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:	***ExxonMobil Oil Corporation-Beaumont Refinery***
Facility Address:	***P.O. Box 3311, Beaumont, Texas 77704***
Facility EPA ID #:	***TXD 990797714***

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 #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 "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):

Benzene has been identified in some facility groundwater wells above its Maximum Contaminant Level (MCL) of 0.005 mg/L, and lead has been identified in some facility groundwater wells above its action level of 0.015 mg/L. Concentrations of detected constituents and locations of monitoring wells associated with detected constituents are reflected in the "Refinery-Wide Remedial Investigation Report and Phase II RCRA Facility Investigation (RFI), December 1997, revised March 2003" as well as in various groundwater investigation/monitoring reports such as the following:

- **Annual Detection Monitoring and 1994 Agreed Order Reports for Calendar Years 1997 through 2003, Mobil Oil Corporation and ExxonMobil Oil Corp. Beaumont Refinery.**
- **Semiannual Compliance Plan Reports for Calendar Years 1999 through 2003 (dated January and July of each subsequent six month reporting period); ExxonMobil Beaumont Refinery.**
- **Biennial Reports for Calendar Years 1999, 2001, and 2003 (dated March of each subsequent year); Mobil Oil Corporation and ExxonMobil Oil Corp. Beaumont Refinery.**
- **Facility Operations Area Project Step 2 Submittal: FOA Assessment Report, March 2004, ExxonMobil Oil Corp. Beaumont Refinery (JDC).**
- **Letter to TCEQ dated September 5, 2003 referencing "Transmittal of H-III Stratum Groundwater Sampling Results; Beaumont Refinery Riverfront Area; ISWR 30587; ExxonMobil Oil Corp. Beaumont Texas.**

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):

The horizontal and vertical extent of groundwater contamination has been defined at the facility, and corrective measures (barrier trench and slurry wall) have been implemented in areas where off-site migration of contaminated groundwater may occur. Hydrogeologic properties of the site have been well defined through numerous investigations, which show that groundwater contamination exists on ExxonMobil property and will remain on ExxonMobil property. For example, Well MR-602A in the Waste Management Area 2 Compliance Plan has historically exhibited elevated benzene levels prior to 1999, but has begun subsiding in concentration recent years, due to controls that are in place. Controls include routine dissolved phase pumping at the well, managed natural attenuation, and the shallow ground water pumping system at the adjacent ExxonMobil Chemical Plant ditch system to maintain a desired flow direction. Decreasing concentrations and evidence of stabilization are reflected in the "Refinery-Wide Remedial Investigation Report and Phase II RCRA Facility Investigation (RFI), December 1997, revised March 2003" as well as groundwater monitoring reports (semi-annual and annual) submitted pursuant to RCRA Part B Permit and Compliance Plan requirements such as the following:

- **Annual Detection Monitoring and 1994 Agreed Order Reports for Calendar Years 1997 through 2003, Mobil Oil Corporation and ExxonMobil Oil Corp. Beaumont Refinery.**
- **Semiannual Compliance Plan Reports for Calendar Years 1999 through 2003 (dated January and July of each subsequent six month reporting period); ExxonMobil Beaumont Refinery.**
- **Facility Operations Area Project Step 2 Submittal: FOA Assessment Report, March 2004, ExxonMobil Oil Corp. Beaumont Refinery (JDC).**
- **Letter to TCEQ dated September 5, 2003 referencing "Transmittal of H-III Stratum Groundwater Sampling Results; Beaumont Refinery Riverfront Area; ISWR 30587; ExxonMobil Oil Corp. Beaumont Texas.**

[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?

X 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):

Based upon available hydrogeologic information, groundwater from the H-III Stratum is discharging to the Neches River. Also, the data from six wells installed in the H-III Stratum near the Neches River indicates one constituent (benzene) in one well exceeds the maximum contaminant level (MCL) of 5 ug/L with a result of 42 ug/L. The remainder of the groundwater results were non-detect and/or below MCLs. Supporting information is contained in the letter to TCEQ of September 5, 2003, referencing "Transmittal of H-III Stratum Groundwater Sampling Results, Refinery Riverfront Area."

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)?

X 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):

Historically, the shallow fill formation (H-I Stratum) was determined to be a source of contaminated groundwater with the potential to discharge to surface water. In 1989 and 1992, a barrier trench and a slurry wall were installed at the wharf area to prevent potential migration from this shallow formation. To verify that the deeper, groundwater formation (H-III Stratum) is not contributing in a significant way to surface water contamination, an investigation of the H-III Stratum was conducted in 2003. Results of that investigation found no indication of non-aqueous phase liquid (NAPL) in any of the wells and confirmed that the deeper H-III Stratum was <u>not significantly</u> contributing to surface water contamination. Based on the data from six wells installed in the H-III Stratum near the Neches River, (Segment 601, tidally influenced), one constituent (benzene) in one well exceeded the maximum contaminant level (MCL) of 5 ug/L with a result of 42 ug/L. The remainder of the groundwater results were non-detect and/or below MCLs. Supporting information documenting that the H-I Stratum does not impact surface water is contained in the installation reports associated with the barrier wall system. Supporting information documenting that the H-III Stratum does not significantly impact surface water is contained in ExxonMobil's letter to the TCEQ of September 5, 2003, referencing "Transmittal of H-III Stratum Groundwater Sampling Results, Refinery Riverfront Area". In summary, the highest observed concentration of benzene in a riverfront well was 42 ug/l which is below the ten (10) times the concentration of applicable groundwater level. In addition to that, the observed concentration of benzene (42 ug/l) is below the Surface Water Risk Based Exposure Limit (RBEL) of 109 ug/l.

[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):

Facility-wide groundwater monitoring has been performed for numerous years and will continue to be performed per RCRA Part B Permit and Compliance Plan requirements as well as supplemental groundwater investigations. This monitoring will verify over future years that the area of groundwater contamination is on ExxonMobil property. Wells used for this demonstration are reflected in the groundwater monitoring reports (semi-annual and annual) submitted pursuant to RCRA Part B permit and Compliance Plan requirements, such as the following:

- **Refinery-Wide Remedial Investigation Report and Phase II RCRA Facility Investigation (RFI), December 1997, revised March 2003 (RMT, JDC).**
- **Permit Annual Detection Monitoring Reports for each Calendar Year (dated January of each subsequent year); ExxonMobil Oil Corp. Beaumont Refinery.**
- **1994 Agreed Order Annual Reports for each Calendar Year (dated January of each subsequent year); ExxonMobil Oil Corp. Beaumont Refinery.**
- **Semiannual Compliance Plan Reports for each six month reporting period of January – June and July - December (dated July and January of each subsequent six month reporting period); ExxonMobil Oil Corp. Beaumont Refinery.**
- **Biennial Reports for Odd Numbered Calendar Years (dated March of each subsequent year); ExxonMobil Oil Corp. Beaumont Refinery.**
- **Facility Operations Area Project Step 2 Submittal: FOA Assessment Report, March 2004, ExxonMobil Oil Corp. Beaumont Refinery (JDC).**
- **Letter to TCEQ dated September 5, 2003 referencing "Transmittal of H-III Stratum Groundwater Sampling Results; Beaumont Refinery Riverfront Area; ISWR 30587; ExxonMobil Oil Corp. Beaumont Texas.**

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 ***ExxonMobil Oil Corporation-Beaumont*** facility , EPA ID # ***TXD 990797714*** , located at ***End of Burt Street, Beaumont, TX***. 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)	<*signed by Murali Padaki*>	Date	June 30, 2004
	(print)	Murali Padaki		
	(title)	Project Manager		
Supervisor	(signature)	<*signed by Phyllis Primrose for Cathy Remmert*>	Date	June 30, 2004
	(print)	Cathy Remmert		
	(title)	Supervisor, Team II		
	(EPA Region or State)	TCEQ, Texas		

Locations where References may be found:

Central Records, Austin, Texas (Building E).

Contact telephone and e-mail numbers

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