DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Georgia-Pacific Corporation
Facility Address: 26100-B LA Highway 405, Plaquemine, LA
Facility EPA ID #: LAR 000 003 483

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 (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 "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 EI 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"**[1] 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?

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

_____ 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):

The EDC Basin and Associated Ditches and North/South Organic Pond are closed units regulated by RCRA post-closure permits. The post-closure permit for the EDC Basin and Associated Ditches (LAR 000 003 483-PC-2) was issued by the Louisiana Department of Environmental Quality (LDEQ) on January 12, 2004. The LDEQ issued the post-closure permit for the North/South Organic Pond (LAR 000 003 483-PC-1) on October 26, 1995 and Class 2 permit modifications were approved by the LDEQ on February 2, 2005. Groundwater contamination issues related to each unit are described as follows:

EDC Basin and Associated Ditches:

Quarterly groundwater monitoring is conducted for the EDC Basin and Associated Ditches. In the vicinity of the EDC Basin and Associated Ditches, Stratum III is the first water-bearing zone typically occurring at approximately 15 feet below grade and is monitored with 12 monitoring wells and 3 piezometers. Sampling parameters include volatile organic compounds, semivolatile organic compounds, metals, and hexavalent chromium. Groundwater samples collected from monitoring wells 9A, EDC-13A, EDC-15 and EDC-1R indicate volatile organic compounds exceeding the Maximum Concentration Limits (MCLs), LDEQ Risk Evaluation /Corrective Action Program (RECAP), Oct. 20, 2003, Groundwater_Screening Standards (GW_SS) or detection limits (DL). The following organic constituents were reported exceeding the MCL, GW_SS or DL for the 1st and 2nd Quarters of 2007 sampling periods:

Stratum III Groundwater

Contaminants	MCL, GW_SS or DL (mg/L)	Wells with Exceedance
Benzene	0.005	9A, EDC-13A, EDC-15
Chloroethane	0.010	9A, EDC-13A, EDC-15
Chloroform	0.100	EDC-13A, EDC-15
1,1-dichloroethane	0.080	9A, EDC-13A, EDC-15
1,2-dichloroethane (EDC)	0.005	9A, EDC-13A, EDC-15
1,1-dichoroethene	0.007	9A, EDC-13A, EDC-15
cis-1,2-dichloroethene	0.070	9A, EDC-13A, EDC-15
trans-1,2-dichloroethene	0.100	EDC-13A, EDC-15
Ethylbenzene	0.700	EDC-13A, EDC-15
1,1,2-trichloroethane	0.005	9A,EDC-13A, EDC-15
Trichloroethene	0.005	9A, EDC-13A, EDC-15
Vinyl chloride	0.002	9A, EDC-13A, EDC-15, EDC-1R
Benzoic acid	0.010*	9A
Bis(2-chloroethyl)ether	0.0057	9A, EDC-15
2,4-dimethylphenol	0.010*	9A
Phenol	0.18	9A

* Detection Limit

Arsenic is detected in groundwater at levels above the MCL for some monitoring wells. These levels of arsenic may be background conditions.

Stratum IVB groundwater is typically found at varying depths ranging from about 31 to 38 feet below grade and is considered the second water-bearing zone. Four wells are used to monitor Stratum IVB groundwater. No constituents of concern have been reported for Stratum IVB groundwater.

Stratum V groundwater usually is found at approximately 55 feet below grade (third water-bearing zone) and is monitored with 6 wells. No constituents of concern have been report for Stratum V groundwater, except for arsenic.

Georgia-Pacific Corporation samples Georgia Gulf's supply well number 8 screened in The Plaquemine Aquifer (top of Aquifer occurs at about 110 feet below grade). No constituents of concern have been reported, except for arsenic.

Summary Tables of the Analytical Results for the 1st and 2nd Quarterly 2007 Reports are provided in Attachment 1 and figures showing the locations of the monitoring well system and potentiometric maps are provided in Attachment 2.

North/South Organic Pond:

Quarterly groundwater monitoring is conducted for the North/South Organic Pond. In the North/South Organic Pond Area, Stratum III is the first water-bearing zone typically occurring at approximately 10 to 22 feet below grade and is monitored with 8 wells. Concentrations of contaminants in groundwater of three wells (NS 2, NS6 and NS8) exceed the MCLs:

Stratum III Groundwater

Contaminants	MCL (mg/L)	Wells with Exceedance
Cumene	0.010	NS2, NS8
4-cumylphenol	0.020	NS2, NS6, NS8
α,α-dimethylbenzyl alcohol	0.020	NS8
Phenol	0.050	NS8

These MCLs are set at "background" conditions and are not based on human health risks.

Stratum V groundwater (the second water-bearing zone) does not have any exceedances of MCLs for monitored constituents at vertical point-of-compliance well NS10B or any other monitoring well.

Summary Tables of the Analytical Results for each Quarter of 2006 are provided in Attachment 3 and figures showing the locations of the monitoring well system and potentiometric maps are provided in Attachment 4.

References:

PSI, 2007. Second Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, May 21, 2007.

PSI, 2007. First Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 15, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for North/South Organic Pond, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses)

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_X_ 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"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

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

Rationale and Reference(s):

EDC Basin and Associated Ditches:

Groundwater monitoring data indicates that the Stratum III groundwater contamination plume is not present at the point-of-compliance wells, except for EDC-1R. Recent concentrations of vinyl chloride in groundwater samples collected from EDC-1R have been reported as 0.0048 mg/L with historical concentrations of vinyl chloride ranging from 0.030 to 0.040 mg/L. This well is downgradient of the highest contaminant concentrations of the plume. EDC-1R is approximately 1,400 feet from the Georgia Gulf property line in the direction of groundwater flow. Horizontal groundwater flow velocity is approximately less than 10 feet per year. Migration of the groundwater contamination plume is not likely to significantly impact areas farther downgradient. Georgia-Pacific is taking measures to address the Stratum III groundwater contamination plume. As part of a permit modification request (January 11, 2007), Georgia-Pacific is proposing to install a Stratum III monitoring well located downgradient of EDC-1R to refine the plume definition. This proposed well, EDC-19A will be sampled quarterly.

The groundwater monitoring data indicates that Stratum IVB and Stratum V monitoring wells are not impacted, which demonstrates that vertical migration of the Stratum III groundwater contamination plume has not occurred at the point of compliance.

Georgia Gulf has conducted two separate remediation pilot studies for the EDC/VCM Manufacturing Complex. Wells 9A and EDC-13 are part of the studies which were implemented in July 2006. A final remediation plan will be provided to address the groundwater contamination plume.

North/South Organic Pond:

Current groundwater monitoring information shows that the groundwater contamination plume in Stratum III is not present at the point-of-compliance well NS9 or the plume-defining wells NS14, NS15 and NS16. The average horizontal groundwater flow velocity for Stratum III based on 2006 data is about 4.22 feet per year toward the east-southeast. There is generally a seasonal reversal of flow to the east of the closed unit. Based on the groundwater data, there is no apparent expansion of the Stratum III groundwater contamination plume.

Stratum V groundwater has not shown any evidence of impact, which demonstrates that the vertical migration of the Stratum III groundwater contamination plume has not occurred.

Georgia-Pacific submitted a Corrective Action Plan (CAP) for the groundwater contamination. As part of this plan, a pilot study involving phytoremediation was implemented in 2006 and is presently ongoing.

References:

PSI, 2007. Second Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, May 21, 2007.

PSI, 2007. First Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 15, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for North/South Organic Pond, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

ARCADIS US, Inc., 2007. Class II Modification for Post-Closure Permit, Groundwater Sampling Program, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, January 11, 2007.

[2] "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.

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

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

__X__ 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):

EDC Basin and Associated Ditches:

The groundwater contamination plume does not affect surface water bodies. The closest downgradient surface water body is a parish drainage ditch paralleling the east property line and is located about 1,400 feet southeast of the groundwater contamination plume. In addition, Bayou La Butte is farther downgradient of the parish drainage ditch at about 4,500 feet southeast of the groundwater contamination plume. Shallow groundwater generally flows away from the Mississippi River, which is more than 4,000 feet away from the EDC Basin and Associated Ditches.

North/South Organic Pond:

The horizontal extent of the groundwater contamination plume is defined by wells NS9, NS14, NS15, and NS16. The closest downgradient surface water body, Bayou La Butte is approximately 4,500 feet southeast of the North/South Organic Pond and groundwater contamination plume.

References:

PSI, 2007. Second Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, May 21, 2007.

PSI, 2007. First Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 15, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for North/South Organic Pond, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] 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 eco-systems 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[3] 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) provide 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 eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] 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[3] greater than 100 times their appropriate groundwater "levels," 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 identify if there is evidence that the amount of discharging contaminants is increasing.

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

Rationale and Reference(s):

N/A

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

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 eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ 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 eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] 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 eco-systems, 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 eco-systems.

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

Rationale and Reference(s):

N/A

[4] 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.

[5] 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 eco-systems.

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?"

__X__ 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):

EDC Basin and Associated Ditches:

Groundwater monitoring of Stratum III, Stratum IVB, Stratum V and Plaquemine Aquifer (Supply Well No.8) is required under the current RCRA post-closure permit. As part of a permit modification request (January 11, 2007), Georgia-Pacific is proposing to install a Stratum III monitoring well located downgradient of EDC-1R to refine the plume definition. Georgia Gulf has initiated remediation pilot studies at two of the monitoring wells (9A and EDC-13A).

North/South Organic Pond:

The current RCRA post-closure permit for the North/South Organic Pond requires groundwater monitoring for Stratum III and Stratum V wells. Georgia-Pacific has implemented a pilot study as part of the Corrective Action Plan for the North/South Organic Pond groundwater contamination plume.

References:

PSI, 2007. Second Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, May 21, 2007.

PSI, 2007. First Quarter 2007 Groundwater Monitoring Report, EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 15, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for EDC Basin and Associated Ditches, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

PSI, 2007. Annual Groundwater Monitoring Report 2006 for North/South Organic Pond, Georgia-Pacific Corporation, Plaquemine, LA, March 1, 2007.

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).

YE 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 Georgia-Pacific Corporation facility , EPA ID # LAR 000 003 483 , located at 26100-B LA Hwy 405, Plaquemine, LA. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" 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 (signature) Celeste Bonnecaze Date 6/27/07
(print) Celeste Bonnecaze
(title) Geologist 3, LDEQ-Waste Permits Div.

Supervisor (signature) [signature] Date 6/27/07
(print) Estuardo Silva
(title) Geologist Supervisor, LDEQ-Waste Permits Div.
(EPA Region or State) Louisiana

Approved 1/17/08

Locations where References may be found:

LDEQ Public Records for AI# 25738

Contact telephone and e-mail numbers

(name) Celeste Bonnecaze
(phone #) 225-219-3419
(e-mail) celeste.bonnecaze@la.gov

ATTACHMENTS AVAILABLE UPON REQUEST