UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

ENVIRONMENTAL INDICATOR MEMORANDUM

DATE: September 30, 2009

SUBJ: First Evaluation of **Holcim (US) Inc.** Status under the RCRAInfo Corrective Action Environmental Indicator Event Codes (CA725 and CA750)
EPA I.D. Number: MSD 077 655 876 NCAPS Ranking: Medium

FROM: Leo J. Romanowski Jr., Sr. Corrective Action Specialist LJR 9/30/09
Corrective Action Section, RUST Branch
RCRA Division, USEPA Region 4

THRU: Karen Knight, CHMM, Chief OCT 2 4 2009
Corrective Action Section, RUST Branch
RCRA Division, USEPA Region 4

TO: Jeff T. Pallas, Chief *Concur:* 10/26/09
RUST Branch RCRA Info date
RCRA Division, USEPA Region 4 LJR

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of the **Holcim (US) Inc. cement manufacturing plant located in Artesia, Mississippi** and its facility status in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRAInfo, formerly RCRIS):

1. Current Human Exposures Under Control (CA725), and

2. Migration of Contaminated Groundwater Under Control (CA750).

Concurrence by the EPA Restoration and Underground Storage Tank (RUST) Branch Chief is required prior to entering these event codes into RCRAInfo. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing this memorandum.

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the <u>first evaluation</u> performed for the **Holcim (US) Inc., (Artesia, Mississippi)** facility. The evaluation, and associated interpretation and conclusions on contamination, exposures and contaminant migration at the facility, are based on information obtained from the following documents:

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1. Revised RCRA Part B Permit Application (1997 and May 15, 2002)

2. Special Industrial Waste Permit Application for CKD Management Unit, Artesia, MS (Malcolm Pirnie Inc. Consultants, July 1999)

3. RFA Reports (1993 and 2003 Addendum)

4. HSWA portion of RCRA Part B Permit (2004)

5. EPA Region 4 toxicologist guidance memo titled "Assessing the Risk of Arsenic in Soil: Considering Bioavailability and Subchronic Toxicity and the Protective Risk Range (dated February 5, 2004)"

6. RFI and CS Report (February 2008)

The EI status codes are:

First Evaluation (9/30/2009): CA725: YE CA750: YE

III. FACILITY SUMMARY

The Holcim facility (the site) is located 3 miles south of Artesia, Mississippi on the east side of Highway 45 Alternate or 22 miles southwest of Columbus, MS. The Holcim property includes approximately 2,640 acres. The majority of the property is woodland or farmland which is managed under the federal Conservation Reserve Program. The facility's active footprint is approximately 300 acres. Operational process and stockpile areas (i.e., limestone, gypsum and coal) occupy about 25 acres and the remaining 275 acres consists of roads and rail lines, cement kiln dust (CKD) and other waste disposal areas, and several large limestone (feedstock) quarries. The surrounding area consists of open agricultural land and undeveloped wooded areas along with a few scattered residential and commercial properties. Census information indicates a total population of about 1100 within a 4-mile radius of the site. The nearest residence is located over ½-mile away.

Since 1974, the Holcim facility has produced Portland cement by the wet process in a long rotary kiln (14' dia. by 500' long), which is SWMU 1. Impure limestone or chalk is quarried from an on-site open pit mine, crushed and stockpiled near the rotary kiln, then mixed with sand and other imported raw materials such as alumina and iron ore. The blended raw materials are mixed with water in a grinding mill to form a slurry which is placed in the heated (approx. 2,700 ºF) rotary kiln to produce the "clinkers". The clinker is cooled, stored and later ground together with gypsum to produce finished Portland cement. The cement product is stored in silos before being bulk loaded (or bagged) onto trucks or railcars for transport to market.

The rotary kiln is predominately fired by hazardous waste-derived fuel (HWDF), coal and petroleum coke. Prior to 1990, coal was the primary fuel. The hazardous-waste-derived-fuel accepted for beneficial energy recovery consists of waste solvents, oils, and out-of-specification intermediates and products from various industries including paint, ink, plastics, refining, petrochemical, pharmaceutical, and coating industries. Holcim created a wholly-owned subsidiary, Energis LLC, as the operator of the controlled access HWDF facility (tank farm, tanker/railcar off-loading area and laboratories). The

HWDF facility is mostly under roof with secondary containment; it is separately fenced and has a second gated entrance within the Holcim property.

On September 22, 2004, EPA issued the HSWA portion of the RCRA permit which included the BIF requirements for the wet process Portland cement kiln system and ancillary hazardous waste feed equipment, as well as, the corrective action requirements for SWMUs/AOCs (i.e., 40 CFR 266 Subpart H, 264 Subpart CC and 264.101). However, the hazardous waste storage/blending tanks continue to operate under interim status. An injunction issued in the early 1990's prohibits the State from processing any application for a "commercial hazardous waste facility". Since the injunction remains in effect, Mississippi Department of Environmental Quality (MDEQ) has not issued a RCRA permit for these interim status fuel storage units. The facility also operates under a Title V Air Permit and a NPDES Permit as issued by MDEQ.

The RFA Addendum (June 2003) identified a total of 43 SWMUs and two AOCs. Cement kiln dust (CKD), known to contain hazardous constituents, is routinely and systematically placed on or released to the native soils at various locations throughout the Holcim facility. The HSWA permit required confirmatory sampling for four units (recycling pond, stormwater ditches, stormwater lagoon and a quarry) and a RFI was suggested for 14 (mostly CKD process and burial areas) of the 43 SWMUs. The three general types of waste requiring CS/RFI assessment are CKD, refractory brick and clinker cooler wet scrubber wastewater and sludge. Based on the release history, only metals are the chemicals of concern (COCs).

There are a total of seven wells (domestic, industrial, stock water) within a one–mile radius of the facility. This includes two on-site Holcim wells. One 6" dia. well at 570' is unused and the other 16" dia. industrial well completed to 1137' is used for process and plant drinking water. Well depths of the remaining five wells ranged from 770' - 1141' deep.

The subsurface is characterized by terrace deposits, a thin soil zone and weathered chalk which overlie fractured sedimentary bedrock. Soils at the site are chiefly clay loam or clay. The soil in the quarry areas has been removed to expose the underlying bedrock (feedstock limestone). Currently, the active quarry has been excavated to an average depth of 60 feet below original ground surface. This active quarry is basically dry (unless raining). One inactive limestone quarry is also water-filled and serves as the Water Recycling Pond (SWMU 14) which is used for irrigation of a nearby sod farm, fire-water system and dust suppression. The subsurface geology underlying the thin soil is comprised of 4-5' of weathered chalk/clay, then approx 450-550' of consolidated sedimentary Selma Chalk which is the principal unit mined for the cement production.

IV. CONCLUSION FOR CA725: CA725 YES

A CA 725, Yes, for "Current Human Exposures Under Control" has been verified and a sufficient body of evidence exists in support of this decision. Based on the analysis documented in Attachment 1, the metals concentrations (except arsenic) in the soil are below the EPA regulatory screening values (EPA Region 9 Preliminary Remediation Goals or PRGs). The arsenic levels in the soil ranged from 1.3 to 49.6 mg/kg at the SWMU locations. The measured site background arsenic soil level averaged 15.7 mg/kg. Additionally, only one of 87 soil samples had arsenic concentrations greater than 2x background arsenic. The arsenic concentrations in the site soil are generally below the Region 4 residential arsenic cleanup levels of 40 mg/kg (subchronic child) and 160 mg/kg (adult) as well as being significantly below the Region 4 industrial cleanup values for the current and anticipated future industrial use (noncancer PRG = 260 mg/kg and the 1E-04 cancer risk PRG = 160 mg/kg). The anticipated future use of this site

will remain industrial. Proper Land Use Controls (LUCs) and Deed restrictions will be recommended for the Final Remedy at this site. Thus, it is recommended that CA725 YES be entered into RCRAInfo.

V. CONCLUSION FOR CA750: CA750 YES

A CA 750, Yes, for "Migration of Contaminated Groundwater Is Under Control" is based on the analysis documented in Attachment 2. The Holcim facility requested a waiver for groundwater monitoring in the application to MDEQ. The depth to groundwater in the industrial process area is very shallow, approximately 2 to 5 feet. Additionally, the underlying chalk formations estimated to be 490 feet thick has a relatively low hydraulic conductivity of 1.6E-7 to 5.8E-7 cm/second and acts as an aquitard and an aquifuge (does not transmit or absorb water). Due to the inability of the chalk to transmit or absorb water, the chalk formation is not an aquifer; and, sufficient groundwater was not present in any site borings for groundwater monitoring. Thus, surface water sampling was used as an indication of any groundwater contamination with results for all metal concentrations in surface water samples being well below the Region 9 PRGs for tap water and/or the MCLs. Therefore, it is recommended that CA750 YES be entered into RCRAInfo.

VI. SUMMARY OF FOLLOW-UP ACTIONS

A. CA725: Not applicable — current human exposures (industrial) are under control**.**

B. CA750: Not applicable — Migration of Contaminated Groundwater is under control**.**

The table below is a "corrective action place marker" for future activities necessary to get to a final remedy and maintain the current EI recommendations:

Holcim (US) Inc. EI/Final Remedy SCHEDULE				
Activity(ies) (As defined by RCRIS)	**CA RCRIS Event Code**	**Scheduled Date** (FY)	**Associated CA RCRIS Code**	**Remarks** (Include units and description of action(s))
Evaluate LUCs and deed notification for CKD burial area (SWMU 16)	CA400/550	2010		May not be necessary; but facility has potentially agreed to consider deed notice (arsenic in soil > BKGD levels but< R4 health-based clean up levels)
Complete Final Remedy documentation and Permit mod for site	CA400/550	2010/2011		Permit modification

VII. LEVEL OF CONFIDENCE IN REACHING A POSITIVE EI EVALUATION AND MAJOR ISSUES REGARDING A FINAL REMEDY

Confidence is high that current human exposures to contamination at the Holcim (US) Inc., Artesia site are under control. Also, due to the lack of a measureable shallow groundwater and the 490' thick chalk formations inability to transmit water (aquitard), migration of contaminated ground water is under control. Also, *de facto* surface water sampling indicates acceptable metals concentrations are below regulatory levels.

Attachments:
1. CA725 — Current Human Exposures Under Control
2. CA750 — Migration of Contaminated Ground Water Under Control
3. Facility Site Map with Major SWMU Locations (Figure 1)

cc: Toby Cook, Chief, Chemical Manufacturing Branch, MSDEQ
Harry Wilson, Chief, Environmental Permits Division, MSDEQ
Jerry Cain, Director, Office of Pollution Control, MSDEQ

ATTACHMENT 1

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
Current Human Exposures Under Control

Facility Name: **Holcim (US) Inc. (Artesia Plant)**
Facility Address: **P.O. Box 185, 8677 Highway 45 S. Alt., Artesia, MS 39736**
Facility EPA ID No.: **MSD 077 655 876**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below,

___ If no - re-evaluate existing data, or

___ If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program, the EIs are near-term objectives that are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated"** [1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs, or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater		X		Not contaminated.
Air (indoors) [2]		X		Not contaminated.
Surface Soil (e.g., <2 ft)	X			Arsenic levels > industrial PRGs; but are comparable to 2x mean site-wide and state-wide background arsenic levels for MS (i.e., 15.7 and 14.4 mg/kg)
Surface Water		X		Not contaminated. Levels < PRGs and/or MCLs
Sediment		X		Not contaminated. Arsenic levels < background arsenic levels
Subsurface Soil (e.g., >2 ft)	X			Arsenic levels > industrial PRGs; but are comparable to 2x mean Site-wide and State-wide background arsenic levels for MS (i.e., 15.7 and 14.4 mg/kg)
Air (outdoors)		X		CKD is not a hazardous waste. Stack emissions of 4.9 lbs arsenic/year has negligible impact.

___ If no (for all media) - skip to #6, and enter "YE" status code after providing or citing appropriate "levels" and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

_X_ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

___ If unknown (for any media) - skip to #6 and enter "IN" status code.

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent Evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants that previously believed. This a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

RATIONALE AND REFERENCE(S)

Surface Soils and Subsurface Soils

Soil analytical results for RCRA metals were compared to (1) EPA Region 9 Preliminary Remediation Goals (PRGs) for both residential and industrial use settings; (2) Background soil concentrations (both Site–wide and State-wide); and, (3) EPA Region 4 acceptable arsenic cleanup levels. Refer to the EPA Region 4 memo titled *"Assessing the Risk of Arsenic in Soil: Considering Bioavailability and Subchronic Toxicity and the Protective Risk Range (dated February 5, 2004)"*.

Arsenic was detected in every soil sample (about 90 samples) at concentrations ranging from 1.3 to 49.6 mg/kg. Although these levels exceed the EPA Region 9 PRG for both residential and industrial use scenarios (i.e., 0.39 and 1.6 mg/kg for cancer endpoint: 22 and 260 mg/kg for non-cancer endpoint), they generally are in the acceptable range of 2 times background arsenic levels. All other metals were below the EPA Region 9 PRGs for residential use.

Background surface soil samples (0-6") were taken at 4 random locations in undisturbed soil on the Holcim property (see attached Figure 1). Except for arsenic, the metals concentrations in the background samples were below the EPA Region 9 PRGs for industrial and residential soils. Background arsenic concentrations ranged from 9 to 21 mg/kg (mean arsenic Site-background = 15.7 mg/kg). Also, additional concentration information in native soils of Mississippi was obtained from Mississippi Agricultural and Forestry Experiment Station (MAFES) Bulletin 1104 titled *"Arsenic Concentrations in Selected Soils and Parent materials in Mississippi (dated June 2001)"*. The concentration of arsenic in the State-wide soils ranged from 0.32 to 55 mg/kg (mean arsenic State-background = 14.4 mg/kg and a standard deviation = 13.7 mg/kg). In comparison, it is easily discerned that the Holcim Site arsenic concentrations may be representative of naturally occurring arsenic in Mississippi soils.

All soil samples contained arsenic concentrations well below the EPA Region 4 acceptable arsenic "cleanup levels" for the current and anticipated future industrial use (non-cancer PRG = 260 mg/kg and the 1E-04 cancer risk PRG = 160 mg/kg). Additionally, only a few soil samples exceeded the EPA Region 4 acceptable arsenic residential "cleanup levels" of 20-40 mg/kg (child) and 160 mg/kg (adult).

The presence of CKD is prevalent throughout the cement manufacturing process areas. Holcim provided laboratory results from weekly CKD analyses for metals from 1997 to 2000 (RFA Addendum –Appendix C, June 2003). As expected, analytical results indicated that hazardous constituents were present in the CKD. The approx. average concentrations from these 155 weekly CKD laboratory analyses were: arsenic < 1 ppm, cadmium <10 ppm, chromium < 50 ppm and lead < 200 ppm. Generally, CKD metals concentrations are all well below the EPA Region 9 residential PRGs as well as the EPA Region 4 acceptable arsenic cleanup levels.

Surface Water (Groundwater)

Surface water was analyzed at all water bodies and process ditches for the RCRA metals. Surface waters included process scrubber wastewater from process ditches (SWMUs 12 and 13); storm water run-off ditches (SWMU 31), Water Recycling Pond (SWMU 14), Stormwater Lagoon (SWMU 29) and a Low Rock Quarry (AOC B). Water results for the analyzed metals were either below EPA Region 9 PRGs and/or the MCLs.

The only RCRA metal of concern detected in the water was arsenic (MCL = 10 ppb). Arsenic concentrations in the surface water were below the MCL and ranged from 2.7 to 7.0 ppb in the kiln process area ditches (SWMUs 12 and 13) and was detected at 6.0, 6.1 and 3.0 ppb at the Water Recycling

Pond (SWMU 14), Stormwater Lagoon (SWMU 29) and the Low Rock Quarry (AOC B). NPDES – Permitted excess water is discharged from SWMU 29 on a batch basis after pH adjustment using CO_2.

EPA Region 4 also notes from Mississippi reference Bulletin 1104 (titled *"Arsenic Concentrations in Selected Soils and Parent materials in Mississippi (dated June 2001")* that the water-soluable (bioavailable) arsenic level for the Selma Chalk is the 2nd highest level (at 10.36 ppm arsenic) of the nine parent soils tested in Mississippi. Other than the highest, the water-soluable (bioavailable) arsenic levels of the remaining 7 parent soils ranged from 0.66 to 4.24 ppm arsenic. As previously stated, the Selma Chalk is the approximately 440' thick principal unit mined for the cement production at the Artesia plant.

Holcim requested a waiver for groundwater monitoring in the application to MSDEQ because the depth to groundwater in the process area is very shallow (approximately 2 to 5 feet) and surface water sampling would suffice as an indication of contamination. Additionally, the underlying chalk formations estimated to be 490 feet thick has a very low hydraulic conductivity of 1.6E-7 to 5.8E-7 cm/sec. and acts as an aquitard. Because the chalk absorbs water slowly, it does not transmit water fast enough to supply a well or spring or even a monitoring well.

Due to the lack of a measureable shallow groundwater at the site and the 490' thick chalk formations inability to transmit water (aquitard), the Agencies concurred that *de facto* surface water sampling could be used as an indication of groundwater conditions. Since metals concentrations in the surface water samples are acceptable and below regulatory levels, migration of contaminated ground water is also considered to be under control.

Sediment

Over 12 surface and subsurface sediment samples were collected. Arsenic sediment concentrations range from 2.7 to 13.4 mg/kg which is within the acceptable background concentration range for this Site.

Air (Outdoor)

Holcim performed an evaluation to determine the effect of stack emissions (from the burning of coal in the rotary kiln) on the deposition of arsenic to the background soil levels. A review of historical stack emissions data indicated that 4.9 pounds of arsenic was emitted on a yearly basis over a 30-year period. Equally dispersing this quantity of arsenic over the plant area of 2640 acres would conservatively add 0.000137 ppm of arsenic to the background surface soils. Thus, the arsenic stack emissions are considered minimal impact to the background soils.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table Potential **Human Receptors** (Under Current Conditions)							
"Contaminated" Media	**Residents**	**Workers**	**Day-Care**	**Con-struction**	**Trespassers**	**Recreation**	**Food**[3]
Groundwater	NC	NC	NC	NC	NC	NC	NC
Air (indoors)	NC	NC	NC	NC	NC	NC	NC
Surface Soil (e.g., < 2 ft)	No	No	No	No	No	No	No
Surface Water	NC	NC	NC	NC	NC	NC	NC
Sediment	NC	NC	NC	NC	NC	NC	NC
Subsurface Soil (e.g., >2 ft)	No	No	No	No	No	No	No
Air (outdoors)	NC	NC	NC	NC	NC	NC	NC

Instructions for Summary Exposure Pathway Evaluation Table:

1. For Media which are not "contaminated" as identified in #2, please strike-out specific Media, including Human Receptors' spaces, or enter "N/C" for not contaminated.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations, some potential "Contaminated" Media - Human Receptor combinations (Pathways) are not assigned spaces in the above table (i.e., **N/L - not likely**). While these combinations may not be probable in most situations, they may be possible in some settings and **should be added as necessary**.

_X_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

___ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

RATIONALE AND REFERENCE(S):

Other than arsenic, all RCRA metals in the soil were below the EPA Region 9 PRGs for residential use. Arsenic was detected in every soil sample at levels exceeding the EPA Region 9 PRG for both residential and industrial use scenarios (i.e., 0.39 and 1.6 mg/kg for cancer endpoint: 22 and 260 mg/kg for non

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.).

cancer endpoint). However, these arsenic soil levels are generally within the acceptable range of 2 times natural background arsenic levels. Additionally, the arsenic concentrations are well below the EPA Region 4 acceptable arsenic "cleanup levels" for the current and anticipated future industrial use (non-cancer PRG = 260 mg/kg and the 1E-04 cancer risk PRG = 160 mg/kg). And only a few soil samples at one closed CKD landfill (SWMU 16) even exceeded the EPA Region 4 acceptable arsenic residential "cleanup levels" of 20-40 mg/kg (child) and 160 mg/kg (adult).

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be "**significant"** [4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

___ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

___ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

___ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

RATIONALE AND REFERENCE(S): Skipped to Question #6

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

___ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

___ If no (there are current exposures that can be reasonably expected to be "unacceptable") - continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

___ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

RATIONALE AND REFERENCE(S): Skipped to Question #6

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **Holcim (US) Inc. facility, EPA ID No.: MSD 077 655 876, located at P.O. Box 185, 8677 Highway 45 S. Alt., Artesia, MS 39736** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by _____ Date: _____
Leo J. Romanowski Jr., Senior Corrective Action Specialist
Corrective Action Section, RUST Branch
RCRA Division
USEPA Region 4

Supervisor _____ Date: _____
Karen Knight, Chief
Corrective Action Section, RUST Branch
RCRA Division
USEPA Region 4

Locations where References may be found:

US EPA Region 4 RUST Branch, RCRA Division SNAFC 61 Forsyth Street Atlanta, GA 30303	Mississippi Department of Environmental Quality Environmental Permits Division Office of Pollution Control PO Box 2261 Jackson, MS 39225

Contact telephone and e-mail numbers

(name): Leo J. Romanowski Jr. ljr; 8/17/09
(phone #): (404) 562-8485 See F:\EI's\Holcim EI Memo Final 9-30-09ljr.doc
(email): Romanowski.leo@epa.gov

ATTACHMENT 2

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **Holcim (US) Inc. (Artesia Plant)**
Facility Address: **P.O. Box 185, 8677 Highway 45 S. Alt., Artesia, MS 39736**
Facility EPA ID No.: **MSD 077 655 876**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

_X_ If yes - check here and continue with #2 below,

___ If no - re-evaluate existing data, or

___ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EIs are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be "**contaminated"** [5] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

___ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

_X_ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

___ If unknown - skip to #8 and enter "IN" status code.

RATIONALE AND REFERENCE(S):

Surface water was analyzed at all water bodies and process ditches. Surface waters included process scrubber wastewater from process ditches (SWMUs 12 and 13); storm water run-off ditches (SWMU 31); Water Recycling Pond (SWMU 14); Stormwater Lagoon (SWMU 29); and, a Low Rock Quarry (AOC B). Water results for the analyzed metals were either below EPA Region 9 PRGs and/or the MCLs.

The only RCRA metal detected of concern in the water was arsenic (MCL = 10 ppb). Arsenic concentrations in the surface water were below the MCL and ranged from 2.7 to 7.0 ppb in the kiln process area ditches (SWMUs 12 and 13) and was detected at 6.0, 6.1 and 3.0 ppb at the Water Recycling Pond (SWMU 14), Stormwater Lagoon (SWMU 29) and the Low Rock Quarry (AOC B). NPDES permitted excess water is discharged from SWMU 29 on a batch basis after pH adjustment using CO_2.

EPA Region 4 also notes from Mississippi reference Bulletin 1104 (titled *"Arsenic Concentrations in Selected Soils and Parent materials in Mississippi (dated June 2001")* that the water-soluable (bioavailable) arsenic level for the Selma Chalk is the 2nd highest level (at 10.36 ppm arsenic) of the nine parent soils tested in Mississippi. Other than the highest, the water-soluable (bioavailable) arsenic levels of the remaining 7 parent soils ranged from 0.66 to 4.24 ppm arsenic. As previously stated, the Selma Chalk is the approximately 440' thick principal unit mined for the cement production at the Artesia plant.

Holcim requested a waiver for groundwater monitoring in the application to MSDEQ because the depth to groundwater in the process area is very shallow (approximately 2 to 5 feet) and surface water sampling would suffice as an indication of contamination. Additionally, the underlying chalk formations estimated to be 490 feet thick has a very low hydraulic conductivity of 1.6E-7 to 5.8E-7 cm/sec. and acts as an aquitard. Because the chalk absorbs water slowly, it does not transmit water fast enough to supply a well or spring or even a monitoring well.

Due to the lack of a measureable shallow groundwater at the site and the 490' thick chalk formations inability to transmit water (aquitard), the Agencies concurred that *de facto* surface water sampling could be used as an indication of groundwater conditions. Since metals concentrations in the surface water samples are acceptable and below regulatory levels, migration of contaminated ground water is also considered to be under control.

[5] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Another line of evidence is based on EPA's 1993 Report to Congress on cement kiln dust (CKD). Specifically, any leachate generated during the cement manufacturing process would have a high pH. And under high pH conditions lead, beryllium, chromium and cadmium are relatively immobile. From 1993 to 1998, Holcim frequently analyzed the Artesian CKD and no extracted TCLP metals from the Artesian CKD even approaches the TCLP Regulatory Limits (which simulate acidic conditions); (see TCTP table below). Also, Holcim used EPA's VLEACH model and TCLP data to predict metal migration thru the buried CKD (several RFI SWMUs). After simulations of 100 years, the metal concentration entering the uppermost first aquifer (Eutaw Formation) was substantially below the analytical detection limits of 5 ppb for selenium (the metal selected for its high mobility). Conclusion -- based on the TCLP data below, no measurable potential for groundwater impacts from CKD is apparent; thus, no probable groundwater issue should occur at the Artesia site.

Artesia CKD TCLP Results (May 1993- July 1998)

mg/L	Sb	As	Ba	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Be	Tl
Ave. Conc.	0.027	0.034	0.545	0.03	0.04	0.015	0.041	0.005	0.018	0.074	0.02	0.001	0.053
TCLP Reg. Limit	1.0	5.0	100.0	1.0	5.0	NA	5.0	0.2	70.0	1.0	5.0	0.007	7.0

3. Has the **migration** of contaminated groundwater **stabilized** such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater" as defined by the monitoring locations designated at the time of this determination?

___ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination" [6]).

___ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - skip to #8 and enter "NO" status code, after providing an explanation.

___ If unknown - skip to #8 and enter "IN" status code.

[6] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

RATIONALE AND REFERENCE(S): Skipped to Question # 8

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

___ If yes - continue after identifying potentially affected surface water bodies.

___ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

___ If unknown - skip to #8 and enter "IN" status code.

RATIONALE AND REFERENCE(S): Skipped to Question # 8

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant"** (i.e., the maximum concentration [7] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature and number of discharging contaminants, or environmental setting) which significantly increase the potential for unacceptable impacts to surface water, sediments, or ecosystems at these concentrations)?

___ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) providing a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or ecosystem.

___ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[7] greater than 100 times their appropriate groundwater "levels," providing the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identifying if there is evidence that the amount of discharging contaminants is increasing.

[7] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

___ If unknown - enter "IN" status code in #8.

RATIONALE AND REFERENCE(S): Skipped to Question # 8

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented [8])?

___ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[9] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and ecosystems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels" . as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

___ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable"**) - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or ecosystems.

___ If unknown - skip to 8 and enter "IN" status code.

RATIONALE AND REFERENCE(S): Skipped to Question # 8

[8] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[9] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or ecosystems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

___ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

___ If no - enter "NO" status code in #8.

___ If unknown - enter "IN" status code in #8.

RATIONALE AND REFERENCE(S): Skipped to Question # 8

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **Holcim (US) Inc. facility, EPA ID No.: MSD 077 655 876, located at P.O. Box 185, 8677 Highway 45 S. Alt., Artesia, MS 39736 .** Specifically, this determination indicates that due to the insignificant contaminant releases to the thin clay soils and the 450' thick underlying impermeable Selma Chalk aquifuge, "contaminated" groundwater is unlikely at this facility and is considered under control. Additionally, no site groundwater monitoring is proposed at this time. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

___ NO - Unacceptable migration of contaminated groundwater is observed or expected.

___ IN - More information is needed to make a determination.

Completed by _____ Date: _____

Leo J. Romanowski Jr., Senior Corrective Action Specialist
Corrective Action Section, RUST Branch
RCRA Division
USEPA Region 4

Supervisor _____ Date: _____

Karen Knight, Chief
Corrective Action Section, RUST Branch
RCRA Division
USEPA Region 4

Locations where References may be found:

US EPA Region 4 RUST Branch, RCRA Division SNAFC 61 Forsyth Street Atlanta, GA 30303	Mississippi Department of Environmental Quality Environmental Permits Division Office of Pollution Control PO Box 2261 Jackson, MS 39225

Contact telephone and e-mail numbers:

(name): Leo J. Romanowski Jr. ljr; 8-17-09
(phone #): (404) 562-8485 See F:\EI's\Holcim EI Memo Final 9-30-09ljr.doc
(email): Romanowski.leo@epa.gov

Figure 1. Facility Site Map with Major SWMUs (Holcim (US) Inc., Artesia, MS)