summary

| | Alkalinity | Aluminum | Ammonia-N | Antimony | Arsenic | Barium | Beryllium | Bicarbonate | Cadmium | Calcium | Carbonate | Chloride | Chromium (total) | Copper | Fluoride | Iron | Lead | Magnesium | Manganese | Mercury (inorganic) | Nickel | Nitrate (as nitrogen) | Nitrite (as nitrogen) | Potassium | Selenium | Silver | Sodium | Sulfate | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ash Grove Cement Company - Chanute, KS | NA | NL | NA | 30* | 0 | 0 | 2 | NA | 0 | NL | NL | NL | 1 | 0 | NA | NL | 6 | NL | NL | 0 | 3 | NA | NA | NL | 0 | 2 | NL | NL | 0 | NL | NL |
| Ash grove Cement Company – Montana City, Montana | 0 | NA | NA | 2 | 0 | 0 | NA | NL | 0 | NA | NA | NL | 0 | 0 | NA | NL | 3 | NL | NA | 0 | 0 | 0 | 0 | NL | 0 | 0 | NA | NL | NA | NA | NL |
| CEMEX., Inc. - Charlevoix, Michigan | NA | NA | NA | NA | 5 | 0 | NA | NA | 1 | NA | NA | NA | 0 | 0 | NA | NA | 0 | NA | NA | 0 | NA | NA | NA | NL | 14 | 0 | NL | NA | NA | NA | NL |
| CEMEX., Inc. – Lyons, Colorado | NA | NL | NA | 0 | 0 | 0 | 0 | NL | 0 | NL | NL | NL | 0 | 0 | 0 | NL | 0 | NL | NL | 0 | 1 | 0 | 0 | NL | 1 | 0 | NL | NL | 0 | NL | NL |
| Essroc - Logansport, Indiana | NA | NA | NA | 0 | 0 | 0 | 0 | NA | 0 | NA | NA | NA | NA | NA | NA | NA | 0 | NA | NA | 0 | 0 | NA | NA | NA | 0 | 0 | NA | NA | NA | NA | NA |
| Holnam - Ada, Oklahoma | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Holnam – Clarksville, Missouri | NA | NA | NA | 0 | 0 | 0 | 0 | NA | 0 | NA | NA | NL | 0 | NA | NA | NA | 1 | NA | Na | 0 | 1 | NA | NA | NL | 0 | 0 | NL | NL | 0 | NL | NL |
| Holnam - Florence, Colorado | 55** | NL | NL | 21** | 1** | 0 | 21** | NL | 2** | NL | NL | NL | NA | NA | NL | NL | 5** | NL | NL | 2** | 0 | 0 | NA | NL | 6** | 0 | NL | NL | 21** | NA | NA |
| Holnam - Laporte, Colorado | NA | NA | NA | NA | 1 | 0 | NA | NA | NA | NA | NA | NL | 0 | 0 | NL | NL | 0 | NA | NL | NA | NA | 0 | 0 | NA | 2 | NA | NA | NL | 0 | NA | NA |
| Holnam - Three Rivers, Montana | NA | NA | NA | 0 | 0 | 0 | 0 | NA | 0 | NA | NA | NL | 0 | 0 | NL | NL | 0 | NA | NA | 0 | NL | NA | NA | NA | 0 | 0 | NA | NL | 0 | NL | NL |
| Lafarge – Paulding, Ohio | NL | NA | NA | NA | 0 | 0 | NA | NA | 0 | NL | NA | NL | 0 | 0 | NA | NL | 0 | NL | NL | 0 | NA | NA | NA | NA | 0 | 0 | NL | NL | NA | NA | NA |
| Lafarge Midwest, Inc. – Alpena, Michigan | NL | NA | NL | 0 | 0 | 0 | NA | NL | 0 | NL | NL | NL | 0 | 0 | NL | NL | 3 | NL | NL | 0 | NL | 0 | NL | NL | 0 | 0 | NL | NL | 0 | NL | NL |
| Lehigh Portland Cement Company – Mitchell, Indiana | NL | NA | NA | NA | 40 | 0 | NA | NL | 0 | NL | NL | NL | 0 | 0 | NL | NL | 0 | NL | NL | 0 | NA | NA | NA | NL | 0 | 0 | NL | NL | NA | NA | NL |
| Lone Star Industries, Inc. - Cape Girardeau, Missouri | NA | NA | NA | 6** | 3 | 0 | 3 | NA | 7 | NA | NA | NA | 0 | 0 | NA | NL | NL | NL | NL | 0 | 0 | NA | NA | NA | 1 | 0 | NA | NL | 0 | NL | NL |
| Lone Star Industries, Inc. - Greencastle, Indiana | NA | NA | NA | 1 | 1 | 0 | 0 | NL | 0 | NA | NA | NA | 0 | 0 | NA | NL | 0 | NA | NL | 0 | 0 | NA | NA | NA | 1 | 0 | NL | NL | 1 | NA | NA |
| Lone Star Industries, Inc. - Pryor, Oklahoma | NA | NA | NA | 1 | 4 | 0 | 0 | NA | 0 | NA | NA | NL | 0 | 0 | NL | NL | 1 | NA | NL | NA | 0 | NA | NA | NA | 0 | 0 | NA | NL | 7 | NA | NA |
| National Cement Company of California – Lebec, California | NL | NA | NA | NA | NA | NA | NA | NA | NA | NL | NA | NL | NA | NA | NA | NA | 17 | NL | NA | NA | NA | 0 | NA | NL | NA | NA | NL | NL | 0 | NA | NA |
| North Texas Cement Company – Midlothian, Texas | NA | NA | NA | 0 | 0 | 0 | 0 | NA | 0 | NA | NA | NA | 0 | NA | NA | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | 0 | 0 | NA | NA | 0 | NA | NL |
| Webster Facility - Pontotoc County, Oklahoma | NL | NA | NA | 0 | NA | NA | NA | NL | NA | NL | NL | NL | 0 | NA | NA | NA | NA | NL | NA | NA | NA | NA | NA | NL | NA | NA | NL | NL | NA | NA | NL |

NA = Not Analyzed
NL = Analyzed but not listed criteria
0 = No greater than criteria
** Detection limit is greater than regulatory value

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Table 2. HBN Summary

| | Alkalinity | Aluminum | Ammonia-N | Antimony | Arsenic | Barium | Beryllium | Bicarbonate | Cadmium | Calcium | Carbonate | Chloride | Chromium (total) | Copper | Fluoride | Iron | Lead | Magnesium | Manganese | Mercury (inorganic) | Nickel | Nitrate (as nitrogen) | Nitrite (as nitrogen) | Potassium | Selenium | Silver | Sodium | Sulfate | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ash Grove Cement Company - Chanute, KS | NL | NL | NA | 60** | 72** | NL | 55** | NA | NL | NL | NL | NL | 0 | 0 | NA | NL | 6 | NL | NL | 0 | NL | NL | NL | NL | 0 | 2 | NL | NL | NL | 0 | 0 |
| Ash grove Cement Company – Montana City, Montana | NL | NA | NA | 2 | 7 | NL | NA | NL | NL | NA | NA | NL | 0 | 0 | NA | NL | 3 | NL | NA | 0 | NL | NL | NL | NL | 0 | 0 | NA | NL | NL | NA | 0 |
| CEMEX, Inc. - Charlevoix, Michigan | NL | NA | NA | NA | 89 | NL | NA | NA | NL | NA | NA | NA | 0 | 0 | NA | NA | 0 | NA | NA | 0 | NL | NL | NL | NL | 4 | 0 | 0 | NA | NL | NA | 0 |
| CEMEX, Inc. – Lyons, Colorado | NL | NL | NA | 0 | 1 | NL | 0 | NL | NL | NL | NL | NL | 0 | 0 | NL | NL | 0 | NL | NL | 0 | NL | NL | NL | NL | 0 | 0 | NL | NL | NL | 0 | 0 |
| Essroc - Logansport, Indiana | NA | NA | NA | 0 | 11 | NL | 0 | NA | NL | NA | NA | NA | NA | NA | NA | NA | 0 | NA | NA | 0 | NL | NA | NA | NA | 0 | 0 | NA | NA | NA | NA | NA |
| Holnam - Ada, Oklahoma | NA | NA | NA | 0 | 0 | NL | 0 | NA | NL | NA | NA | NA | NA | NA | NA | NA | 0 | NA | NA | 0 | NL | NA | NA | NA | 0 | 0 | NA | NA | NA | NA | NA |
| Holnam – Clarksville, Missouri | NA | NA | NA | 0 | 1 | NL | 0 | NA | NL | NA | NA | NL | 0 | NA | NA | NA | 1 | NA | NA | 0 | NL | NA | NA | NL | 0 | 0 | NL | NL | NL | NA | NA |
| Holnam - Florence, Colorado | NL | NL | NL | 7** | 21** | NL | 21** | NL | NL | NL | NL | NL | NA | NA | NL | NL | 5** | NL | NL | 0 | NL | NL | NA | NL | 0 | 0 | NL | NL | NL | NA | NA |
| Holnam - Laporte, Colorado | NA | NA | NA | NA | 9 | NL | NA | NA | NA | NA | NA | NL | 0 | 0 | NL | NL | 0 | NA | NL | NA | NA | NL | NL | NA | 0 | NA | NA | NL | NL | NA | NA |
| Holnam - Three Rivers, Montana | NA | NA | NA | 0 | 13** | NL | 0 | NA | NL | NA | NA | NL | 0 | 0 | NL | NL | 0 | NA | NA | 0 | NL | NA | NA | NA | 0 | 0 | NA | NL | NL | 0 | 0 |
| Lafarge – Paulding, Ohio | NL | NA | NA | NA | 2** | NL | NA | NA | NL | NL | NA | NL | 0 | 0 | NA | NL | 0 | NL | NL | 0 | NA | NA | NA | NA | 0 | 0 | NL | NL | NA | NA | NA |
| Lafarge Midwest, Inc. – Alpena, Michigan | NL | NA | NL | 0 | 0 | NL | NA | NL | NL | NL | NL | NL | 0 | 0 | NL | NL | 3 | NL | NL | 0 | NL | NL | NL | NL | 0 | 0 | NL | NL | NL | 0 | 0 |
| Lehigh Portland Cement Company – Mitchell, Indiana | NL | NA | NA | NA | 110** | NL | NA | NL | NL | NL | NL | NL | 0 | 0 | NL | NL | 0 | NL | NL | 0 | NA | NA | NA | NL | 0 | 0 | NL | NL | NA | NA | 0 |
| Lone Star Industries, Inc. - Cape Girardeau, Missouri | NA | NA | NA | 6** | 44** | NL | 3 | NA | NL | NA | NA | NA | 0 | 0 | NA | NL | 13** | NL | NL | 0 | NL | NA | NA | NA | 0 | 0 | NA | NL | NL | 0 | 0 |
| Lone Star Industries, Inc. - Greencastle, Indiana | NA | NA | NA | 1 | 13** | NL | 0 | NA | NL | NA | NA | NA | 0 | 0 | NA | NL | 0 | NA | NL | 0 | NL | NA | NA | NA | 0 | 0 | NA | NL | NL | NA | 0 |
| Lone Star Industries, Inc. - Pryor, Oklahoma | NA | NA | NA | 0 | 5** | NL | 0 | NA | NL | NA | NA | NL | 0 | 0 | NL | NL | 1 | NA | NL | NA | NL | NA | NA | NA | 0 | 0 | NA | 0 | 0 | NA | NA |
| National Cement Company of California – Lebec, California | NL | NA | NA | NA | NA | NA | NA | NA | NA | NL | NA | NL | NA | NA | NA | NA | 17 | NL | NA | NA | NA | NL | NA | NL | NA | NA | NL | NL | NL | NA | NA |
| North Texas Cement Company – Midlothian, Texas | NA | NA | NA | 0 | 6** | NL | 0 | NA | NL | NA | NA | NA | 0 | NA | NA | NA | 0 | NA | NA | 0 | NA | NA | NA | NA | 0 | 0 | NA | NA | NL | NA | 0 |
| Webster Facility - Pontotoc County, Oklahoma | NL | NA | NA | 0 | NA | NA | NA | NL | NA | NL | NL | NL | 0 | NA | NA | NA | NA | NL | NA | NA | NA | NA | NA | NL | NA | NA | NL | NL | NA | NA | 5 |

NA = Not Analyzed
NL = Analyzed but not listed criteria
0 = No greater than criteria
** Detection limit is greater than regulatory value

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# PART II

# ANALYSIS OF INDIVIDUAL FACILITY REPORTS

**Ash Grove Cement Company – Chanute, KS**

**Summary:** This report is thorough as it contains historical information, subsurface descriptions (geology and geochemistry of groundwater), permitting history and documentation, and a summary of groundwater quality, submitted to the facility by ARCADIS (Geraghty & Miller).

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | Yes |
| Total no. of wells sampled | 6 |
| Sampling dates or duration | Eight sampling events: 8/98, 11/98, 1/99, 2/99, 4/99, 5/99, 6/99, and 8/99 |
| Upgradient wells specified | 2 |
| Downgradient wells specified | 2 |
| Site map included | No |
| Adequate physical description | Fair |
| Contains discussion section | Yes |
| Contains conclusions | Yes |
| References cited | Yes |

Table 2. Summary of reported data

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background | #>Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | N | - | NL | NL | - | - | - |
| Aluminum | Y | - | NL | NL | - | 0.26 – 3.66; | 7 > 3.66 |
| Ammonia-N | N | - | NL | NL | - | - | - |
| Antimony | Y | 0.002 to 0.04 | 0.006 | 0.014 | 60**/60** | 0.0021 – 0.07 | 0 > 0.07 |
| Arsenic | Y | 0.001 to 0.01 | 0.05 | 0.0000568 | 0/72** | ND – 0.007 | 5 > 0.007 |
| Barium | Y | - | 2 | NL | 0 | 0.14 – 0.22 | 22 > 0.22 |
| Beryllium | Y | 0.001 to 0.005 | 0.004 | 0.004 | 2/55** | - | - |
| Bicarbonate | N | - | NL | NL | - | - | - |
| Cadmium | Y | 0.005 | 0.005 | NL | 0 | - | - |
| Calcium | Y | - | NL | NL | - | 47.4 – 52.5 | 1 > 52.5 |
| Carbonate | N | - | NL | NL | - | - | - |
| Chloride | Y | - | NL | NL | - | 5.4 – 28.5 | 5 |
| Chromium (total) | Y | 0.005 to 0.01 | 0.1 | 40 | 1/0 | - | - |
| Copper | Y | 0.01 | 1.3 | 1.0 | 0/0 | - | - |
| Fluoride | N | - | 4 | NL | - | - | - |
| Iron | Y | - | NL | NL | - | 0.39 – 8.4 | 3 > 8.4 |
| Lead | Y | 0.001 to 0.003 | 0.015 | 0.015 | 6/6 | ND – 0.01 | 3 > 0.01 |
| Magnesium | Y | - | NL | NL | - | 37.3 – 41.0 | 1 > 41.0 |
| Manganese | Y | 0.01 | NL | NL | - | 0.026 – 0.171 | 3 > 0.171 |



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**Ash Grove Cement Company – Chanute, KS (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background | #>Background |
|---|---|---|---|---|---|---|---|
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 | - | - |
| Nickel | Y | 0.005 to 0.04 | 0.1 | NL | 3 | ND – 0.02 | 3 > 0.02 |
| Nitrate (as nitrogen) | N | - | 10 | NL | - | - | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - | - | - |
| Potassium | Y | - | NL | NL | | ND – 15.8 | 1 > 15.8 |
| Selenium | Y | 0.002 to 0.005 | 0.05 | 0.175 | 0/0 | ND | 2 > ND |
| Silver | Y | 0.007 to 0.01 | 0.05 | 0.20 | 2/2 | ND - 500 | 0 |
| Sodium | Y | - | NL | NL | - | 9.5 – 57.0 | 47 > 57.0 |
| Sulfate | Y | - | NL | NL | - | 14.4 – 17.8 | 30 > 17.8 |
| Thallium | Y | 0.001 to 0.05 | 0.002 | NL | 60** | ND – 0.145 | - |
| Vanadium | Y | 0.01 | NL | 0.3 | 0 | - | - |
| Zinc | Y | 0.02 | NL | 10 | 0 | - | - |
| **Field Parameters** | | | | | | | |
| pH | Y | - | NL | NL | - | 6.67 – 7.5 | 18 > 7.5; 2 < 6.67 |
| Conductivity | Y | - | NL | NL | - | 6.82 – 700 | 12 > 700 |
| TSS | N | - | NL | NL | - | - | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** Based on the report which is not dated but apparently submitted after August 2001 by ARCADIS (Geraghty & Miller), the following observations have been made:

***Conclusion (1):*** *Hydrogeologic conditions at the site are not conducive for collecting representative groundwater samples; therefore, concentrations of metals and inorganic parameters are highly variable over time.*

While it may be true that conditions at the site are not conducive for collecting groundwater samples using EPA-approved low flow sampling procedures, the report does not indicate why this fact would result in highly variable concentrations of metals and inorganic parameters. What evidence exists that this is the case in this region? A reference of historical studies is necessary to substantiate this conclusion. Also, since attaining representative groundwater samples is not possible, why should any of the data shown in this report be acceptable?

***Conclusion (2):*** *The results of the statistical evaluation of the initial two years of groundwater quality data indicate that none of the 14 metals had concentrations which indicated a*



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*statistically significant increase over background conditions. Therefore, the KDHE did not require ongoing statistical evaluation of additional groundwater quality data.*

Although the KDHE decided not to require ongoing statistical evaluations of the groundwater data, the report does not illustrate the degree upon which the observed data statistically differs from background conditions. Again, as commented under Conclusion (1), if the hydrogeologic conditions are not conducive for collecting representative groundwater samples, are the background samples representative of background conditions? It is apparent that time and effort has been expended to explore background conditions; however, the report needs to quantify the degree of uncertainty of all of the reported data, as well as the statistical evaluation of the data.

***Conclusion (3):*** Based on the initial statistical evaluation and comparison to the highly conservative Federal MCLs and Kansas HBLs, a release from the CKD landfill is not apparent.

See next comment (4).

***Conclusion (4):*** *Due to the high degree of variability, a long-term monitoring program and possible additional statistical analysis will be required to determine whether releases are likely to occur in the future.*

Again, the report does not attempt to quantify the degree of variability that is supposedly inherent in groundwater constituent measurements in the vicinity of this site. There is no statement of how long long-term monitoring should occur in order to reduce uncertainty to acceptable levels. Therefore, given that the initial and recent measurements of groundwater quality were not necessarily based on long-term monitoring, the data may not be adequate to characterize past and present conditions with respect to the landfill.



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**Ash Grove Cement Company – Montana City, Montana**

**Summary:** A 15-acre CKD landfill was constructed on the Ash Grove property and as part of the permitting and sighting process four groundwater monitoring wells, including one upgradient well, were installed adjacent to the landfill. The report states that there is no evidence that leachate from the landfill is impacting local groundwater.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 4 |
| Sampling dates or duration | 3 times (12/18/98, 6/28/99, 5/11/00) |
| Upgradient wells specified | 1 (not specified) |
| Downgradient wells specified | 3 (not specified) |
| Site map included | No |
| Adequate physical description | Limited |
| Contains discussion section | Limited |
| Contains conclusions | Limited |
| References cited | No |

Table 2. Summary of reported data

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | # > Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | Y | NA | NA | NL | 0/NA | 234 – 251 | 0 |
| Aluminum | N | NA | NA | NL | - | - | - |
| Ammonia-N | N | NA | NA | NL | - | - | - |
| Antimony | Y | 0.003 | 0.006 | 0.014 | 2/2 | <0.003 – 0.008 | 0 |
| Arsenic | Y | 0.003 | 0.05 | 5.68E-5 | 0/7 | <0.005 – 0.007 | 0 |
| Barium | Y | 0.005 | 2 | NL | 0/NA | <0.005 – 0.036 | 8 |
| Beryllium | N | NA | 0.004 | 0.004 | - | - | - |
| Bicarbonate | Y | NL | NA | NL | 0/NA | 285 – 306 | 2 |
| Cadmium | Y | 0.0001 | 0.005 | NL | 0/NA | <0.0001 | 0 |
| Calcium | N | NA | NA | NL | - | - | - |
| Carbonate | N | NA | NA | NL | - | - | - |
| Chloride | Y | 1.0 | NA | NL | 0/NA | <1.0 – 5.18 | 9 |
| Chromium (total) | Y | 0.001 | 0.1 | 40 | 0/0 | <0.001 | 3 |
| Copper | Y | 0.001 | 1.3 | 1.0 | 0/0 | <0.001 – 0.005 | 4 |
| Fluoride | N | NA | 4 | NL | - | - | - |
| Iron | Y | 0.01 | NA | NL | 0 | <0.01 – 0.25 | 6 |
| Lead | Y | 0.003 | 0.015 | 0.015 | 3/3 | <0.003 – 0.016 | 3 |



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**Ash Grove Cement Company – Montana City, Montana (continued)**

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | # > Background |
|---|---|---|---|---|---|---|---|
| Magnesium | Y | 0.005 | NA | NL | 0/NA | <0.005 – 0.016 | 9 |
| Manganese | N | NA | NA | NL | - | - | - |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 | <0.0002 | 0 |
| Nickel | Y | 0.02 | 0.1 | NL | 0/NA | <0.02 | 0 |
| Nitrate (as nitrogen) | Y | 0.01 | 10 | NL | 0/NA | 1.51 – 1.9 | 3 |
| Nitrite (as nitrogen) | Y | 0.01 | 1 | NL | 0/NA | <0.01 | 2 |
| Potassium | N | NA | NA | NL | - | - | - |
| Phosphorus (total) | Y | 0.01 | NA | NL | 0/NA | <0.01 – 0.05 | 8 |
| Selenium | Y | 0.001 | 0.05 | 0.175 | 0/NA | <0.001 | 2 |
| Silver | Y | 0.003 | 0.05 | 0.20 | 0/NA | <0.003 - <0.01 | 0 |
| Sodium | N | NA | NA | NL | - | - | - |
| Sulfate | Y | NL | NA | NL | 0/NA | 289 – 357 | 5 |
| Thallium | N | NA | 0.002 | NL | - | - | - |
| Zinc | Y | 0.01 | NA | 10 | NA/0 | <0.01 | 4 |
| **Field Parameters** | | | | | | | |
| pH | Y | NA | NA | NL | - | 7.62 – 8.1 | - |
| Conductivity | Y | NA | NA | NL | - | 952-1,052 | - |
| TSS | N | - | NA | NL | - | - | - |
| Dissolved soilds | Y | NA | NA | NL | - | 719 - 768 | - |
| COD | N | - | NA | NL | - | - | - |
| **Organic Substances** (only detected substances listed) | | | | | | | |
| None sampled | | | - | | | | |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The text states that there is one upgradient and three down gradient locations; however, no specific well numbers are specified. Names of the monitoring wells are provided. The well listed with a "U" after its name would appear to represent the upgradient location and the wells with a "D" after their name represent the downgradient. Although this is likely and assumed for performing this review, the text does not state that this is the case.

Groundwater samples were collected from multiple sampling events and analyzed for a reasonable number of parameters with low detection limits. Only two substances (antimony and lead) were detected at concentrations greater than MCLs; however, elevated antimony concentrations were noted in the reference well sample which potentially indicates either high natural levels of the substance or an upgradient contaminant source. Elevated antimony concentrations were only observed during one of the three sampling events.



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**Ash Grove Cement Company – Montana City, Montana (continued)**

The text of the report states that there is no evidence that leachate from CKD is impacting groundwater; however, 14 of the 21 substances analyzed by the laboratory were detected at concentrations greater than background during multiple sampling events or at sample locations indicating that the CKD source area does impact the local groundwater.

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**CEMEX., Inc. - Charlevoix, Michigan**

**Summary:** There are 9 CKD piles on the property. Investigations have been conducted to determine the extent of the impact to the local groundwater and to Lake Michigan. The report overtly states that there has been an impact to the groundwater as a result of CKD and that pH levels and potassium concentrations are the best indicators of the release due to the variability of other metals analyzed.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | Results listed for 19; however, total and dissolved results are not specified |
| Sampling dates or duration | 11/14/96, 5/22/96, 10/15/96, 11/20/96, 12/18/96, 1/13/00, 4/5/00, 10/4/00, 1/10/01, 4/4/01, 7/10/01 |
| Upgradient wells specified | Unknown |
| Downgradient wells specified | Unknown |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Limited |
| Contains conclusions | Limited |
| References cited | No |

Table 2. Summary of reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | - | - | NA | NL | - |
| Aluminum | - | - | NA | NL | - |
| Ammonia-N | - | - | NA | NL | - |
| Antimony | - | - | 0.006 | 0.014 | - |
| Arsenic | Y | 0.025 | 0.05 | 5.68E-5 | 5/89 |
| Barium | Y | 0.025 | 2 | NL | 0/NA |
| Beryllium | - | - | 0.004 | 0.004 | - |
| Bicarbonate | - | - | NA | NL | - |
| Cadmium | Y | 0.0002 | 0.005 | NL | 1/NA |
| Calcium | - | - | NA | NL | - |
| Carbonate | - | - | NA | NL | - |
| Chloride | - | - | NA | NL | - |
| Chromium (total) | Y | 0.005 | 0.1 | 40 | 0/0 |
| Copper | Y | 0.025 | 1.3 | 1.0 | 0/0 |
| Fluoride | - | - | 4 | NL | - |
| Iron | - | - | NA | NL | - |
| Lead | Y | 0.005 | 0.015 | 0.015 | 0/0 |
| Magnesium | - | - | NA | NL | - |
| Manganese | - | - | NA | NL | - |



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**CEMEX., Inc. - Charlevoix, Michigan (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Nickel | - | - | 0.1 | NL | - |
| Nitrate (as nitrogen) | - | - | 10 | NL | - |
| Nitrite (as nitrogen) | - | - | 1 | NL | - |
| Potassium | Y | NL | NA | NL | - |
| Selenium | Y | 0.0025 | 0.05 | 0.175 | 14/4 |
| Silver | Y | 0.0025 | 0.05 | 0.2 | 0/0 |
| Sodium | Y | NL | NA | NL | - |
| Sulfate | - | - | NA | NL | - |
| Thallium | - | - | 0.002 | NL | - |
| Zinc | Y | 0.02 | NA | 10 | NA/0 |
| **Field Parameters** | | | | | |
| pH | Y | - | NA | NL | - |
| Conductivity | Y | - | NA | NL | - |
| TSS | - | - | NA | NL | - |
| Dissolved soilds | - | - | NA | NL | - |
| COD | - | - | NA | NL | - |
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | - | - | - | - | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** In the first paragraph of the report, it is stated that investigations have been conducted on the property in accordance and under the oversight of Michigan Department of Environmental Quality to determine the impact of CKD to the groundwater in the area and nearby Lake Michigan. The results of the investigations should be provided. An explanation about why the Michigan DEQ became involved with the site should be given.

Some portions of the report reference background concentrations in the groundwater at the property, but the background well location is not specified. The background well should be listed to address the impact to the groundwater.

It does appear that a significant amount of sampling has been conducted on the property during multiple sampling events conducted in 1996 and 2000. Based on the information provided, there has been an impact to the groundwater of metals and pH. The pH, as sampled in 1996, indicate levels ranging from approximately 8 to greater than 12 with the majority of results being nearer to 12. pH does not appear to have been analyzed during the 2000 sampling event. It should also



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**CEMEX., Inc. - Charlevoix, Michigan (continued)**

be noted that the number of metals sampled on the property should be increased to better assess the impact and the nature of the impact.

The low HBN concentration for arsenic dramatically increases the number of samples that exceed the criteria. Additionally, the analytical detection limits for the substance are considerably greater than the HBN value.

As stated in the report, groundwater in the vicinity of this property has been affected by the presence of CKD piles.

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**CEMEX, Inc. – Lyons, Colorado**

**Summary:** Colorado Division of Minerals and Geology requested an assessment of the property and the impact of CKD piles to the local groundwater. CKD has been disposed of on the property since 1969.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 2 |
| Sampling dates or duration | Unknown |
| Upgradient wells specified | Unknown |
| Downgradient wells specified | Unknown |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Limited and not relevant to groundwater quality |
| Contains conclusions | Limited and not relevant |
| References cited | No |

Table 2. Summary of report data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | - | NL | NL | - |
| Aluminum | Y | - | NL | NL | - |
| Ammonia-N | N | - | NL | NL | - |
| Antimony | Y | 0.005 | 0.006 | 0.014 | 0 |
| Arsenic | Y | 0.003 | 0.05 | 5.68E-5 | 0/1 |
| Barium | Y | - | 2 | NL | 0/NA |
| Beryllium | Y | 0.004 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | Y | - | NL | NL | - |
| Boron | Y | - | NL | NL | - |
| Cadmium | Y | 0.005 | 0.005 | NL | 0/NA |
| Calcium | Y | - | NL | NL | - |
| Carbonate | Y | - | NL | NL | - |
| Chloride | Y | - | NL | NL | - |
| Chromium (total) | Y | 0.01 | 0.1 | 40 | 0/NA |
| Cobalt | Y | 0.01 | NL | NL | - |
| Copper | Y | 0.01 | 1.3 | 1.0 | 0/0 |
| Fluoride | Y | - | 4 | NL | 0/NA |
| Iron | Y | - | NL | NL | - |
| Lead | Y | 0.05 | 0.015 | 0.015 | 0/0 |
| Lithium | Y | - | NL | NL | - |
| Magnesium | Y | - | NL | NL | - |
| Manganese | Y | - | NL | NL | - |



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**CEMEX, Inc. – Lyons, Colorado (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Molybdenum | Y | 0.01 | NL | NL | - |
| Nickel | Y | 0.04 | 0.1 | NL | 1/NA |
| Nitrate (as nitrogen) | Y | 0.01 | 10 | NL | 0/NA |
| Nitrite (as nitrogen) | Y | 0.01 | 1 | NL | 0/NA |
| Potassium | Y | 5 | NL | NL | - |
| Selenium | Y | 0.005 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.01 | 0.05 | 0.20 | 0/0 |
| Silicon | Y | - | NL | NL | - |
| Sodium | Y | - | NL | NL | - |
| Strontium | Y | - | NL | NL | - |
| Sulfate | Y | - | NL | NL | - |
| Sulfite | Y | - | NL | NL | - |
| Sulfide | Y | - | NL | NL | - |
| Titanium | Y | 0.01 | NL | NL | - |
| Thallium | Y | 0.002 | 0.002 | NL | 0/NA |
| Vanadium | Y | 0.01 | NL | 0.3 | - |
| Zinc | Y | - | NL | 10 | - |
| **Field Parameters** | | | | | |
| pH | Y | - | NL | NL | NA |
| Conductivity | Y | - | NL | NL | NA |
| TSS | N | - | NL | NL | NA |
| Dissolved solids | Y | - | NL | NL | NA |
| Total Inorganic Carbon | Y | - | NL | NL | NA |
| Total Organic Carbon | Y | 1 | NL | NL | NA |
| COD | N | - | NL | NL | NA |
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | | | | | |
| **Other Substances** | | | | | |
| Gross Alpha (pCi/L) | Y | - | NL | NL | NA |
| Gross Beta (pCi/L) | Y | - | NL | NL | NA |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.



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**CEMEX, Inc. – Lyons, Colorado (continued)**

**Specific Comments:** The first paragraph states that the past assessment was "performed to the ultimate satisfaction of the Division (Colorado Division of Minerals and Geology)" but it does not state what the assessment determined and there is no summary of any conclusions that were made.

A chemical analysis, assessment of the local geology and hydrology, and analysis of groundwater impacts have been conducted and are included in the past reports, but no summary is included in this report.

Leachate testing of CKD from the property was performed and a few parameters were found to be at concentrations greater than groundwater standards. This type of sampling and analysis should not be used to replace groundwater sampling. Subsequent sampling appears to have only analyzed for the parameters that were found to be greater than groundwater criteria during the leachate analysis. Groundwater sampling and analysis should be conducted for any possible contaminants, not only the elevated substances detected during the leachate analysis. The groundwater sample results listed in the tables are not addressed, summarized, or referenced in the report. No information is provided about the monitoring wells or samples that have been collected from them.

In the last paragraph, a statement is made that samples have been collected from local surface water and analyzed for the substances detected during leachate analysis of the CKD and that no substances were detected at concentrations greater than the standards. This is not relevant to groundwater quality.

The analytical tables and groundwater sampling events are not summarized in any way in the text of the report and it is not known whether there is any background water quality information. There appears to be only minimal impact to the groundwater based on the given information; however, more information and more data should be collected. The HBN for arsenic is less than the analytical detection limits.

It is difficult to make a conclusion about the quality of the groundwater in the vicinity of the site without more information. Additionally, only two groundwater sampling points would not be able to adequately characterize the groundwater in the area even if the information was available.

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**Essroc – Logansport, Indiana**

**Summary:** Samples were collected quarterly from a number of wells; however, specific information about the sampling events or the placement of the monitoring wells is not provided. The report concludes that the data "indicate the apparent lack of impact on the groundwater of the CKD landfills at the Logansport plant," but the report does not provide sufficient detail to either support or refute the given conclusion.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 12* |
| Sampling dates or duration | Five quarterly sampling events - specific dates and times not listed. |
| Upgradient wells specified | 3 |
| Downgradient wells specified | 8 |
| Site map included | No |
| Adequate physical description | Limited |
| Contains discussion section | Limited |
| Contains conclusions | Limited |
| References cited | No |

* One monitoring well not mentioned in the report text is listed in the data tables (EW-3). There is no information concerning the well.

Table 2. Summary of reported data

| | Sampled ? | DL* | MCL | HBN (Landfill) | # Exceed MCL/HBN | Background mg/l | #> Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | N | NL | NA | NL | - | NA | - |
| Aluminum | N | NL | NA | NL | - | NA | - |
| Ammonia-N | N | NL | NA | NL | - | NA | - |
| Antimony | Y | NL | 0.006 | 0.014 | 0/0 | BDL | 0 |
| Arsenic | Y | NL | 0.05 | 5.68E-5 | 0/11 | BDL-.012 | 1 |
| Barium | Y | NL | 2 | NL | 0/NA | 0.16-0.2 | 14 |
| Beryllium | Y | NL | 0.004 | 0.0040 | 0/0 | BDL | 1 |
| Bicarbonate | N | NL | NA | NL | - | NA | - |
| Cadmium | Y | NL | 0.005 | NL | 0/NA | BDL | 0 |
| Calcium | N | NL | NA | NL | - | NA | - |
| Carbonate | N | NL | NA | NL | - | NA | - |
| Chloride | N | NL | NA | NL | - | NA | - |
| Chromium (total) | N | NL | 0.1 | 40 | - | NA | - |
| Copper | N | NL | 1.3 | 1.0 | - | NA | - |
| Fluoride | N | NL | 4 | NL | - | NA | - |
| Iron | N | NL | NA | NL | - | NA | - |
| Lead | Y | NL | 0.015 | 0.015 | 0/0 | BDL | 0 |
| Magnesium | N | NL | NA | NL | - | NA | - |
| Manganese | N | NL | NA | NL | - | NA | - |
| Mercury (inorganic) | Y | NL | 0.002 | 0.011 | 0/0 | BDL | 0 |
| Nickel | Y | NL | 0.1 | NL | 0/NA | BDL | 1 |
| Nitrate (as nitrogen) | N | NL | 10 | NL | - | NA | - |
| Nitrite (as nitrogen) | N | NL | 1 | NL | - | NA | - |



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**Essroc – Logansport, Indiana (continued)**

| | Sampled ? | DL* | MCL | HBN (Landfill) | # Exceed MCL/HBN | Background mg/l | #> Background |
|---|---|---|---|---|---|---|---|
| Potassium | N | NL | NA | NL | - | NA | - |
| Selenium | Y | NL | 0.05 | 0.175 | 0/0 | BDL | 0 |
| Silver | Y | NL | 0.05 | 0.20 | 0/0 | BDL | 0 |
| Sodium | N | NL | NA | NL | - | NA | - |
| Sulfate | N | NL | NA | NL | - | NA | - |
| Thallium | N | NL | 0.002 | NL | - | NA | - |
| **Field Parameters** | | | | | | | |
| pH | N | NL | NA | NL | - | NA | - |
| Conductivity | N | NL | NA | NL | - | NA | - |
| TSS | N | NL | NA | NL | - | NA | - |
| **Organic Substances** (only detected substances listed) | | | | | | | |
| Naphthalene | Y | NL | NA | 1.0 | NA/1 | NA | 1 |
| 1,1-Dichloroethane | Y | NL | NA | 9.0E-4 | NA/1 | NA | 1 |
| 1,1-Dichloroethene | Y | NL | 0.007 | NL | 0/NA | BDL | 1 |
| CIS-1,2-Dichloroethene | Y | NL | 0.07 | NL | 0/NA | BDL | 4 |
| Tetrachloroethene | Y | NL | 0.005 | 0.40 | 4/0 | BDL | 4 |
| 1,1,1-Trichloroethane | Y | NL | 0.2 | NL | 0/NA | BDL | 4 |
| Trichloroethene | Y | NL | 0.005 | 0.008 | 3/3 | BDL | 3 |
| M/P Xylene | Y | NL | 10 | 70 | 0/0 | BDL | 1 |

NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
BDL = Below detection limit.

**Specific Comments:** The report lacks any detailed information concerning the site and the sampling events that occurred on the property. Inorganic contaminants have been detected at concentrations greater than background, but concentrations are less that applicable MCLs. Organic contaminants, not likely attributable to CKD, were detected at concentrations greater than MCLs but this occurrence is not addressed in the report. Due to the very low HBN for arsenic, it is unlikely that the analytical method detection limits were below this value.

The description of the solid waste management units (SWMU) located on the property lacks any information concerning the size of the SWMUs or details of their use including disposal history. Chemical analysis of the waste material would assist in determining the groundwater parameters to analyze. In addition, site-specific information concerning property characteristics, including, but not limited to, site geology, topography, the size of the property, and surrounding area is not included.

The description of the eight groundwater monitoring wells and the three off-site residential drinking water wells does specify which monitoring wells are considered upgradient of the source areas and that the monitoring wells located on the property are screened within the upper aquifer; however, there is no information to support these statements such as groundwater flow direction or groundwater table elevations. The paragraph does not specify whether the residential wells are screened within the same aquifer as the monitoring wells located on the property. A site map showing the placement of the monitoring wells is necessary to support any conclusions.



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**Essroc – Logansport, Indiana (continued)**

The facility report states that a risk assessment was completed for the property and that EPA has accepted the risk assessment as valid; however, there is no statement of what the risk assessment concluded. The validity of the assessment does not communicate the inherent risk associated with the property. Additionally, a description of the NOD should be included.

The facility report states that only a few substances are detected at concentrations greater than the detection limits, but the detection limits are not specified for any substances. It is necessary for the detection limits to be at concentrations less than the appropriate health based risk criteria for any conclusions to be made. Additionally, there is no mention in the paragraph of the substances that were detected at concentrations greater than the background values. The text portion of the report concludes that there is an apparent lack of impact on the groundwater from the site; however, this cannot be established based on the given information.

The data tables list substances that were not detected at concentrations greater than the detection limits as BDL (below detection levels) but it does not state what the detection limits are. This is important for comparability to MCLs. It also is not stated whether the metals analysis is for unfiltered or dissolved metals and a number of metals which would be important to assess an impact to groundwater were not analyzed (i.e., Fe, Ca, and others). Additionally, it is not known whether EPA-approved analytical methods were used by the lab or what sample collection methods were used in the field.

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**Holnam – Ada, Oklahoma (Webster Facility – Pontotoc County)**

**Summary:** There are two reports submitted which summarize two independent sampling events. These reports include a detailed summary of the statistical analysis of the data results; however, general information concerning the property and the data results is not included. This information is needed to make an accurate assessment of the quality of the report and the conclusions that are made in the report.

There are 4 groundwater monitoring wells on the property; one of which is considered upgradient of potential sources of contamination. Analytical data from two rounds of groundwater sampling is included with the report. The report states that groundwater elevation data also was collected as part of the sampling events; however, this data is not included in the report.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 4 |
| Sampling dates or duration | Results for two sampling events provided (08/2000, 2/2001) (report indicates monitoring is conducted twice per year) |
| Upgradient wells specified | 1 |
| Downgradient wells specified | 3 |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Statistical analysis discussed |
| Contains conclusions | Conclusion of no impact based on statistical analysis |
| References cited | No |

Table 2. Summary of reported data

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | #>Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | Y | - | NL | NL | - | NA | 0 |
| Aluminum | N | - | NL | NL | - | NA | NA |
| Ammonia-N | N | - | NL | NL | - | NA | NA |
| Antimony | Y | 0.02 | 0.006 | 0.014 | 0/0 | <0.02 | 0 |
| Arsenic | N | - | 0.05 | 5.68E-5 | - | NA | NA |
| Barium | N | - | 2 | NL | - | NA | NA |
| Beryllium | N | - | 0.004 | 0.004 | - | NA | NA |
| Bicarbonate | Y | - | NL | NL | - | NA | 0 |
| Cadmium | N | - | 0.005 | NL | - | NA | NA |
| Calcium | Y | - | NL | NL | - | 300-330 | 0 |
| Carbonate | Y | 0.06 | NL | NL | - | <0.06 | 0 |
| Chloride | Y | - | NL | NL | - | 5 – 6 | 0 |
| Chromium (total) | Y | 0.01 | 0.1 | 40 | 0/0 | < 0.01 | 0 |
| Copper | N | - | 1.3 | 1.0 | - | NA | NA |
| Fluoride | N | - | 4 | NL | - | NA | NA |
| Iron | N | - | NL | NL | - | NA | NA |



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**Holnam – Ada, Oklahoma (Webster Facility – Pontotoc County) (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | #>Background |
|---|---|---|---|---|---|---|---|
| Lead | N | - | 0.015 | 0.015 | - | NA | NA |
| Magnesium | Y | - | NL | NL | - | 23 – 30 | 0 - ? |
| Manganese | N | - | NL | NL | - | NA | NA |
| Mercury (inorganic) | N | - | 0.002 | 0.011 | - | NA | NA |
| Nickel | N | - | 0.1 | NL | - | NA | NA |
| Nitrate (as nitrogen) | N | - | 10 | NL | - | NA | NA |
| Nitrite (as nitrogen) | N | - | 1 | NL | - | NA | NA |
| Potassium | Y | 1.0 | NL | NL | - | 2.2 – 3.5 | 0 - ? |
| Selenium | N | - | 0.05 | 0.175 | - | NA | NA |
| Silver | N | - | 0.05 | 0.2 | - | NA | NA |
| Sodium | Y | - | NL | NL | - | 6.9 - ? | 3 |
| Sulfate | Y | - | NL | NL | - | 310 - ? | 0 |
| Thallium | N | - | 0.002 | NL | - | NA | NA |
| Zinc | Y | 0.05 | NL | 10 | 0/5 | <0.05 – 0.05 | 4 |
| **Field Parameters** | | | | | - | | |
| pH | N | - | NL | NL | - | NA | NA |
| Conductivity | Y | - | NL | NL | - | NA | 0 |
| TSS | N | - | NL | NL | - | NA | NA |
| Dissolved soilds | Y | - | NL | NL | - | 922 – 1,110 | 0 |
| COD | Y | - | NL | NL | - | 25 - 32 | 1 |
| **Organic Substances** (only detected substances listed) | | | | | | | |
| None sampled | - | - | - | | - | - | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
? Due to the poor quality of the reproduction some concentration are unidentifiable
** Detection limit is greater than regulatory value.

**Specific Comments:** Both reports contain a relatively lengthy section describing the statistical analysis that was performed on the analytical results from the two sampling events. The analysis indicates the relative variability of the results and exceedances from the predicted values. However, at least a portion of the conclusion should summarize the individual data results in simple terms of greater than background or greater than the applicable regulatory value. For instance, the recorded concentrations of zinc are consistently greater in the downgradient wells than in the concentrations from the reference well during both sampling events. Additionally, the concentrations also are consistently greater than the HBN value. This clearly indicates an impact to the quality of the groundwater and it is not addressed in the data summary report.

A greater number of substances, primarily metals, should be analyzed during the sampling events. Metals that are indicative of CKD were not sampled; thus, no conclusions of the impact of these substances can be determined.

As previously stated, these two reports do not contain site specific background information, geologic information, site maps, or source area descriptions. General information necessary to assess the quality of the report is not included. There is no summary of the sampling methods used during sample collected.



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**Holnam – Ada, Oklahoma (Webster Facility – Pontotoc County) (continued)**

The reports reference past sampling events; however, the data from the past sampling events is not contained in the report. The detection limits for antimony as listed in the data table (0.02 mg/l) is significantly greater than the MCL for the metal (0.006 mg/l). To properly assess whether there is an impact of antimony to the property, the detection limit must be below the MCL. Additionally, the report indicates that antimony was detected during past sampling at the property. It is likely that the detection limit used during that analysis is the same as the detection limit used in the subsequent analyses. If that is the case, then there are concentrations of antimony significantly greater that the MCLs present in the groundwater. Any new sampling on the property must properly address antimony before any conclusions of impact to the quality of groundwater can be made.

The report indicates that sampling procedures have been inconsistent: "Additionally, a submersible pump was utilized to purge the wells prior to sampling. This change in well purging may have contributed to the detection of zinc." Sampling methods should not be altered between sampling events and wells should always be purged prior to sampling to ensure that a sample is representative of the natural conditions. It is not stated whether it was the use of the pump for purging the wells that changed or the purging of the wells itself. This should be stated. Purging wells by hand versus purging wells with a pump should not affect the resulting concentration provided adequate sampling techniques are utilized.

Neither report definitively states whether there has been an impact to the groundwater table attributable to CKD stored on the property. The only conclusions of both reports is that groundwater monitoring on the property should continue. First, more information is needed to determine whether an impact to the groundwater table has occurred and second, these reports do not adequately address that question.

US EPA ARCHIVE DOCUMENT

**Holnam – Clarksville, Missouri**

**Summary:** The text portion is brief and provides minimal information. Four wells have been installed on the property for regulatory purposes and to obtain geologic and hydrogeologic information. Wells upgradient or downgradient were not identified in the report. Samples have been collected from the property during five sampling events which have indicated stability of the concentrations.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 4 |
| Sampling dates or duration | 5 sample events (11/5/98, 4/27/99, 7/22/99, 10/28/99, 1/10/00) |
| Upgradient wells specified | Unknown |
| Downgradient wells specified | Unknown |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Limited |
| Contains conclusions | Not relevant to groundwater quality |
| References cited | No |

Table 2. Summary of reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | - | NL | NL | - |
| Aluminum | N | - | NL | NL | - |
| Ammonia-N | N | - | NL | NL | - |
| Antimony | Y | 0.005 | 0.006 | 0.014 | 0/0 |
| Arsenic | Y | 0.005** | 0.05 | 5.68E-5 | 0/1 |
| Barium | Y | 0.010 | 2 | NL | 0/NA |
| Beryllium | Y | 0.004 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | N | - | NL | NL | - |
| Boron | N | - | NL | NL | - |
| Cadmium | Y | 0.001 | 0.005 | NL | 0/NA |
| Calcium | N | - | NL | NL | - |
| Carbonate | N | - | NL | NL | - |
| Chloride | Y | 1.00 | NL | NL | NA/NA |
| Chromium (total) | Y | 0.005 | 0.1 | 40 | 0/0 |
| Cobalt | N | - | NL | NL | - |
| Copper | N | - | 1.3 | 1.0 | - |
| Fluoride | N | - | 4 | NL | - |
| Iron | N | - | NL | NL | - |
| Lead | Y | 0.003 | 0.015 | 0.015 | 1/1 |
| Lithium | N | - | NL | NL | - |



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**Holnam – Clarksville, Missouri (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Magnesium | N | - | NL | NL | - |
| Manganese | N | - | NL | NL | - |
| Mercury (inorganic) | Y | 0.00002 | 0.002 | 0.011 | 0/0 |
| Molybdenum | N | - | NL | NL | - |
| Nickel | Y | 0.01 | 0.1 | NL | 1/NA |
| Nitrate (as nitrogen) | N | - | 10 | NL | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - |
| Potassium | Y | 1.0 | NL | NL | NA/NA |
| Selenium | Y | 0.005 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.005 | 0.05 | 0.20 | 0/0 |
| Silicon | N | - | NL | NL | - |
| Sodium | Y | 1.00 | NL | NL | NA/NA |
| Strontium | N | - | NL | NL | - |
| Sulfate | Y | 1.0 | NL | NL | NA/NA |
| Sulfite | N | - | NL | NL | - |
| Sulfide | N | - | NL | NL | - |
| Titanium | N | - | NL | NL | - |
| Thallium | Y | 0.002 | 0.002 | NL | 0/NA |
| Vanadium | N | - | NL | 0.3 | - |
| Zinc | N | - | NL | 10 | - |
| **Field Parameters** | | | | | |
| pH | Y | NA | NL | NL | NA |
| Conductivity | Y | NA | NL | NL | NA |
| TSS | N | - | NL | NL | - |
| Dissolved solids | Y | NA | NL | NL | NA |
| Total Inorganic Carbon | N | - | NL | NL | - |
| Total Organic Carbon | N | - | NL | NL | - |
| COD | N | - | NL | NL | - |
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | | - | - | | - |
| **Other Substances** | | | | | |
| Gross Alpha (pCi/L) | | NL | NA | NL | NA |
| Gross Beta (pCi/L) | | NL | NA | NL | NA |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** detection limit is greater than regulatory value

**Specific Comments:** No background monitoring well is identified and there is no site-specific information contained in the report or the letter that is provided with the data summary report.



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**Holnam – Clarksville, Missouri (continued)**

The only conclusion made in the report is that the concentrations of the substances detected has remained constant over time, a conclusion that is not relevant to an assessment of impact to the area.

The data itself does not have a significant number of substances detected at concentrations greater than MCL or HBN standards, but without definitive information concerning the location of the wells and the depths screened, for example, a conclusion cannot be made that there is no impact. Additionally, without information concerning the background concentrations of substances, it cannot be determined whether there is an impact to the local groundwater at concentrations less than regulatory standards.

US EPA ARCHIVE DOCUMENT

**Holnam – Florence, Colorado**

**Summary:** The report consists of three short paragraphs that briefly cover permitting status, facility history, and a brief conclusion regarding groundwater quality in the vicinity of the site.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface | No |
| Total no. of wells sampled | 4 |
| Sampling Dates or duration | 3 wells/4 quarters; 1 additional well/5th quarter |
| Upgradient wells specified | Not specified |
| Downgradient wells specified | 1 well, not named |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | No |
| Contains conclusions | Limited |
| Reference cited | No |

Table 2. Summary of reported data

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | Y | - | NL | NL | NA |
| Aluminum | Y | 0.05 to 0.10 | NL | NL | NA |
| Ammonia-N | Y | | NL | NL | NA |
| Antimony | Y | 0.01 to 0.2 | 0.006 | 0.014 | 21**/7** |
| Arsenic | Y | 0.005 to 0.1 | 0.05 | 0.0000568 | 1**/21** |
| Barium | Y | 0.1 | 2 | NL | 0 |
| Beryllium | Y | 0.005 to 0.01 | 0.004 | 0.004 | 21**/21** |
| Bicarbonate | Y | - | NL | NL | NA |
| Cadmium | Y | 0.005 to 0.01 | 0.005 | NL | 2** |
| Calcium | Y | - | NL | NL | NA |
| Carbonate | Y | - | NL | NL | NA |
| Chloride | Y | - | NL | NL | NA |
| Chromium (total) | N | - | 0.1 | 40 | NA |
| Copper | N | - | 1.3 | 1.0 | NA |
| Fluoride | Y | - | 4 | NL | 0 |
| Iron | Y | 0.05 | NL | NL | NA |
| Lead | Y | 0.05 to 0.005 | 0.015 | 0.015 | 5**/5** |
| Magnesium | Y | - | NL | NL | NA |
| Manganese | Y | 0.01 | NL | NL | NA |
| Mercury (inorganic) | Y | 0.0002 to 0.005 | 0.002 | 0.011 | 2**/0 |
| Nickel | Y | 0.04 | 0.1 | NL | 0 |
| Nitrate (as nitrogen) | Y | - | 10 | NL | 1 |



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**Holnam – Florence, Colorado (continued)**

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Nitrite (as nitrogen) | N | - | 1 | NL | NA |
| Potassium | Y | - | NA | NL | NA |
| Selenium | Y | 0.005 to 0.1 | 0.05 | 0.175 | 6**/0 |
| Silver | Y | 0.01 | 0.05 | 0.20 | 0/0 |
| Sodium | Y | - | NL | NL | NA |
| Sulfate | Y | - | NL | NL | NA |
| Thallium | Y | 0.01 to 0.1 | 0.002 | NL | 21** |
| **Field Parameters** | | | | | |
| pH | Y | - | NL | - | NA |
| Conductivity | Y | - | NL | NL | NA |
| TSS | Y | - | NL | NL | NA |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The quality of this report is very poor due to: (1) absence of site map, (2) absence of locational references associated with monitoring wells, (3) absence of background concentrations, and (4) lack of attention to statistical importance, if any, of results. The conclusion that groundwater in the vicinity of this site is not influenced by placing CKD in the quarry is unfounded based on the report and accompanying data.

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**Holnam – Laporte, Colorado**

**Summary:** The report appears to be abbreviated, as it provides only a summary of analytical data collected over a five-quarter period. However, actual data are only shown for the first three quarters, with calculated differences shown for all five quarters in separate tables. The text summary is extremely brief and states only the number and vague locations of wells, period of sampling, and the conclusion that the "monitoring wells were voluntarily sampled for five quarters to show that there is no impact to groundwater."

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 3 |
| Sampling dates or duration | Five sampling events: five consecutive quarters beginning with 1st quarter 2000 |
| Upgradient wells specified | 1 |
| Downgradient wells specified | 2 |
| Site map included | No |
| Adequate physical description | None |
| Contains discussion section | No |
| Contains conclusions | No |
| References cited | No |

Table 2. Summary of reported data

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background | #>Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | N | | - | NL | - | - | - |
| Aluminum | N | | - | NL | - | - | - |
| Ammonia-N | N | | - | NL | - | - | - |
| Antimony | N | | 0.006 | 0.014 | - | - | - |
| Arsenic | Y | - | 0.05 | 0.0000568 | 1/9 | 0.01 – 0.027[d] | 3 > 0.027 |
| Barium | Y | | 2 | NL | 0 | ND – 0.014 | 6 > 0.014 |
| Beryllium | N | | 0.004 | 0.004 | 0/0 | - | - |
| Bicarbonate | N | | - | NL | - | - | - |
| Cadmium | N | | 0.005 | NL | - | - | - |
| Calcium | N | | - | NL | - | - | - |
| Carbonate | N | | - | NL | - | - | - |
| Chloride | Y | | - | NL | - | 25 - 28 | 6 > 28 |
| Chromium (total) | Y | | 0.1 | 40 | 0/0 | ND[d] | 0 |
| Copper | Y | | 1.3 | 1.0 | 0/0 | ND[d] | 0 |
| Fluoride | Y | | 4 | NL | 0 | 0.5 – 0.7 | 6 > 0.7 |
| Iron | Y | | - | NL | 0 | ND – 0.1 | 3 > 0.1 |
| Lead | Y | | 0.015 | 0.015 | 0/0 | ND – 0.013 | 0 |
| Magnesium | N | | - | NL | - | - | - |
| Manganese | Y | | - | NL | - | 0.04 – 0.053 | 5 > 0.053 |
| Mercury (inorganic) | N | | 0.002 | 0.011 | - | - | - |
| Nickel | N | | 0.1 | NL | - | - | - |



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**Holnam – Laporte, Colorado (continued)**

| | Sampled? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background | #>Background |
|---|---|---|---|---|---|---|---|
| Nitrate (as nitrogen) | Y | | 10 | NL | 0 | 3.28 – 3.77 | 0 |
| Nitrite (as nitrogen) | Y | | 1 | NL | 0 | 0.04 – 0.66 | 0 |
| Potassium | N | | - | NL | - | - | - |
| Selenium | Y | | 0.05 | 0.175 | 2/0 | 0.046 – 0.101 | 0 |
| Silver | N | | 0.05 | 0.20 | - | - | - |
| Sodium | N | | - | NL | - | - | - |
| Sulfate | Y | | - | NL | - | 4000 - 4410 | 0 |
| Thallium | Y | | 0.002 | NL | 0 | ND – 0.0007 | 0 |
| **Field Parameters** | | | | | | | |
| pH | Y | | - | | - | 7.5 – 7.6 | 6 > 7.6 |
| Conductivity | N | | - | NL | - | - | - |
| TSS | N | | - | NL | - | - | - |

NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
[d] Dissolved.

**Specific Comments:** Based on the report which is not dated, the following observations have been made:

***General Conclusion:*** *The groundwater monitoring wells were voluntarily sampled for five quarters to show that there is no impact to groundwater.*

However:

(1) Not all potentially important chemicals/compounds were sampled.
(2) Only data for first three quarters are explicitly shown.
(3) There are several chemicals that indicate higher values within the downgradient sampling areas. Groundwater downgradient of the CDK disposal area appears to be influenced, to some degree, by increases in arsenic, barium, chloride, fluoride, iron, and manganese.
(4) There is no information regarding the site description.



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**Holnam – Three Rivers, Montana**

**Summary:** The report essentially consists of poorly labeled data tables. The introductory paragraph states that there are 3 wells (1 upgradient and 2 downgradient). However, the accompanying analytical results show data for 7 monitoring wells with no indication as to their association (relative position). As such, Table 2 cannot be completed for background comparisons.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 3, but data sheets indicate 7 |
| Sampling dates or duration | Stated: sampled twice per year |
| Upgradient wells specified | 1, not indicated in analytical results |
| Downgradient wells specified | 2, not indicated in analytical results |
| Site map included | No |
| Adequate physical description | None |
| Contains discussion section | No |
| Contains conclusions | No |
| References cited | No |

Table 2. Summary of reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | | - | NL | - |
| Aluminum | N | | - | NL | - |
| Ammonia-N | N | | - | NL | - |
| Antimony | Y | 0.003 | 0.006 | 0.014 | 0/0 |
| Arsenic | Y | 0.003 | 0.05 | 0.0000568 | 0/13** |
| Barium | Y | - | 2 | NL | 0 |
| Beryllium | Y | 0.001 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | N | - | - | NL | - |
| Cadmium | Y | 0.0001 | 0.005 | NL | 0 |
| Calcium | N | - | - | NL | - |
| Carbonate | N | - | - | NL | - |
| Chloride | Y | - | - | NL | - |
| Chromium (total) | Y | 0.001 | 0.1 | 40 | 0/0 |
| Copper | Y | 0.001 | 1.3 | 1.0 | 0/0 |
| Fluoride | Y | - | 4 | NL | 0 |
| Iron | Y | 0.01 | - | NL | - |
| Lead | Y | 0.003 | 0.015 | 0.015 | 0/0 |
| Magnesium | N | - | - | NL | - |
| Manganese | N | - | - | NL | - |



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**Holnam – Three Rivers, Montana (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Mercury (inorganic) | Y | 0.0006 | 0.002 | 0.011 | 0/0 |
| Nickel | Y | 0.02 | 0.1 | NL | 0 |
| Nitrate (as nitrogen) | N | - | 10 | NL | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - |
| Potassium | N | - | - | NL | - |
| Selenium | Y | 0.001 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.003 | 0.05 | 0.20 | 0/0 |
| Sodium | N | - | - | NL | - |
| Sulfate | Y | - | - | NL | - |
| Thallium | Y | 0.003 | 0.002 | NL | 0 |
| Vanadium | Y | 0.1 | NL | 0.3 | 0 |
| Zinc | Y | 0.01 | NL | 10 | 0 |
| **Field Parameters** | | | | | |
| pH | Y | | - | | - |
| Conductivity | Y | | - | NL | - |
| TSS | N | | - | NL | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** Based on the report, which is not dated, the following observations have been made:

(1) Not all potentially important chemicals/compounds were sampled.
(2) A comparison of background to downgradient samples is not possible due to a lack of monitoring well identification.
(3) There is not sufficient information provided to draw conclusions about the impact of the facility.



US EPA ARCHIVE DOCUMENT

**Lafarge Midwest, Inc. – Alpena, Michigan**

**Summary:** The CKD landfill located at the Lafarge facility is both lined and caped. Groundwater monitoring is conducted according to the State approved Hydrogeologic Monitoring Plan which includes annual sample collected from the network of 12 monitoring wells at the facility which includes background monitoring. Continuous quarry dewatering is also conducted in the vicinity of the CKD landfill.

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 12 |
| Sampling Dates or duration | 2 (6/28/00, 6/7/01) |
| Upgradient wells specified | Not specified |
| Downgradient wells specified | Not specified |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Limited |
| Contains conclusions | Limited |
| References cited | No |

**Summary of Reported Data:**

| | Sampled ? | DL* | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l* | #>Background* |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | Y | 20 | NL | NL | NA/NA | ? | ? |
| Aluminum | N | - | NL | NL | - | - | - |
| Ammonia-N | Y | 0.5 | NL | NL | NA/NA | ? | ? |
| Antimony | Y | .0023/.0092 | 0.006 | 0.014 | */* | ? | ? |
| Arsenic | Y | .0044/.0.013 | 0.05 | 5.68E-5 | 0/* | ? | ? |
| Asbestos (>10 microns) | N | - | 7 MFL | NL | - | - | - |
| Barium | Y | ? | 2 | NL | 0/NA | ? | ? |
| Beryllium | Y | 0.001 | 0.004 | 0.004 | 0/0 | ? | ? |
| Bicarbonate | Y | 20 | NL | NL | NA/NA | ? | ? |
| Boron | N | - | NL | NL | - | - | - |
| Cadmium | Y | 0.0002 | 0.005 | NL | 0/NA | ? | ? |
| Calcium | Y | ? | NL | NL | NA/NA | ? | ? |
| Carbonate | Y | 20 | NL | NL | NA/NA | ? | ? |
| Chloride | Y | 10 | NL | NL | NA/NA | ? | ? |
| Chromium (total) | Y | 0.001 | 0.1 | 40 | 0/0 | ? | ? |
| Cobalt | Y | 0.015 | NL | NL | NA/NA | ? | ? |
| Copper* | Y | 0.0022/0.001 | 1.3 | 1.0 | 0/0 | ? | ? |
| Cyanide (as free cyanide) | Y | .02/.005 | 0.2 | NL | 0/NA | ? | ? |
| Fluoride | Y | ? | 4 | NL | 0/NA | ? | ? |
| Iron | Y | 0.020 | NL | NL | NA/NA | ? | ? |



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**Lafarge Midwest, Inc. – Alpena, Michigan (continued)**

| | Sampled ? | DL* | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l* | #>Background* |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Lead* | Y | 0.001/ 0.0022 | 0.015 | 0.015 | 3/3 | ? | ? |
| Lithium | N | - | NL | NL | - | - | - |
| Magnesium | Y | ? | NL | NL | NA/NA | ? | ? |
| Manganese | Y | 0.020 | NL | NL | NA/NA | ? | ? |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 | ? | ? |
| Molybdenum | N | - | NL | NL | - | - | - |
| Nickel | Y | 0.020 | 0.1 | NL | 0/NA | ? | ? |
| Nitrate (as nitrogen) | Y | 0.08 | 10 | NL | 0/NA | ? | ? |
| Nitrogen (Nitrate + Nitrite) | Y | .037/.02 | 11 | NL | 0/NA | ? | ? |
| Potassium | Y | ? | NL | NL | NA/NA | ? | ? |
| Selenium | Y | .042/.00 28 | 0.05 | 0.175 | 0/* | ? | ? |
| Silver | Y | 0.0005 | 0.05 | 0.20 | 0/0 | ? | ? |
| Silicon | N | - | NL | NL | - | - | - |
| Sodium | Y | ? | NL | NL | NA/NA | ? | ? |
| Strontium | N | - | NL | NL | - | - | - |
| Sulfate | Y | ? | NL | NL | NA/NA | ? | ? |
| Sulfite | N | - | NL | NL | - | - | - |
| Sulfide | N | - | NL | NL | - | - | - |
| Titanium | N | - | NL | NL | - | - | - |
| Thallium | Y | .0056/.0 18 | 0.002 | NL | */NA | ? | ? |
| Vanadium | Y | 0.010 | NL | 0.3 | NA/0 | ? | ? |
| Zinc | Y | 0.004 | NL | 10 | NA/0 | ? | ? |
| **Field Parameters** | | | | | | | |
| pH | Y | NA | NL | NL | NA/NA | ? | ? |
| Conductivity | Y | NA | NL | NL | NA/NA | ? | ? |
| TSS | N | - | NL | NL | - | - | - |
| Dissolved solids | Y | ? | NL | NL | NA/NA | ? | ? |
| Total Inorganic Carbon | N | - | NL | NL | - | - | - |
| Total Organic Carbon | Y | ? | NL | NL | NA/NA | ? | ? |
| COD | Y | 5 | NL | NL | NA/NA | ? | ? |
| **Organic Substances** (only detected substances listed) | | | | | | | |
| Total recoverable phenolics | Y | 0.005 | NL | NL | NA/NA | - | - |

** detection limit is greater than regulatory value

**Specific Comments:** The text of the report states that reference/background data is collected at the site; however, no reference well location is given. As a result no conclusions can be made concerning the quality of the groundwater on the property in relation to background conditions. There are a few instances of accidences of MCL or HBN regulatory criteria for lead. Based on



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**Lafarge Midwest, Inc. – Alpena, Michigan (continued)**

the number of samples collected from the property during the two sampling events there does not appear to be a significant impact from the property to the local groundwater but without significantly more information concerning the location and depth of the monitoring wells, local and regional geology, groundwater flow, background information and source area information no conclusions can be made concerning the impact.

US EPA ARCHIVE DOCUMENT

**Lafarge – Paulding, Ohio**

**Summary:** The text portion of this report is comparatively detailed. The site has 6 monitoring wells (4 of which are upgradient) which are sampled twice annually. The location of upgradient wells are not specified in the text, but their locations are inferred based on the information contained in the report. The wells are set at 115 feet bgs or approximately 10 feet below the base of the landfill.

The report states that, based on statistical analysis of the data, no impact to the groundwater has been observed.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | Some well information, minimal geologic information |
| Total no. of wells sampled | 6 |
| Sampling dates or duration | 14 sample events (from 9/95 thru 6/01); 2 sample events for chemical analysis (dates unknown) |
| Upgradient wells specified | Yes (inferred) |
| Downgradient wells specified | Yes (inferred) |
| Site map included | No |
| Adequate physical description | Yes, of the source areas; otherwise limited |
| Contains discussion section | Limited |
| Contains conclusions | Statement of statistical analysis |
| References cited | No |

Table 2. Summary reported data

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | # > Background |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | | | |
| Alkalinity | Y | NL | NL | NL | 0/0 | 81-230 | 0 |
| Aluminum | N | - | NL | NL | - | - | - |
| Ammonia-N | N | - | NL | NL | - | - | - |
| Antimony | N | - | 0.006 | 0.014 | - | - | - |
| Arsenic | Y | 0.005 | 0.05 | 5.68E-5 | 0/2** | <0.005 | 1 |
| Barium | Y | 0.010 | 2 | NL | 0/0 | 0.008 – 0.319 | 0 |
| Beryllium | N | - | 0.004 | 0.004 | - | - | - |
| Bicarbonate | N | - | NL | NL | - | - | - |
| Boron | N | - | NL | NL | - | - | - |
| Cadmium | Y | 0.0005 | 0.005 | NL | 0/0 | <0.0005 | 0 |
| Calcium | Y | NL | NL | NL | 0/0 | 41 – 210 | 3 |
| Carbonate | N | - | NL | NL | - | - | - |
| Chloride | Y | NL | NL | NL | 0/0 | 5 – 27 | 0 |
| Chromium (total) | Y | 0.010 | 0.1 | 40 | 0/0 | <0.01 | 0 |
| Cobalt | N | - | NL | NL | - | - | - |
| Copper | N | - | 1.3 | 1.0 | - | - | - |
| Fluoride | N | - | 4 | NL | - | - | - |
| Iron | Y | 0.01 | NL | NL | 0/0 | <0.05 | 6 |



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**Lafarge – Paulding, Ohio (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN | Background mg/l | # > Background |
|---|---|---|---|---|---|---|---|
| Lead | Y | 0.005 | 0.015 | 0.015 | 0/0 | <0.005 | 0 |
| Lithium | N | - | NL | NL | - | - | - |
| Magnesium | Y | NL | NL | NL | 0/0 | 34 – 130 | 2 |
| Manganese | Y | 0.050 | NL | NL | 0/0 | <0.05 – 0.03 | 4 |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 | <0.0002 | 0 |
| Molybdenum | N | - | NL | NL | - | - | - |
| Nickel | N | - | 0.1 | NL | - | - | - |
| Nitrate (as nitrogen) | N | - | 10 | NL | - | - | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - | - | - |
| Potassium | N | - | NL | NL | - | - | - |
| Selenium | Y | 0.005 | 0.05 | 0.175 | 0/0 | <0.005 | 0 |
| Silver | Y | 0.010 | 0.05 | 0.20 | 0/0 | <0.01 | 0 |
| Silicon | N | - | NL | NL | - | - | - |
| Sodium | Y | NL | NL | NL | 0/0 | 15 – 69 | 2 |
| Strontium | N | - | NL | NL | - | - | - |
| Sulfate | Y | NL | NL | NL | 0/0 | 123 – 680 | 3 |
| Sulfite | N | - | NL | NL | - | - | - |
| Sulfide | N | - | NL | NL | - | - | - |
| Titanium | N | - | NL | NL | - | - | - |
| Thallium | N | - | 0.002 | NL | - | - | - |
| Vanadium | N | - | NL | 0.3 | - | - | - |
| Zinc | N | - | NL | 10 | - | - | - |
| **Field Parameters** | | | | | | | |
| pH | N | - | NL | NL | NA | - | - |
| Conductivity | N | - | NL | NL | NA | - | - |
| TSS | N | - | NL | NL | - | - | - |
| Dissolved solids | Y | NL | NL | NL | NA | 210-1,100 | 3 |
| Total Inorganic Carbon | N | - | NL | NL | - | - | - |
| Total Organic Carbon | Y | NL | NL | NL | NA | 1.9 – 11 | 0 |
| COD | Y | NL | NL | NL | - | 19 - 63 | 0 |
| **Organic Substances** (only detected substances listed) | | | | | | | |
| None sampled | | - | - | | - | - | - |

NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value

**Specific Comments:** The report provides a reasonable amount of detail concerning the source areas on the property. There is some information concerning the depth of the monitoring wells, but no information about the location of the wells in relation to the sources. The text also does not state which of the 6 wells are located upgradient of the sources--only that 4 of the 6 are upgradient. The information concerning reference wells can be inferred from the sample summary tables with the exception of MW-1. Additionally, a greater number of wells are located upgradient than downgradient which should be explained. The number of upgradient wells seems excessive, and it appears there should have been more wells installed downgradient of the potential contaminant sources. Based on the analytical information, concentrations of contaminants are below MCL values; however, a number of substances are detected at greater



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**Lafarge – Paulding, Ohio (continued)**

concentrations than reference values indicating that there is an impact to the local groundwater table as a result of the CKD piles. Samples for metals analysis were all field filtered. Unfiltered samples should have been collected as well for comparison to regulatory criteria. Not enough information is available to conclusively determine the impact from the CKD piles. The statistical analysis conducted for contaminants was performed for only a few parameters for which there is extensive data. A second method of analysis should be used to make a determination of the data for which there is only two sampling events.

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**Lehigh Portland Cement Company – Mitchell, Indiana**

**Summary:** Lehigh is located in an area of karst geology; therefore, sampling of the local surface water bodies is a better indicator of groundwater contamination than groundwater monitoring wells and sample collection. Based on a sampling plan for the property, samples would be collected during multiple sampling events from periods of both high and low flow and from areas, both up and downgradient of the property. Due to the amount of time necessary for the transport of the potential contaminant substances from the facility to the sampling locations, the initial sampling event as summarized in the facility report would need to be used to establish base line conditions. As part of the summary report, samples were collected from the low flow period. High flow samples have not yet been collected and would be collected when sufficient conditions exist. Therefore, the data summarized in the data tables cannot be used for determining the impact of CKD to the groundwater table.

It should be emphasized that the location of the landfill in an area of karst geology makes the impact of the landfill very difficult to assess. Also, the data collected and summarized in the report represents base line conditions only and are compared to groundwater regulatory criteria for consistency with other reports.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | Indicates only karst conditions exist – more information is needed |
| Total no. of wells sampled | 0 – Surface water collection points only |
| Sampling dates or duration | 3 sample events during low or standard conditions – 30+ samples collected during each event (11/9/00, 1/11/01, 1/30/01) |
| Upgradient wells specified | NA – upgradient sample location not specified |
| Downgradient wells specified | NA – sample location not specified |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | Limited |
| Contains conclusions | Only states that no conclusion could be made at this time |
| References cited | No |

Table 2. Summary reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | Y | NL | NL | NL | NA/NA |
| Aluminum | N | - | NL | NL | - |
| Ammonia-N | N | - | NL | NL | - |
| Antimony | N | - | 0.006 | 0.014 | - |
| Arsenic | Y | 0.005 | 0.05 | 5.68E-5 | 40/** |



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**Lehigh Portland Cement Company – Mitchell, Indiana (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Barium | Y | 0.020 | 2 | NL | 0/NA |
| Beryllium | N | - | 0.004 | 0.004 | - |
| Bicarbonate | Y | NL | NL | NL | NA/NA |
| Boron | N | - | NL | NL | - |
| Cadmium | Y | 0.005 | 0.005 | NL | 0/NA |
| Calcium | Y | 1.0 | NL | NL | NA/NA |
| Carbonate | Y | 1 | NL | NL | NA/NA |
| Chloride | Y | NL | NL | NL | NA/NA |
| Chromium (total) | Y | 0.01 | 0.1 | 40 | 0/0 |
| Cobalt | N | - | NL | NL | - |
| Copper | Y | 0.01 | 1.3 | 1.0 | 0/0 |
| Fluoride | Y | NL | 4 | NL | 0/NA |
| Iron | Y | 0.10 | NL | NL | NA/NA |
| Lead | Y | 0.005 | 0.015 | 0.015 | 0/0 |
| Lithium | N | - | NL | NL | - |
| Magnesium | Y | 1.0 | NL | NL | NA/NA |
| Manganese | Y | 0.015 | NL | NL | NA/NA |
| Mercury (inorganic) | Y | 0.0005 | 0.002 | 0.011 | 0/0 |
| Molybdenum | N | - | NL | NL | - |
| Nickel | N | - | 0.1 | NL | - |
| Nitrate (as nitrogen) | N | - | 10 | NL | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - |
| Potassium | Y | - | NL | NL | NA/NA |
| Selenium | Y | 0.005 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.005 | 0.05 | 0.20 | 0/0 |
| Silicon | N | - | NL | NL | - |
| Sodium | Y | NL | NL | NL | NA/NA |
| Strontium | N | - | NL | NL | - |
| Sulfate | Y | NL | NL | NL | NA/NA |
| Sulfite | N | - | NL | NL | - |
| Sulfide | N | - | NL | NL | - |
| Titanium | N | - | NL | NL | - |
| Thallium | N | - | 0.002 | NL | - |
| Vanadium | N | - | NL | 0.3 | - |
| Zinc | Y | 0.02 | NL | 10 | NA/0 |
| **Field Parameters** | | | | | |
| pH | N | - | NL | NL | - |
| Conductivity | N | - | NL | NL | - |
| TSS | Y | NL | NL | NL | NA/NA |



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**Lehigh Portland Cement Company – Mitchell, Indiana (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Dissolved solids | Y | NL | NL | NL | NA/NA |
| Total Inorganic Carbon | N | - | NL | NL | - |
| Total Organic Carbon | N | - | NL | NL | - |
| COD | N | - | NL | NL | - |
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | - | - | - | - | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value

**Specific Comments:** Areas of karst geology and the impact from areas of potential contamination are very difficult to assess. This report does not provide enough information concerning the conditions that exist at the site to determine whether the sampling approach is appropriate. For instance, the distance from the site to the sample locations for water bodies should be included and the water bodies receiving groundwater from the site and background location have not been specified. Additionally, the report states that conclusions concerning an impact to the groundwater cannot be made due to the length of time needed for the transport to occur. As a result, there can be no conclusions made at this time concerning the impact or lack of impact to the groundwater in the area. More information and sampling events are necessary. Also, if contaminants are detected they may not necessarily be attributable to the site – groundwater in the vicinity of the site may travel and be received by water bodies other than the few that are sampled.



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**Lone Star Industries, Inc. – Cape Girardeau, Missouri**

**Summary:** This summary report makes two specific claims: (1) the source of elevated metals groundwater concentration does not appear to be the CKD Management Area because background concentrations are elevated, and therefore, not significantly different; and (2) previous studies indicated that metals are not leaching through the CKD to the groundwater. However, the report does not contain a site map, subsurface description, methods of groundwater collection and analyses, or any indication as to the relative locations of monitoring wells to one another with respect to groundwater flow direction. In other words, there is no way to substantiate or refute the claims stated above. The monitoring well data indicate concentrations of arsenic, beryllium, cadmium, and selenium that exceed MCLs. Silicon also is present in relatively high concentrations in some wells.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 11 |
| Sampling dates or duration | Annual sampling in most cases |
| Upgradient wells specified | Not identifiable |
| Downgradient wells specified | Not identifiable |
| Site map included | No |
| Adequate physical description | None |
| Contains discussion section | No |
| Contains conclusions | No |
| References cited | No |

Table 2. Summary of reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | | - | NL | - |
| Aluminum | N | | - | NL | - |
| Ammonia-N | N | | - | NL | - |
| Antimony | Y | 0.1 | 0.006 | 0.014 | 6**/6** |
| Arsenic | Y | 0.001 | 0.05 | 0.000056 8 | 3/44** |
| Barium | Y | 0.02 | 2 | NL | 0 |
| Beryllium | Y | - | 0.004 | 0.004 | 3/3 |
| Bicarbonate | N | - | - | NL | - |
| Cadmium | Y | 0.001 | 0.005 | NL | 7 |
| Calcium | N | - | - | NL | - |
| Carbonate | N | - | NL | NL | - |
| Chloride | N | - | NL | NL | - |
| Chromium (total) | Y | 0.01 | 0.1 | 40 | 0/0 |
| Copper | Y | 0.01 | 1.3 | 1.0 | 0/0 |



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**Lone Star Industries, Inc. – Cape Girardeau, Missouri (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Fluoride | N | - | 4 | NL | 0 |
| Iron | Y | - | NL | NL | - |
| Lead | Y | 0.1 to 0.001 | NL | 0.015 | 13** |
| Magnesium | Y | - | NL | NL | - |
| Manganese | Y | - | NL | NL | - |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Nickel | Y | 0.04 | 0.1 | NL | 0 |
| Nitrate (as nitrogen) | N | - | 10 | NL | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - |
| Potassium | N | - | NL | NL | - |
| Selenium | Y | 0.001 | 0.06 | 0.175 | 1/0 |
| Silver | Y | 0.001 to 0.01 | 0.05 | 0.20 | 0/0 |
| Sodium | N | - | NL | NL | - |
| Sulfate | Y | - | NL | NL | - |
| Thallium | Y | 0.1 | 0.002 | NL | 0 |
| Vanadium | Y | 0.05 | NL | 0.3 | 0 |
| Zinc | Y | - | NL | 10 | 0 |
| **Field Parameters** | | | | | |
| pH | Y | - | NL | NL | - |
| Conductivity | Y | - | NL | NL | - |
| TSS | N | - | NL | NL | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** Evaluating the likelihood that the metals present in the downgradient groundwater are insignificantly different than background is not possible due to the lack of necessary information (site maps, geologic descriptions, history, etc.). In addition, references to earlier work, or inclusion of past reports, is necessary to review potential historical impacts to the site.



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## Lone Star Industries, Inc. – Greencastle, Indiana

**Summary:** The summary report claims that groundwater within an on-site quarry area is minimally influenced by historical CKD management practices and offers some explanation as to why elevated water quality constituents have been discovered there. However, the report does not contain a site map, subsurface description, methods of groundwater collection and analyses, or any indication about the relative locations of monitoring wells to one another with respect to groundwater flow direction. In other words, there is no way to substantiate or refute the claims stated above. The monitoring well data indicate concentrations of arsenic, antimony, selenium, and thallium that exceed MCLs. Sulfate also is present in relatively high concentrations in several wells.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 8 |
| Sampling dates or duration | Generally 2 sampling periods: 4/98, 6/98 |
| Upgradient wells specified | Not identifiable |
| Downgradient wells specified | Not identifiable |
| Site map included | No |
| Adequate physical description | None |
| Contains discussion section | No |
| Contains conclusions | No |
| References cited | No |

Table 2. Summary of reported data

| | Sampled? | DL[1] | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | - | - | NL | - |
| Aluminum | N | - | - | NL | - |
| Ammonia-N | N | - | - | NL | - |
| Antimony | Y | 0.005 | 0.006 | 0.014 | 1/1 |
| Arsenic | Y | 0.002 | 0.05 | 0.0000568 | 1/13** |
| Barium | Y | 0.01 | 2 | NL | 0 |
| Beryllium | Y | 0.001 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | N | - | - | NL | - |
| Cadmium | Y | 0.001 | 0.005 | NL | 0 |
| Calcium | N | - | - | NL | - |
| Carbonate | N | - | - | NL | - |
| Chloride | N | - | - | NL | - |
| Chromium (total) | Y | 0.001 | 0.1 | 40 | 0/0 |
| Copper | Y | 0.005 | 1.3 | 1.0 | 0/0 |
| Fluoride | N | - | 4 | NL | 0 |
| Iron | Y | - | - | NL | - |
| Lead | Y | 0.002 | NL | 0.015 | 0 |
| Magnesium | N | - | NL | NL | - |
| Manganese | Y | 0.005 | NL | NL | - |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Nickel | Y | 0.01 | 0.1 | NL | 0 |
| Nitrate (as nitrogen) | N | - | 10 | NL | - |
| Nitrite (as nitrogen) | N | - | 1 | NL | - |



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**Lone Star Industries, Inc. – Greencastle, Indiana (continued)**

| | Sampled? | DL[1] | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Potassium | N | - | - | NL | - |
| Selenium | Y | 0.002 | 0.06 | 0.175 | 1/0 |
| Silver | Y | 0.001 | 0.05 | 0.20 | 0/0 |
| Sodium | N | - | - | NL | - |
| Sulfate | Y | 1.0 | 500 | NL | 8 |
| Thallium | Y | 0.002 | 0.002 | NL | 1 |
| Zinc | Y | 0.005 | NL | 10 | 0 |
| **Field Parameters** | | | | | |
| pH | Y | - | - | - | - |
| Conductivity | Y | - | - | - | - |
| TSS | N | - | - | - | - |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The facilities report does not contain enough information to evaluate the influence of CKD practices on groundwater. The claims presented in the report summary (e.g., related to the influence of CKD on perched water table) cannot be evaluated given the quantity of information provided. In order to provide a fair evaluation, a more substantial report is required.

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**Lone Star Industries, Inc. – Pryor, Oklahoma**

**Summary:** This report consists of one paragraph that briefly covers permitting status, history, and brief conclusion regarding groundwater quality in the vicinity of the site.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | No |
| Total no. of wells sampled | 7 |
| Sampling dates or duration | 1999 |
| Upgradient wells specified | Not specified |
| Downgradient wells specified | Not specified |
| Site map included | No |
| Adequate physical description | No |
| Contains discussion section | No |
| Contains conclusions | Limited |
| Reference cited | No |

Table 2. Summary reported data

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | | NA | NL | NA |
| Aluminum | N | | NA | NL | NA |
| Ammonia-N | N | | NA | NL | NA |
| Antimony | Y | 0.005 | 0.006 | 0.014 | 1/0 |
| Arsenic | Y | 0.005 | 0.05 | 0.0000568 | 4/5** |
| Barium | Y | - | 2 | NL | 0 |
| Beryllium | Y | 0.001 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | N | | NA | NL | NA |
| Cadmium | Y | 0.001 | 0.005 | NL | 0 |
| Calcium | N | | NA | NL | NA |
| Carbonate | N | | NA | NL | NA |
| Chloride | Y | - | NA | NL | NA |
| Chromium (total) | Y | - | 0.1 | 40 | 0/0 |
| Copper | Y | 0.005 | 1.3 | 1.0 | 0/0 |
| Fluoride | N | | 4 | NL | 0 |
| Iron | Y | 0.03 | NA | NL | NA |
| Lead | Y | 0.002 | 0.015 | 0.015 | 1/1 |
| Magnesium | N | | NA | NL | NA |
| Manganese | Y | - | NA | NL | NA |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Nickel | Y | 0.01 | - | NL | NA |



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**Lone Star Industries, Inc. – Pryor, Oklahoma (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Nitrate (as nitrogen) | N | | 10 | NL | 1 |
| Nitrite (as nitrogen) | N | | 1 | NL | NA |
| Potassium | N | | NA | NL | NA |
| Selenium | Y | 0.002 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.001 | 0.05 | 0.20 | 0 |
| Sodium | N | | NA | NL | NA |
| Sulfate | Y | - | 500 | NL | 3 |
| Thallium | Y | 0.004 | 0.002 | NL | 7** |
| **Field Parameters** | | | | | |
| pH | N | | NA | NL | NA |
| Conductivity | N | | NA | NL | NA |
| TSS | Y | 4.0 | NA | NL | NA |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The quality of this report is very poor due to: (1) absence of a site map, (2) absence of geographical references associated with monitoring wells, (3) absence of background concentrations, and (4) lack of attention to statistical importance, if any, of results. The claim that the CKD-influenced groundwater at this site is limited to a perched aquifer cannot be confirmed based on the information provided.



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**National Cement Company of California – Lebec, California**

**Summary:** The CKD landfill has been closed and a documented release has occurred. Long-term monitoring is being conducted to monitor for any new releases from the source area and to monitor the existing conditions.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | Yes |
| Total no. of wells sampled | 12 |
| Sampling dates or duration | 40 (3/91 thru 8/00) |
| Upgradient wells specified | Yes |
| Downgradient wells specified | Yes |
| Site map included | Yes |
| Adequate physical description | Yes |
| Contains discussion section | Yes |
| Contains conclusions | Yes |
| References cited | Yes |

Table 2. Summary of reported data

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | Y | - | NL | NL | NA |
| Aluminum | N | - | NL | NL | - |
| Ammonia-N | N | - | NL | NL | - |
| Antimony | N | - | 0.006 | 0.014 | - |
| Arsenic | N | - | 0.05 | 5.68E-5 | - |
| Barium | N | - | 2 | NL | - |
| Beryllium | N | - | 0.004 | 0.004 | - |
| Bicarbonate | N | - | NL | NL | - |
| Boron | N | - | NL | NL | - |
| Cadmium | N | - | 0.005 | NL | - |
| Calcium | Y | - | NL | NL | NA |
| Carbonate | N | - | NL | NL | - |
| Chloride | Y | - | NL | NL | NA |
| Chromium (total) | N | - | 0.1 | 40 | - |
| Cobalt | N | - | NL | NL | - |
| Copper | N | - | 1.3 | 1.0 | - |
| Fluoride | N | - | 4 | NL | - |
| Iron | N | - | NL | NL | - |
| Lead | Y | 0.002 | 0.015 | 0.015 | 17/17 |
| Lithium | N | - | NL | NL | - |
| Magnesium | Y | - | NL | NL | NA |
| Manganese | N | - | NL | NL | - |
| Mercury (inorganic) | N | - | 0.002 | 0.011 | - |
| Molybdenum | N | - | NL | NL | - |



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**National Cement Company of California – Lebec, California (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Nickel | N | - | 0.1 | NL | - |
| Nitrate (as nitrogen) | Y | - | 10 | NL | NA |
| Nitrogen (Nitrate + Nitrite) | N | - | 11 | NL | |
| Potassium | Y | 5.00 | NL | NL | NA |
| Selenium | N | - | 0.05 | 0.175 | - |
| Silver | N | - | 0.05 | 0.20 | - |
| Silicon | N | - | NL | NL | - |
| Sodium | Y | - | NL | NL | NA |
| Strontium | N | - | NL | NL | - |
| Sulfate | Y | - | NL | NL | NA |
| Sulfite | N | - | NL | NL | - |
| Sulfide | N | - | NL | NL | - |
| Titanium | N | - | NL | NL | - |
| Thallium | N | - | 0.002 | NL | - |
| Vanadium | N | - | NL | 0.3 | - |
| Zinc | N | - | NL | 10 | - |
| **Field Parameters** | | | | | |
| pH | Y | - | NL | NL | NA |
| Conductivity | Y | - | NL | NL | NA |
| TSS | N | - | NL | NL | - |
| Dissolved solids | Y | - | NL | NL | NA |
| Total Inorganic Carbon | N | - | NL | NL | - |
| Total Organic Carbon | N | - | NL | NL | - |
| COD | N | - | NL | NL | - |
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | | | | | |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The report is thorough and relatively complete. It appears that the rationale used for the analytical selection may be sufficient. The level of detail in the report and the amount of sampling that has been conducted is sufficient to support the conclusions that have been made concerning the impact to the groundwater table. However, the facility should be asked to provide any additional information it has to further substantiate that the parameters being monitored are adequate.



US EPA ARCHIVE DOCUMENT

**North Texas Cement Company – Midlothian, Texas**

**Summary:** The summary for the site is fairly brief but included with the summary report is a copy of the RCRA Facility Investigation which is a detailed investigation containing maps, figures, and a complete site summary. The RCRA report states that there is no impact to the local groundwater table as a result of the CKD landfill on the property.

Table 1. Overall report quality

| | |
|---|---|
| Subsurface description | Yes |
| Total no. of wells sampled | 6 |
| Sampling dates or duration | 1 (7/1997) |
| Upgradient wells specified | Yes |
| Downgradient wells specified | Yes |
| Site map included | Yes |
| Adequate physical description | Yes |
| Contains discussion section | Yes |
| Contains conclusions | Yes |
| References cited | No |

Table 2. Summary of reported data

| | **Sampled ?** | **DL** | **MCL** | **HBN (landfill)** | **# Exceed MCL/HBN** |
|---|---|---|---|---|---|
| **Inorganic Chemicals** | | | | | |
| Alkalinity | N | - | NL | NL | |
| Aluminum | N | - | NL | NL | |
| Ammonia-N | N | - | NL | NL | |
| Antimony | Y | 0.006 | 0.006 | 0.014 | 0/0 |
| Arsenic | Y | 0.005 | 0.05 | 5.68E-5 | 0/* |
| Barium | Y | 0.01 | 2 | NL | |
| Beryllium | Y | 0.003 | 0.004 | 0.004 | 0/0 |
| Bicarbonate | N | - | NL | NL | |
| Boron | N | - | NL | NL | |
| Cadmium | Y | 0.005 | 0.005 | NL | 0/0 |
| Calcium | N | - | NL | NL | |
| Carbonate | N | - | NL | NL | |
| Chloride | N | - | NL | NL | |
| Chromium (total) | Y | 0.005 | 0.1 | 40 | 0/0 |
| Cobalt | N | - | NL | NL | |
| Copper | N | - | 1.3 | 1.0 | |
| Fluoride | N | - | 4 | NL | |



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**North Texas Cement Company – Midlothian, Texas (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| Iron | N | - | NL | NL | |
| Lead | Y | 0.003 | 0.015 | 0.015 | 0/0 |
| Lithium | N | - | NL | NL | |
| Magnesium | N | - | NL | NL | |
| Manganese | N | - | NL | NL | |
| Mercury (inorganic) | Y | 0.0002 | 0.002 | 0.011 | 0/0 |
| Molybdenum | N | - | NL | NL | |
| Nickel | N | - | 0.1 | NL | |
| Nitrate (as nitrogen) | N | - | 10 | NL | |
| Nitrogen (Nitrate + Nitrite) | N | - | 11 | NL | |
| Potassium | N | - | NL | NL | |
| Selenium | Y | 0.005 | 0.05 | 0.175 | 0/0 |
| Silver | Y | 0.005 | 0.05 | 0.20 | 0/0 |
| Silicon | N | - | NL | NL | |
| Sodium | N | - | NL | NL | |
| Strontium | N | - | NL | NL | |
| Sulfate | N | - | NL | NL | |
| Sulfite | N | - | NL | NL | |
| Sulfide | N | - | NL | NL | |
| Titanium | N | - | NL | NL | |
| Thallium | Y | 0.01 | 0.002 | NL | 0/0 |
| Vanadium | N | - | NL | 0.3 | |
| Zinc | Y | 0.02 | NL | 10 | 0/0 |
| **Field Parameters** | | | | | |
| pH | | | NL | NL | |
| Conductivity | N | | NL | NL | |
| TSS | N | | NL | NL | |
| Dissolved solids | N | | NL | NL | |
| Total Inorganic Carbon | N | | NL | NL | |
| Total Organic Carbon | N | | NL | NL | |
| COD | N | | NL | NL | |



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**North Texas Cement Company – Midlothian, Texas (continued)**

| | Sampled ? | DL | MCL | HBN (landfill) | # Exceed MCL/HBN |
|---|---|---|---|---|---|
| **Organic Substances** (only detected substances listed) | | | | | |
| None sampled | | | | | |

Note: Background well locations were not identified.
NL = Not listed as having a regulatory standard (MCL and/or HBN).
NA = Not applicable.
** Detection limit is greater than regulatory value.

**Specific Comments:** The report is thorough and relatively complete, but there has been only one sampling event and only a few metals were analyzed. The level of detail in the report would be sufficient to support the conclusions if there were a greater number of metals analyzed and the conduct of multiple sampling events. Based on the information contained in the report, it does not appear that a release to the groundwater table has occurred although a greater number of samples should be collected to support that conclusion.

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