

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: GEORGIA GULF CHEMICALS & VINYL, LLC - Plaquemine Site
Facility Address: PO BOX 629, PLAQUEMINE, LOUISIANA 70765-0629
Facility EPA ID #: LAD 057 117 434

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?

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 (EI) 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 EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

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 EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do 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).

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	<u> </u>	<u> </u>	<u>See Appendix A</u>
Air (indoors) ²	<u> </u>	<u>X</u>	<u> </u>	<u>Contaminated groundwater is not present beneath occupied buildings. See Appendix A</u>
Surface Soil (e.g., <2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>See Appendix A</u>
Surface Water	<u> </u>	<u>X</u>	<u> </u>	<u>No impacts to surface water are suspected based on investigations conducted to date. See Appendix A</u>
Sediment	<u> </u>	<u>X</u>	<u> </u>	<u>No impacts to sediments are suspected based on investigations conducted to date. See Appendix A.</u>
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>See Appendix A</u>
Air (outdoors)	<u> </u>	<u>X</u>	<u> </u>	<u>See Appendix A</u>

 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.

✓ 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.

Rationale and Reference(s):

The existing Plaquemine facility, Georgia Gulf Chemicals & Vinyls, LLC plant, is situated in an industrial and commercial area as shown in Figure 1, the Site Location Map. Figure 2 presents a plan view of the site depicting the physical layout of the Plaquemine facility showing the location of the SWMUs and areas of concern (AOCs). Figure 3 shows in more detail the location of the areas where the assessments are being conducted in the Phenol Plant. Figure 4 shows the location of the areas where the assessments are being conducted in the EDC/VCM Plant. Figure 5 presents the RFI sampling locations in the EDC/VCM Manufacturing Complex. Figure 6 shows the area of investigation at the Cumene Release Area. Figure 7 presents the Landfarm unit with the location of monitoring wells and borings. Figure 8 provides the geographical location of municipal wells, industrial wells installed in a 2-mile radius from the facility.

Appendix A presents the rationale to render an exposure pathways incomplete determination for the purpose of current human exposures to environmental media, based on results of the site assessments, RFI Investigations conducted to this date, and site specific information collected at the facility.

Out of the 36 SWMUs identified in the 1985 Preliminary Assessment conducted by EPA contractors, A.T. Kearney, only 8 were carried over to the 1986 RCRA Facility Assessment (RFA) as part of the permit process required by the 1984 HSWA (amendments) to RCRA. The HSWA portion (Section VII) of the permit issued on July 27, 1990, required to conduct a RCRA Facility Investigation (RFI) of eight (8) SWMUs. Georgia Gulf appealed the HSWA part of the permit and through negotiations among Georgia Gulf, the LDEQ, and the EPA, narrowed the number of SWMUs requiring further investigation down to two (2) SWMUs- The Phenol Plant and the EDC/VCM Manufacturing Complex.

Georgia Gulf submitted to the Louisiana Department of Environmental Quality (LDEQ) two Resource Conservation and Recovery Act (RCRA) facility Investigation (RFI) Work Plans; one for the EDC/VCM Plant and one for the Phenol Plant, and since 1996 there has been extensive site assessment work performed in the EDC/VCM Plant and the Phenol Plant to identify areas of concern and corrective actions have been implemented in both plants.

Additional field activities are planned and being conducted to complement RFI investigations at the Phenol Plant and the EDC/VCM Manufacturing Complex.

PHENOL PLANT

The areas under investigation in the Phenol Plant RFI are divided into six sites. (Site 1) Heavy Ends Tanks 47519 and 47520, Light Oils Tank 47536, and the Heavy Ends Transfer Area Ditch; (Site 2) the Gravity Separator; (Site 3) the Phenol Drain Drum Area; (Site 4) the CHP Drain Drum Area; (Site 5) the Underground Phenol Lines, and the Underground CHP Lines (Site 6). Impacts in soil and groundwater were investigated.

Based on the RFI investigations conducted up to this date at the Phenol Plant, only the shallow groundwater has been impacted.

Surface Soil (e.g., <2 ft) and Subsurface Soil (e.g., > 2 ft) impacts occur in the area limited to the Phenol Plant. The exposure to human health is not likely to be a complete pathway because the facility is fenced and access is permitted only to authorized personnel. Furthermore, the soil in the Phenol Plant is completely covered by a concrete, which provides a barrier to exposure from soil. See Appendix A.

The known chemicals of concern (COCs) at the Phenol Plant are cumene, acetone, phenol, cumyl phenol, vinyl chloride, alpha-methyl styrene and metals in the groundwater and the COC for the soil media are cumene, acetone, alpha methyl styrene, acetophenone, dimethyl benzyl alcohol, phenol and metals.

EDC/VCM PLANT

The RFI activities addressed subsurface soil and groundwater conditions for the following areas: (1) EDC/VCM Plant; (2) Sump 301; (3) EDC and VCM tank farms; (4) VCM Wastewater Ponds; (5) Muriatic acid facility; (6) OHC Unit; (7) Furnace Unit; (8) E-401 Structure; and (9) 409 Structure.

Based on the RFI investigations at the EDC/VCM Manufacturing Complex conducted to this date, only the shallow groundwater has been impacted.

Surface soils (e.g., <2 ft) identified from the April 1997 site assessment, have been removed along with subsurface soils in the most contaminated areas. The areas, which posed the greatest concern, were the EDC Basin and Associated Ditches. The EDC Basin has been capped under RCRA guidelines and the associated ditches have been over excavated, backfilled with clean filled, lined, and all are now covered with concrete, eliminating any potential of human exposure.

The soils that are impacted below 2 feet do not pose a human health treat because they are underneath process units, a tank farm and paved roads. The exposure pathway for the subsurface soils is mostly covered with concrete. See Appendix A.

The known chemicals of concern (COCs) at the EDC/VCM Manufacturing Complex are for the soil media 1,1,2-Trichloroethane, 1,2-Dichloroethane, Chloroform, cis-1,2-Dichloroethene, Dichloromethane, trans-1,2-Dichloroethene, Trichloroethylene, and Vinyl Chloride.

The COCs in groundwater are 1,1,2-trichloroethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloroethene, (total), chloroform, cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethylene, and vinyl chloride.

CUMENE RELEASE AREA

On May 31, 2001, Georgia Gulf notified to LDEQ of a new Potential Area of Concern (AOC), as per their RCRA HSWA permit Section VII.J.1., from the release of cumene from a product distribution line. Georgia Gulf excavated impacted soils directly beneath the pipeline and conducted a subsurface soil and groundwater investigation to determine if any related impacts existed beneath and surrounding the release area. Investigation results from the Cumene Release Area showed that Cumene was the COC for soil and groundwater.

The potential risk to human health and environment associated with exposure to cumene detected in soil and groundwater were evaluated using the Louisiana Department of Environmental Quality (LDEQ) Risk

Evaluation/Corrective Action Program (RECAP). On June 16, 2003, Georgia Gulf submitted a report detailing the Risk Evaluation/Corrective Action Program (RECAP) documenting the approach and methods used to evaluate the potential risk to human health and the environment associated with exposure to cumene at the place of release.

Based on the results of the comparison of maximum detected concentration (29.5 mg/L) of cumene in groundwater with the developed Management Option -1 RECAP Standard (61 mg/L), corrective action is not warranted for the shallow groundwater at the site for the protection of human health and the environment.

Based on the results of the comparison of maximum detected concentration (2,160 mg/kg) of Cumene in soil with the developed Management Option -1 RECAP Standard (350 mg/kg), corrective action is warranted for soil at the site for the protection of human health and the environment.

Institutional controls for the small area, less than 0.5 acre, under the pipe rack that exceeds the Cumene limiting MO-1 RS, are proposed to mitigate and limit the potential risks to the small area of potential soil impacts located beneath the pipe rack. Therefore, potential current industrial or construction worker exposure scenarios will be mitigated or eliminated by use of the use of work permit system.

LANDFARM

The Landfarm, initially identified as SWMU 8 in the Preliminary Assessment, is a land disposal unit of approximately 170 acres, of which 130 acres are used to dispose lime solids, brine solids and wastes. The Landfarm was originally classified as a hazardous waste unit; however, it was later determined that the solids placed in the unit were not hazardous wastes, and the LDEQ Solid Waste Division issued a Solid Waste Permit (P-0173) on June 10, 1988. Because groundwater monitoring results from some of the wells located around the perimeter of the unit revealed that chloride concentrations exceeded the background concentrations, Georgia Gulf submitted a notification to LDEQ of potential impacts to groundwater on September 6, 2001. On August 25, 2003, LDEQ requested a site investigation to delineate the horizontal and vertical extent of impacts in soil and groundwater.

Based on the site investigation results recently conducted (June 14, 2004), the Constituents of Concern (COC) at the Landfarm are chloride and arsenic in soil and in groundwater. Impacts in the second water-bearing zone were not observed.

Surface Soil (e.g., <2 ft) and subsurface soil (e.g., > 2 ft) impacts occur in the area limited to the Landfarm unit within the Georgia Gulf property. The exposure to human health is not likely to be completed because the facility is fenced and access is permitted only to authorized personnel. See Appendix A.

Also, it should be noted that elevated arsenic concentrations in soil are commonly observed throughout agricultural areas in Louisiana where arsenic pesticides had been applied in the past. The LDEQ/RECAP (October 20, 2003) document gives the background arsenic level for soil as 12 mg/kg. Based on the site investigation results recently conducted (June 14, 2004), out of nine locations, only two boring locations reported concentrations greater than the Louisiana background arsenic level ranged between 14.0 and 16.2 mg/kg, and they were located next to an agricultural farmland.

As previously mentioned, groundwater in the first water bearing zone was impacted from arsenic and chloride in the Landfarm. However, concentrations of arsenic were detected within the property limits of the facility at location GGC-11 with a concentration of 0.101mg/L, and in location GGC-19 with a concentration of 0.0893 mg/L. The LDEQ/RECAP Screening Standard, as well as the Maximum Contaminant Level (MCL) for arsenic is 0.05 mg/L. Impacts in groundwater from chloride concentrations were detected within the property limits of the facility, and on two newly installed monitoring wells locations (LF-9 and LF-10) on the western side near the property limits of the Georgia Gulf property, chloride concentrations were 574 mg/L in well LF-9, and 277 mg/L in well LF-10. Chloride is listed as one of the National Secondary Drinking Water Contaminant. Concentrations above 250 mg/L, which is the secondary Maximum Contaminant Level, cause a salty taste, corrosivity and staining problems in the drinking water. Therefore, it could be considered that there are not severe adverse health effects that chloride concentrations might pose to the human health other than cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water.

In accordance with LDEQ Solid Waste regulations, LAC 33:VII.709.E.4.f.ii, and expressed by Georgia Gulf correspondence dated June 14, 2004, Georgia Gulf will notify all property owners that appear to have property that

overlie the areas in which constituents appear to be above screening standards, and will install monitor wells to monitor the horizontal delineation of impacted areas. It should be also noticed that the off-site impacted groundwater by chloride concentrations above 250 mg/L is located toward the southern portion of the Georgia Gulf's property where Air Liquid Plant (formerly Big Tree Industries) is located. This facility is an industrial facility where only workers might be the potential receptors that might be exposed to impacted groundwater. However, since groundwater is not used as a potable water supply area where Georgia Gulf and Air Liquide facilities are located, it is practical to say that the human exposure pathway from groundwater is not complete.

In conclusion, it may be said that arsenic and chloride concentrations found at the Landfarm do not pose severe adverse health effects to humans, and the human exposure pathway is not complete through direct contact with groundwater since the groundwater is not a source of water supply and safety and health practices established at the Georgia Gulf facility will preclude inadvertent exposure to the impacted groundwater for workers and visitors.

References:

Preliminary Assessment (A.T. Kearney, Inc), October 28, 1985;
 Hazardous Waste Permit, July 27, 1990;
 Revised Preliminary Report and Revised RCRA Facility Investigation Work Plan, December 1997;
 RCRA Facility Investigation – Task I, Current Conditions at Georgia Gulf, January 1996;
 RFI Work Plan for the Phenol Plant at Georgia Gulf, January 1996;
 Report of Groundwater Certification Assessment Proposed Phenol Plant Expansion Project for Georgia Gulf Corporation, June 30, 1995;
 Report of Groundwater Certification Assessment Proposed Phenol Plant Phase II Expansion Project for Georgia Gulf Corporation, February 26, 1999;
 Submittal of the RCRA Facility Investigation for the Phenol Plant, December 2002;
 Phase II RCRA Facility Investigation (RFI) Work Plan- Phenol Plant, October 2003;
 Preliminary Report and RCRA Facility Investigation Work Plan for the EDC/VCM Manufacturing Complex, January 1996;
 Site Assessment of the EDC Basin and Associated Ditches, April 1997;
 Final RCRA facility Investigation (RFI) EDC/VCM Manufacturing Complex, March 2000;
 Phase II RCRA Facility Investigation (RFI) Work Plan, June 2004;
 Management Option 1 Risk Assessment Cumene Release Area, June 2003;
 Solid Waste Landfarm Site Investigation Report, April 2002;
 Site Assessment Plan, November, 2003;
 Solid Waste Landfarm Site Investigation Report, June 2004.
 Louisiana Department of Environmental Quality (LDEQ)/ Risk Evaluation/Corrective Action Program (RECAP), October 20, 2003.

Footnotes:

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) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is 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.

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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)

<u>"Contaminated" Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	NO	NO	NO	YES			NO
Air (indoors)							
Soil (surface, e.g., <2 ft)	NO	YES	NO	YES	NO	NO	NO
Surface Water							
Sediment							
Soil (subsurface e.g., >2 ft)				YES			NO
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
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) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- _____ 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):

Contaminated media includes shallow groundwater, subsurface soil (greater than 2 feet) and surface soil (less than 2 feet). There are not currently, nor are there any indication of future, completed pathways between these media and any potential receptors. Appendix A presents in more detail the bases to render an exposure pathways incomplete for the purpose of current human exposures to environmental media, based on results of the site assessments, RFI Investigations conducted to this date, and site specific information collected at the facility.

Surficial soils

Potential human exposure pathways to contaminated surface soils through dermal contact and incidental ingestion by onsite workers, and construction/utility workers is considered to be insignificant due to the following controls that are currently in place at the Georgia Gulf facility.

The Georgia Gulf facility is restricted to authorized, trained, company personnel, and authorized, visitors. Access is restricted to the plant by a perimeter fence with guarded gates, regular patrolling of the property, and surveillance by video cameras. Exposures to chemicals in the surface soils is controlled also by the on-site work permit process, the excavation program, and other OSHA site safety programs that require the use of personal protective equipment and personal monitoring during work activities. There are detailed health and safety programs in place maintained in the Engineering and Technology Building that will preclude inadvertent exposure to the impacted areas. Personal protective equipment (PPE) requirements are implemented by all site-related personnel who may come into contact with contaminated media through daily activities or via intrusive activities (i.e., excavation, construction) to reduce direct contact exposures. Personal protective equipment requirements and excavation restrictions are in place to minimized or eliminate direct contact exposures by Georgia Gulf workers and future construction workers to contaminated soils (surface and subsurface) and groundwater identified at various locations in the process areas. Because of these work practices that are in place at the Georgia Gulf, exposures are considered to be insignificant.

Groundwater

The chemicals of concern in groundwater are limited to the shallow water-bearing zone. Workers could be exposed to shallow contaminated groundwater during excavation activities; however, they are protected through OSHA health and safety practices, the facility's work permit system, and the excavation program, which is mandatory for workers and contractors. Workers are required to wear proper personal protective equipment and use personal health and safety monitoring, where warranted. Furthermore, on-site workers are not exposed to contaminated shallow groundwater because all on-site water use is from municipal water. Therefore, exposures to contaminated groundwater are considered insignificant because of these in-place work practices.

Moreover, contamination in the upper aquifers is monitored by a site-wide monitoring well system. Attachment 1 provides a computer listing of registered water wells within a 1-mile radius of the facility. Twenty domestic wells in the Mississippi River Alluvial Aquifer are present within a 1-mile radius of the site; however, 19 of these wells have been abandoned. The one active domestic well is screened at a much greater depth (180 to 190 ft bls) than the Stratum V groundwater being investigated. Figure 8 provides the geographical location of municipal wells, industrial wells installed in a 2-mile radius from the facility. Therefore, it is not likely that the Plaquemine Aquifer, which occurs at depths of 250 to 300 ft bls, will be impacted in the future.

Any shallow discharge through ditches or canals to the Mississippi River is controlled through permitted outfalls, and effluent is required to remain within LPDES permit limits; the exposure is therefore considered to be insignificant. Because of controls in place, exposure to contaminated groundwater is considered to be insignificant.

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

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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):

Based on RFI results and other relevant site-specific information, human exposures for environmental media is considered under control. See Appendix A.

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.

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

Rationale and Reference(s): _____

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

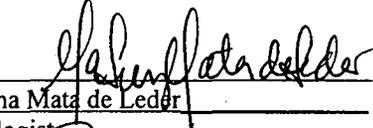
6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

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 Georgia Gulf Chemicals & Vinyls, LLC - Plaquemine Site facility, EPA ID # LAD 057 117 434, located at Plaquemine, Louisiana 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

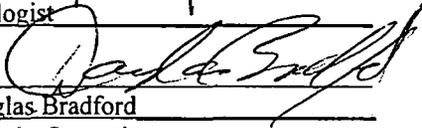
(signature) 

(print) Luzma Mata de Leder

(title) Geologist

Date June 30, 2004

Supervisor

(signature) 

(print) Douglas Bradford

(title) Geologist Supervisor

(EPA Region or State) Louisiana

Date 6/30/04

Locations where References may be found:

US EPA, Region 6

LDEQ Hazardous Waste Files

LDEQ Solid Waste Files

LDEQ Ground Water Files

On-site facility records and correspondence files

Contact telephone and e-mail numbers

(name) Luzma Mata de Leder

(phone #) (225) 219-4320

(e-mail) Luzma.MatadeLeder@la.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

APPENDIX A

HUMAN EXPOSURE PATHWAY ANALYSIS

Environmental Indicator (EI) RCRIS code (CA 725)

APPENDIX A

The existing Plaquemine facility, Georgia Gulf Chemicals & Vinyls, LLC plant, is situated in an industrial and commercial area. The facility is zoned for industrial use and this zoning category is unlikely to change in the future. See Figure 1. Industrial facilities that border the Georgia Gulf facility are Ashland Oil Corporation to the east Union Carbide to the East and Southeast, and Air Liquide to the southwest. The Mississippi River is located north of the facility, and undeveloped agricultural land is located to the south and west. Bayou LaButte flows through the far southeastern corner of the facility property. Additionally, the Mississippi River and Bayou LaButte support recreational activities such as swimming, fishing, and boating. The nearest residential area is the community of Reveille, which extends onto the portion of the northwest corner of the facility property. The community of Plaquemine is located approximately three miles west of the facility.

Potentially Exposed Human Receptors

On site contaminated media that have identified at this site include groundwater, surface soil (e.g., <2 ft), and subsurface soil (e.g., > 2ft).

Potential human receptors that may be exposed to contaminated media include: current and future industrial workers and site visitors and hypothetical future recreational receptors via groundwater/surface water exchange. Exposure routes include ingestion, dermal contact, and inhalation.

Trespasses are not identified as potential receptors because of site restrictions in place that include a perimeter fence with a guard at the facility entrances, regular patrolling of the property, and use of video cameras. No residential exposure is considered applicable to the Constituents of Concern that have been identified in soil or shallow groundwater. A recent LDOTD well survey within a 1-mile radius of the Georgia Gulf plant was conducted. Attachment 1 provides the list of surveyed wells and Figure 8 provides the geographical location of municipal wells, and industrial wells installed in a 2-mile radius from the facility. Twenty domestic wells in the Mississippi River Alluvial Aquifer were present within a 1-mile radius of the Georgia Gulf site; however, 19 of these wells have been abandoned. The one active domestic well is screened at a much greater depth (180 to 190 ft bls), and RFI investigations conducted to this date have shown no impacts to this depth.

Human exposure is unlikely under a residential scenario due to residential receptors not being located immediately adjacent to the Site and due to the Plaquemine facility being a fenced, active industrial facility. Therefore, current and future exposure to residential receptors via soil and groundwater is not considered to be a complete exposure pathway.

The RFI investigation for the Phenol and EDC/VCM Plants, and the investigation in the Cumene Release Area have documented that constituents are not migrating offsite; therefore, potential receptors include mainly workers and authorized visitors.

The off-site contamination by chloride concentrations found at the Landfarm does not pose severe adverse health effects to humans. The impacted aquifer is not used in the area as a drinking water source. Where similarly impacted water is found, a salty taste, corrosivity and staining problems in the drinking water occur when chloride concentrations above 250 mg/L are detected. Although the water is not being consumed, it could be considered that there are not severe adverse health effects that chloride concentrations might pose to the human health other than cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water.

The off-site impacted groundwater by chloride concentrations above 250 mg/L is located toward the southern portion of the Georgia Gulf's property where Air Liquid Plant (formerly Big Tree Industries) is located. This facility is an industrial facility where only workers are the potential receptors that might be exposed to impacted

groundwater. However, since groundwater is not used as a potable water supply area where Georgia Gulf and Air Liquide facilities are located, it is safe to say that the human exposure pathway from groundwater is not complete.

The following summary identifies conclusions of the exposure pathways analysis, specifically addressing environmental media listed for evaluation in form CA725.

Surface Soil (e.g., <2 ft)

The exposure of workers to chemicals present in surface soil at the site is minimal due to control and monitoring activities via permits and health and safety policies. The Georgia Gulf facility has extensive health and safety/work permits standards in place. These safety/work permit procedures are maintained in the Engineering and Technology Building at the Georgia Gulf facility.

The use of a safety work permit system will prevent any exposure to the Constituents of Concern in surface/subsurface soil during subgrade work activities by Georgia Gulf personnel. This procedure includes the following. Soil concentrations identified at the area of release will be marked on facility maps. Restrictions for any site excavation will be marked on facility maps. Safety personnel issuing work permits will be aware of site-related restrictions because work permits for excavation are only issued after review of site maps for work areas, and work permits will not be issued unless appropriate worker personal protective equipment and provisions for containment soil will be also established as part of the work permit process.

Potential exposure routes for surface soil include ingestion, dermal, and inhalation of vapors/airborne particulates. However, most of the site is paved, covered by structures or shell; these features mitigate potential exposure pathways under routine conditions. Facility workers are required to wear protective clothing, which minimizes dermal contact with soils. Saturated conditions and surface cover that are present at the site limit inhalation of particles from soil. Additionally, any exposure by workers to chemicals released to the soil would be considered occupational and therefore regulated by OSHA and site-specific health and safety policies. Personal monitoring is conducted as needed to confirm compliance with OSHA regulations.

Subsurface Soil (e.g., >2 ft)

The exposure of workers to chemicals present in the subsurface soil at the site is minimal due to control and monitoring activities via permits and health and safety policies.

There are detailed health and safety programs in place maintained in the Engineering and Technology Building that will preclude inadvertent exposure to the impacted area. Personal protective equipment (PPE) requirements are implemented by all site-related personnel who may come into contact with contaminated media through daily activities or via intrusive activities (i.e., excavation, construction) to reduce direct contact exposures. Personal protective equipment requirements and excavation restrictions are in place to minimize or eliminate direct contact exposures by Georgia Gulf workers and future construction workers to contaminated subsurface soils identified at various locations in the process area. Facility workers are required to wear protective clothing, which minimizes dermal contact with soils. Saturated conditions and surface cover that are present at the site limit inhalation of particles from soil. Additionally, any exposure by workers to chemicals released to the soil would be considered occupational and therefore regulated by OSHA and site-specific health and safety policies. Personal monitoring is conducted as needed to confirm compliance with OSHA regulations.

Groundwater

The COC in groundwater are limited to the first and second water-bearing zones, which include Stratum III and Stratum V. Stratum III varies in depth from an average of 11 ft bls in the north to 16 ft bls in the south. Stratum V ranges from a depth of 35 ft bls in the north to 52 ft bls in the south. Stratum VI is a medium clay, approximately 40 feet thick that separates the Top of the Plaquemine Aquifer. The Top of Plaquemine Aquifer, which is the principal source of public and industrial groundwater supply in the area is located between 100 ft bls to 300 ft bls consisting of sand units.

Workers could be exposed to shallow contaminated groundwater during excavation activities; however, they are protected through OSHA health and safety practices, the facility's work permit system, and the excavation program, which is mandatory for workers and contractors. Contamination in the upper aquifers is monitored by a site-wide monitoring well system. Exposures to contaminated groundwater are considered to be insignificant because of these in-place practices.

Furthermore, on-site workers are not exposed to contaminated shallow groundwater because all on-site water use is from municipal water. Moreover, Attachment 1 provides a computer listing of registered water wells within a 1-mile radius of the facility. Twenty domestic wells in the Mississippi River Alluvial Aquifer are present within a 1-mile radius of the site; however, 19 of these wells have been abandoned. The one active domestic well is screened at a much greater depth (180 to 190 ft bls) than the Stratum IV groundwater being investigated. Figure 8 provides the geographical location of municipal wells, industrial wells installed in a 2-mile radius from the facility.

Based on evaluations of site-specific groundwater monitoring data and the geologic and hydrogeologic setting of this area, it is not likely that the Plaquemine Aquifer, which occurs at depths of 250 to 300 ft bls, has been or will be impacted in the future.

Additional wells are proposed to monitor groundwater concentrations in the Phenol Plant and in the EDC/VCM Manufacturing Complex to provide with additional information regarding groundwater quality at the site, and to provide opportunities for early detections for control of exposure should constituents be detected.

Air (Indoors/Outdoors)

The RFI data indicate that contaminated groundwater is not present beneath occupied buildings, indicating that inhalation of volatile constituents that may be released from shallow groundwater is not a complete pathway for workers or visitors identified for exposure through direct contact with groundwater on site.

Air emissions related to process operations are controlled by State Air Permits. Emission controls and process monitoring are used to maintain compliance with permit requirements. In addition, professional Industrial Hygiene (IH) personnel are employed as warranted at the site to ensure that OSHA standards are met for worker protection. This is consistent with *Draft EPA Guidance, Evaluating the Vapor Intrusion into Indoor Air* (EPA 530-F-02-052), in which EPA identified that OSHA will take the lead on addressing occupational exposures. In areas where there is potential for OSHA standards to be exceeded, appropriate PPE is required.

Surface Water / Sediment

Based on the data gathered through the investigations performed to date, constituents of concern (COC) are not discharging via groundwater to a surface water body.

Hypothetically possible receptor populations could potentially include limited recreational users of the adjacent Mississippi River (i.e., wading, swimming, fishing) and aquatic biota exposed via groundwater to surface water exchange. However, hydrogeological data from RFI Investigations indicate that groundwater flow velocity is slow (0.005 foot per day or 1.83 feet per year) and that the direction of shallow groundwater movement at the Site results in groundwater flow south-southeast away from the Mississippi River. Additionally, the closest impacted area to the Mississippi River is the cumene release area, which is approximately 3,000 feet from the river. Therefore, the exposure pathway for recreational receptors and aquatic biota is considered incomplete.

The exposure routes for surface runoff from the facility are controlled by measures taken under the facility's LPDES permit, which regulates the water discharges to the Mississippi River. Storm water is collected in areas where product processing areas occurs, and is either treated through the facility WWTP or reused in the process. Precipitation is contained in dikes and is managed under the facility SPCC Plan. The final discharge from the WWTP is regulated under an LPDES permit.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA 725)

FIGURES

Figure 1. Site Location Map.

Figure 2. Physical layout of the Plaquemine facility.

Figure 3. Phenol Plant Layout.

Figure 4. EDC/VCM Manufacturing Complex. Site Layout Map.

Figure 5. RFI Sampling Locations Map. EDC/VCM Manufacturing Complex.

Figure 6. Cumene Release Area. Sample Location Map.

Figure 7. Landfarm Sample Location Map.

Figure 8. Water Well Location Map.

ATTACHMENT

Computer printout listing registered water wells.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA 725)

FIGURES

Figure 1. Site Location Map.

Figure 2. Physical layout of the Plaquemine facility.

Figure 3. Phenol Plant Layout.

Figure 4. EDC/VCM Manufacturing Complex. Site Layout Map.

Figure 5. RFI Sampling Locations Map. EDC/VCM Manufacturing Complex.

Figure 6. Cumene Release Area. Sample Location Map.

Figure 7. Landfarm Sample Location Map.

Figure 8. Water Well Location Map.

ATTACHMENT

Computer printout listing registered water wells.

**Attachments Available
Upon Request**