

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: Chalmette Refining, LLC/ExxonMobil

Facility Address: 500 W. St. Bernard Highway, Chalmette, LA 70043-4821

Facility EPA ID #: LAD008179707

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?

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).

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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?

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):

Petroleum hydrocarbons are the major chemical constituents present at the site (site location shown in Figure 1). Dissolved and phase-separate hydrocarbons have been observed in the water table zone and the Upper Sands Unit (RFI, 2000). Analytical data from groundwater sampling indicate the presence of constituents in groundwater above risk-based screening standards. Figure 2 presents the site-wide distribution of TPH-DRO in the water table zone (data from RFI, 2000, and perimeter well sampling completed in June 2004). TPH-DRO is the most prevalent constituent at the site in groundwater, and is used to represent constituent distribution at the site.

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).

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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):

Based on the results of the RFI and the June 2004 perimeter well installations, the horizontal and vertical extent of contamination has been delineated in groundwater, in the water table zone and in the Upper Sands Unit. There is no evidence of off-site impacts from the facility, and downward migration of constituents is not known to occur based on sample results from the Upper Sands Unit, site geology, and NAPL characteristics. Localized constituent occurrence in the Upper Sands Unit was determined in the RFI to be a result of leaks in the deep disposal well casing.

In accordance with a Sampling and Analysis Plan (SAP) dated December 2003, ten perimeter monitoring wells were installed during June 2004 to provide additional information regarding groundwater quality at the site and to confirm that the constituent plume is not expanding. Perimeter well data collected in June 2004 corroborate the extent of impact previously established in the RFI. TPH-DRO results for the perimeter wells are shown on Figure 2 with the RFI data. TPH-DRO was the constituent reported in highest concentration in the perimeter well samples (with maximum reported value of 6.55 mg/L). TPH-GRO and carbon disulfide were each detected in only one perimeter well, and no other constituents were detected.

All perimeter well results from the June 2004 sampling event are below risk-based standards developed in accordance with the LDEQ Risk Evaluation Corrective Action Program (RECAP), Management Option 1 (MO-1) for Class 3 ground water (i.e., GW3DW or GW3NDW). The plume has stabilized, with perimeter concentrations less than applicable risk-based standards. Ongoing groundwater corrective action, which will improve groundwater conditions interior to the plume, include free-product recovery from wells in both the water table zone and the Upper Sands Unit. Additional remediation activities include the activities outlined in the SAP to demonstrate that Monitored Natural Attenuation (MNA) is achieving groundwater cleanup objectives, including groundwater sampling as evidence of the lack of constituent plume migration.

MNA has been identified with EPA concurrence as a viable corrective action for impacted site groundwater, pending confirmatory monitoring. Monitoring of ground water quality within and along the perimeter of the facility will continue in accordance with the SAP. The well network to be used for future monitoring in accordance with the SAP is shown in Figure 3. Additional references are provided in Attachment A.

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.

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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):

Off-site migration of constituents resulting in exposure in surface water has not been identified and is not expected to occur. The RFI concludes that the extent of contamination is delineated within facility boundaries and the ground water data do not indicate that off-site impacts are present.

June 2004 perimeter monitoring results from wells in the batture area support the findings of the RFI. Perimeter well constituent concentrations (including TPH-DRO shown in Figure 2) are less than MO-1 RECAP Standards (GW3DW or GW3NDW) that have been calculated to represent concentrations in ground water that will not result in the cross-media transfer of constituents from ground water to a downgradient surface water body in concentrations of concern. For the purpose of calculating the GW3DW standard, the Mississippi River at the southern border of the facility was conservatively assessed as the downgradient surface water body, assumed to receive ground water and (potentially) constituent discharge. This assumption is highly unlikely based on the following:

- 1) Groundwater flow in the water table zone near the Mississippi River is a function of the river stage. When the river stage is higher than approximately 8 feet NGVD, ground water flow is from the river towards the refinery. Flow is consistently away from the river and towards the refinery for the great majority of the year, based on review of a large body of historical river stage data. A potentiometric surface map illustrating these conditions is provided as Figure 4.
- 2) Groundwater concentrations in the water table zone indicate that the plume has reached declining conditions. Specifically in the batture area, concentrations reported nearest the river (e.g., MPA-GP-101, MPA-GP-45) are lower than concentrations reported nearer the refinery process areas.
- 3) Analytical data for ground water samples collected from water table zone wells indicate that conditions are favorable for the biological degradation of constituents in this zone. The low hydrocarbon concentrations beneath the batture will further attenuate under natural conditions.

In accordance with the December 2003 revised SAP, groundwater flow direction in the batture area, and its relation to the river stage, will continue to be monitored and evaluated through installation of piezometers (2004) intended to augment the monitor well network (Figure 3) for the measurement of the potentiometric surface. Additional references are provided in Attachment A.

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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 implemented⁴)?

_____ 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): _____

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.

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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):

Groundwater at the Chalmette facility is monitored by a network of groundwater wells that includes 42 wells in the Upper Interbedded Unit, 23 wells in the Upper Sands Unit, and 14 wells in the Lower Sands Unit. The groundwater monitoring network is under current review based on the proposal of monitored natural attenuation as the groundwater remedy for this site. As part of this proposal, the Chalmette facility has installed additional wells, and plans to plug and abandon other wells in order to maintain an efficient long-term groundwater monitoring program. Site-wide and perimeter ground water monitoring (Figure 3) will be performed in accordance with the December 2003 SAP which received EPA and LDEQ review. The monitoring program includes sampling, analysis, and reporting of ground water data for a minimum of eight consecutive quarters. Additionally, groundwater elevation monitoring will be performed monthly for 12 months following installation of the additional piezometers (Figure 3). The sample data will be used to confirm MNA as an effective remediation technology for shallow groundwater beneath the facility. Additional references are provided in Attachment A.

Because of the controls that are currently in place at the Chalmette Refinery, and progress to date on the monitored natural attenuation (MNA) proposal, the migration of contaminated groundwater is considered to be under control.

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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 Chalmette Refining, LLC/ExxonMobil facility, EPA ID # LAD008179707, located at Chalmette, Louisiana. 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) Jeffrey Jones Date 6/30/09
(print) Jeffrey Jones
(title) Geologist III, LDEQ, Environmental Technology Division

Supervisor (signature) Narendra Dave Date 6/30/09
(print) Narendra Dave
(title) Geologist Manager, LDEQ, Environmental Technology Division
(EPA Region or State) Louisiana

Locations where References may be found:

Louisiana Department of Environmental Quality Records File Room
On-site facility records and correspondence files, Chalmette Refining, LLC, 500 W. St. Bernard Highway,
Chalmette, LA 70043-4821

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ATTACHMENT A

References

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**Chalmette Refining, L.L.C.
References**

ARCADIS Geraghty and Miller, April 7, 1998. RCRA Facility Investigation Work Plan Addendum (MW-16 Area), Chalmette Refining, L.L.C.

ARCADIS Geraghty and Miller, September 24, 1998. RCRA Facility Investigation Deep Well Area Groundwater Monitoring Technical Investigation, Task 12, Chalmette Refining, L.L.C.

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Environmental Resources Management, March 24, 2003. Closure Plan – Biological Reactor Lagoons, Chalmette Refining, L.L.C.

Environmental Resources Management, September 10, 2003. First Half 2003 Semi-Annual Ground Water Data Report for the Biological Reactor Lagoons, Chalmette Refining, L.L.C.

Environmental Resources Management, October 15, 2003. First Half 2003 Ground Water Monitoring Report – Deep Well Number 1 Area, Chalmette Refining, L.L.C.

Environmental Resources Management, March 25, 2004. Second Half 2003 Ground Water Report for the Biological Reactor Lagoons, Chalmette Refining, L.L.C.

Environmental Resources Management, March 25, 2004. RCRA Interim Status Ground Water Monitoring Results, Statistical Evaluation and Data Report for 2003, Chalmette Refining, L.L.C.

Environmental Resources Management, April 2, 2004. Second Half 2003 Ground Water Monitoring Report – Deep Well Number 1 Area, Chalmette Refining, L.L.C.

Environmental Resources Management, May 12, 2004. Ground Water Monitor Well Installation Permit Request, Chalmette Refining, L.L.C.

Geraghty and Miller, June 5, 1997. RCRA Facility Investigation Geophysical Logging Technical Memorandum, Task 7, Chalmette Refining, Mobil Oil Corporation.

Geraghty and Miller, July 9, 1997. RCRA Facility Investigation Facility Wide Groundwater Sampling and New Monitor Well Locations Technical Memorandum, Task 2, Chalmette Refining, Mobil Oil Corporation.

Geraghty and Miller, December 1, 1997. RCRA Facility Investigation CPT/ROST and New Monitor Well Locations Technical Memorandum, Task 9, Chalmette Refining, Mobil Oil Corporation.

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ATTACHMENT A

**References
(continued)**

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Montgomery Watson, May 1995. Groundwater Certification Report for the TDU and Para-xylene Expansion Project, Mobil Oil Corporation, Chalmette Refinery.

Montgomery Watson, March 1996. RFI Work Plan, Mobil Oil Corporation, Chalmette Refinery.

Montgomery Watson, March 1996. Description of Current Conditions (DOCC) for the Chalmette Refinery, Volumes I through IV, Mobil Oil Corporation, Chalmette Refinery.

Montgomery Watson, 1996. Interim Measures Technical Memorandum, Mobil Oil Corporation, Chalmette Refinery.

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FIGURES

Figure 1. Site Location Map, Chalmette Refining, LLC

Figure 2. TPH-DRO Concentrations in Groundwater

Figure 3. Monitored Natural Attenuation Well Network

Figure 4. Potentiometric Surface Map - Upper Interbedded Unit, April 2004

Attachments
&

Figures
Available Upon
Request