SWR# ***30040***

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 Baytown Refinery***
Facility Address: ***2800 Decker Drive Baytown, Texas 77520***
Facility EPA ID #: ***TXD000782698***

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.

The following reports were submitted to the Texas Commission on Environmental Quality (TCEQ), or its predecessor agency, and were utilized for this EI determination:

- *Environmental Resources Management (ERM). June 15, 1998. Revised RFI Work Plan for Twenty-Two Solid Waste Management Units, Exxon Company, U.S.A. Baytown Refinery, Baytown, Texas.*
- *ERM. September 19, 2000. Phase I/II RFI Report for Eight Perimeter SWMUs, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. July 3, 2002. Addendum 1 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 75, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. November 19, 2002. Addendum 2 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 65, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. December 10, 2002. Addendum 3 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 55/56, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. March 25, 2003. Addendum 4 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 54, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *Texas Commission on Environmental Quality. April 11, 2003. Approval of Extension Request – RFI for SWMU 83, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. December 19, 2003. Addendum 6 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
- *ERM. February 17, 2004. SWMU 63 RCRA Facility Investigation APAR, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*

Note that all data and information collected to date at the Perimeter SWMUs, and denoted in Addenda 1-6, are utilized for RCRA Corrective Action evaluation following TRRP (30 TAC §350).

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?

__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):

Protective Concentration Level Exceedance (PCLE) Zones in groundwater were identified at the following SWMUs:

	Key Contaminants	**Levels – Reported Concentrations and Protective Concentration Levels (PCLs)**	**Groundwater Zone**
SWMU 60	*Arsenic, lead, benzene*	*APAR Worksheets 6.1 and 6.2 from:* *ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Uppermost transmissive zone*
SWMU 62	*Arsenic, lead, benzene, benzo(a)anthracene, benzo(a)pyrene, LNAPL*	*APAR Worksheet 6.1 and 6.2 from:* *ERM. December 19, 2003. Addendum 6 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Uppermost transmissive zone*
SWMU 63	*Benzene, benzenethiol (UTZ only)*	*APAR Worksheet 6.1 and 6.2 from:* *ERM. February 17, 2004. SWMU 63 RCRA Facility Investigation APAR, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Uppermost transmissive zone* *Second transmissive zone*

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):

The migration of affected ground water is stabilized and is expected to remain within the existing well network at the SWMUs.

	Physical Evidence - Groundwater Sampling Data	**Rationale**
SWMU 60	*Figure 4, showing delineation to Residential Exposure Assessment Levels in groundwater, from:* *ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Groundwater sampling data demonstrate that, based on delineation to residential Protective Concentration Levels (PCLs), it appears that migration of contaminated groundwater has stabilized. Sampling has demonstrated that the PCLE zone is limited to the SWMU area.*
SWMU 62	*Figure 6, showing delineation to Residential Exposure Assessment Levels in groundwater, from:* *ERM. December 19, 2003. Addendum 6 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Groundwater sampling data demonstrate that, based on delineation to residential Protective Concentration Levels (PCLs), it appears that migration of contaminated groundwater has stabilized. Sampling has demonstrated that the PCLE zone is limited to the SWMU area.*
SWMU 63	*Figures 5 and 6, showing delineation to Residential Exposure Assessment Levels in groundwater, from:* *ERM. February 17, 2004. SWMU 63 RCRA Facility Investigation APAR, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*	*Groundwater sampling data demonstrate that, based on delineation to residential Protective Concentration Levels (PCLs), it appears that migration of contaminated groundwater has stabilized. Routine ground water monitoring has demonstrated that the PCLE zone in the UTZ is not expanding laterally. The PCLE zone in the STZ is 1 µg/L greater than the MCL.*

[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?

__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):

	Potentially-Affected Surface Water Bodies	**Reference**
SWMU 60	*Houston Ship Channel, Segment 1005*	*ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
SWMU 62	*Goose Creek (a tributary of the Houston Ship Channel)*	*ERM. December 19, 2003. Addendum 6 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*

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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)?

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_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):

	Potentially-Affected Surface Water Bodies	**Rationale**	**Reference**
SWMU 60	*Houston Ship Channel, Segment 1005*	*A groundwater-to-surface water discharge evaluation was completed for SWMU 60 to assess the maximum known (or reasonably suspected) concentration[3] of key constituents. It was determined that PCLs were not exceeded. There was no evidence that the concentrations are increasing.* *Based on this evaluation (consistent with 30 TAC 350.51), there is no clear evidence that there is sufficient discharge of groundwater contaminants into the surface water to have unacceptable impacts to the receiving surface water, sediments, or eco-system.*	*Worksheet 6.2 and Attachment 14 (Tier 2 Screening-Level Ecological Risk Assessment for SWMU 60) from:* *ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*
SWMU 62	*Goose Creek (a tributary of the Houston Ship Channel)*	*A groundwater-to-surface water discharge evaluation was completed for SWMU 62 to assess the maximum known (or reasonably suspected) concentration[3] of key constituents. It was determined that PCLs were not exceeded. There was no evidence that the concentrations are increasing.*	*Worksheet 6.2 and Attachment 9 (Tier 2 Screening-Level Ecological Risk Assessment for SWMU 62) from:* *ERM. December 19, 2003. Addendum 6 to the Phase I/II*

		Based on this evaluation (consistent with 30 TAC 350.51), there is no clear evidence that there is sufficient discharge of groundwater contaminants into the surface water to have unacceptable impacts to the receiving surface water, sediments, or eco-system.	*RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas.*

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

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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 implemented[4])?

N/A 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.

N/A 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.

N/A 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.

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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"?

__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):

	Planned Future Sampling	**Identify Monitoring Locations**
SWMU 60	*Response Action Plan (RAP) that describes future monitoring/sampling (as applicable) will be submitted to TCEQ within 180 days of APAR approval (submitted September 22, 2003).* *Groundwater monitoring (if included) will be reported in accordance with Baytown Refinery's RCRA Groundwater Compliance Plan (No. CP-50111).*	*Locations will be based on data provided in:* *ERM. September 22, 2003. Addendum 5 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 60, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas, and will be identified in RAP.*
SWMU 62	*Response Action Plan (RAP) that describes future monitoring/sampling (as applicable) will be submitted to TCEQ within 180 days of APAR approval (submitted December 19, 2003).* *Groundwater monitoring (if included) will be reported in accordance with Baytown Refinery's RCRA Groundwater Compliance Plan (No. CP-50111).*	*Locations will be based on data provided in:* *ERM. December 19, 2003. Addendum 6 to the Phase I/II RFI Report for Eight Perimeter SWMUs – SWMU 62, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas, and will be identified in RAP.*
SWMU 63	*Ongoing semiannual groundwater monitoring program approved by TCEQ in a letter to ExxonMobil dated September 12, 2002.* *Response Action Plan (RAP) that describes future monitoring/sampling (as applicable) will be submitted to TCEQ within 180 days of APAR approval (submitted February 17, 2004).* *Groundwater monitoring (if included) will be reported in accordance with Baytown Refinery's RCRA Groundwater Compliance Plan (No. CP-50111).*	*Ongoing semiannual groundwater monitoring program includes monitor wells 63_MW705, 63_MW757, 63_MW758, 63_MW759 63_MW706A. Reporting included in Semiannual Compliance Plan (No. CP-50111) Report for Baytown Refinery's Waste Management Area-1.* *Future locations will be based on data provided in:* *ERM. February 17, 2004. SWMU 63 RCRA Facility Investigation APAR, ExxonMobil Refining and Supply Baytown Refinery, Baytown, Texas, and will be identified in RAP.*

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- 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 Baytown Refinery* facility, EPA ID# *TXD000782698*, located at *2800 Decker Drive, Baytown, Texas*. 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)_____ Date __04-28-04
(print) Kititke Cook
(title) Project Manager

Supervisor (signature)_____ Date __04-28-04
(print) Jason Wang
(title) Team Leader
Texas Commission on Environmental Quality

Locations where References may be found:

TCEQ Central Records, Austin, Texas

Contact telephone and e-mail numbers

Project Manager listed above
(512) 239-2343
corract@tceq.state.tx.us

Final Note: The purpose of the Migration of Contaminated Groundwater EI is to verify that the groundwater plume is stable. A "YE" determination does not constitute a screening tool to end the corrective action process. The "YE" determination may be changed at any time as new information becomes available.

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 Baytown Refinery_facility, EPA ID # _TXD000782698_, located at_2800 Decker Drive, Baytown, Texas_. 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) Kilike Cook Date 04-28-04
(print) Kilike Cook
(title) Project Manager

Supervisor (signature) Jason Wang Date 4/28/04
(print) Jason Wang
(title) Team Leader
Texas Commission on Environmental Quality

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