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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

Current Human Exposures Under Control

Facility Name:	UOP LLC
Facility Address:	8725 Old Mooringsport Road, Shreveport, LA 71120
Facility EPA ID #:	LAD 057 109 449

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

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 "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			See below
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)	X			
Surface Water		X		
Sediment		X		
Subsurf. Soil (e.g., >2 ft)	X			
Air (outdoors)		X		

___ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

___ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Groundwater

There were three SWMUs where groundwater concentrations exceeded the Louisiana Risk Evaluation Corrective Action Program (RECAP) Screening Standards, the former miscellaneous chemical storage area (MCSA), the aluminum chloride area, and the area where catalyst was observed in a pipeline excavation.

The MCSA SWMU was used for storage of drums containing distillation column bottoms from about 1960 to 1973. The drums apparently leaked to the surface soils and infiltrated to the groundwater. The key contaminants are chlorobenzene, 1,4-dichlorobenzene, 2,2'-oxybis(1-chloropropane), 4-chloroaniline,

(Continued on next page)

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

2. Rationale and Reference(s). (Continued)

Groundwater (cont.)

2,4-dinitrophenol, nitrobenzene, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene, and 3,4-dichloronitrobenzene. The extent of constituents in the groundwater has been defined and is contained within the property boundary. The nearest property boundary is approximately 1,200 feet downgradient from the limits of the plume. Based on a RECAP evaluation using Management Option 1 (MO-1). The chloronitrobenzene isomers (1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene) were the only constituents that have been detected above the MO-1 limiting RECAP Standards. The following table summarizes the MO-1 Standards and results:

Groundwater COC	Limiting MO-1 RECAP Standard (mg/L)	Maximum Detected Concentration (mg/L)
1-chloro-2&4-nitrobenzene	101.2	380
1-chloro-3-nitrobenzene	114.4	128

The RECAP document was submitted to LDEQ on January 11, 2006 and was approved in a letter from LDEQ dated November 6, 2006. UOP subsequently submitted a Corrective Action Evaluation Report, which was submitted to LDEQ on March 3, 2008.

The former aluminum chloride area SWMU was the location of the former aluminum chloride unit and the 4-nitrophenol (PNP) unit. The PNP unit operated from the early 1960s to approximately 1978. The aluminum chloride unit was demolished in 1999. Organic constituents were released to the surface soils during the operation of the PNP unit and subsequently infiltrated to the groundwater in this area. The key contaminants are 1,1,1-trichloroethane, benzene, chlorobenzene, 4-chloroaniline, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene, toluene, 2-chlorophenol, 2-methylnaphthalene, 4-nitroaniline, 4-nitrophenol, nitrobenzene, aniline, 1,1-biphenyl (diphenyl), and 1,2-diethylbenzene. The extent of constituents in the groundwater has been defined and is contained within the property boundary. The nearest property boundary is approximately 900 feet downgradient from the limits of the plume. The MO-1 RECAP evaluation submitted to LDEQ on January 11, 2006 indicated that none of the constituents exceeded the MO-1 limiting RECAP standards.

Buried debris was encountered during excavation for a natural gas pipeline, and this area was reported as a newly identified SWMU in October 1996. The types of material in the area consisted of construction debris (concrete, metal piping, etc), catalyst spheres and empty glass jars. It is suspected that the material was placed in the area sometime between 1950 and 1960. Aluminum, arsenic, beryllium, nickel thallium, and vanadium were detected above screening standards in the groundwater. It is believed that the metal constituents in the groundwater are naturally occurring. None of the constituents exceeded the MO-1 limiting RECAP standard as shown in the RECAP report that was submitted to LDEQ and dated January 15, 2007. LDEQ issued the No Further Action Notification for the pipeline SWMU in a letter dated March 4, 2008.

Surface Soil

In the MCSA SWMU, the impacted surface soils (< 2 ft) are confined to the area (<1 acre) where the drums were stored. The key contaminants in the surface soil are 2, 4-dinitrophenol, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, and 1-chloro-4-nitrobenzene. The soils were evaluated under MO-1 in the January 11, 2006 RECAP document. Three constituents exceeded the calculated MO-1 RECAP Standards. The following compares the maximum concentrations in the surface soils of these three constituents at the MCSA SWMU to the calculated MO-1 limiting RECAP standards.

Soil COCs	Limiting MO-1 RS (mg/kg)	Maximum Surface Soil Concentration (mg/kg)
1-Chloro-2-nitrobenzene	4.5	130
1-Chloro-3-nitrobenzene	30	65
1-Chloro-4-nitrobenzene	30	51

There were not any constituents detected above RECAP screening standards in the surficial soil in the aluminum chloride area SWMU.

The surficial material in the pipeline excavation area SWMU is fill that was placed over the buried debris.

(Continued on next page)

2. Rationale and Reference(s). (Continued)

Subsurface Soils

In the MCSA SWMU, the impacted subsurface soils are confined to the area (<1 acre) where the drums were stored. The key contaminants in the subsurface soils are benzene, 2, 4-dinitrophenol, 4-nitroaniline, nitrobenzene, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene, 2-5-dichloronitrobenzene, and 3, 4-dichloronitrobenzene. The soils were evaluated under MO-1 in the January 11, 2006 RECAP document. Four constituents exceeded the calculated MO-1 RECAP Standards. The following compares the maximum concentrations in the subsurface soils of these four constituents at the MCSA SWMU to the calculated MO-1 limiting RECAP standards.

Soil COCs	Limiting MO-1 RS (mg/kg)	Maximum Subsurface Soil Concentration (mg/kg)
Nitrobenzene	41.7	52.5
1-Chloro-2&4-nitrobenzene	4.5	10,200
1-Chloro-3-nitrobenzene	30	3,975

In the aluminum chloride area SWMU, the impacted subsurface soils are confined to approximately 0.15 acres. The key contaminants in the subsurface soils are 4-chloroaniline, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, and 1-chloro-4-nitrobenzene. Based on the January 11, 2006 MO-1 RECAP evaluation, none of these constituents were detected above the limiting RECAP standards.

Thallium and lead were detected above the RECAP screening standards in the pipeline area. Based on the January 15, 2007 MO-1 RECAP evaluation submitted to LDEQ for the pipeline area SWMU, none of the constituents were detected above the MO-1 limiting RECAP standards. LDEQ issued the No Further Action Notification for the pipeline SWMU in a letter dated March 4, 2008.

References:

URS Corporation (URS). 2006. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana. January 11, 2006.

URS Corporation (URS). 2007. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Area Where Catalyst Was Observed in the Pipeline Excavation. UOP, Shreveport, Louisiana. January 15, 2007.

URS Corporation (URS). 2008. Corrective Action Evaluation Report: Miscellaneous Chemical Storage Area, UOP Shreveport, Louisiana, March 3, 2008.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	Yes	No	No	No
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Soil (subsurface e.g., >2 ft)	No	No	No	Yes	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

___ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

X If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

___ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Potential exposures could occur for the hypothetical future construction workers who perform intrusive work. Construction workers could be exposed to affected groundwater, surface soil and/or subsurface soils at the specific areas of contamination related to the SWMUs. Exposure routes for the construction workers would consist

(Continued on next page)

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

3. Rationale and Reference(s): (Continued)

of inhalation, ingestion, and dermal contact to contaminated surface and subsurface soils and incidental ingestion and dermal contact to contaminated groundwater. However, these exposures are unlikely to occur. The probability of construction activity in these areas is very low because the SWMUs are identified in the RCRA permit and are well documented. The facility has controls that limit construction activity in these areas. Any work in the SWMU areas would require the appropriate health and safety controls that would limit exposure.

There is also a potential for a plant industrial worker to be exposed to the contaminated surface soils within the MCSA SWMU where the drums were stored. Exposure is likely to be low because there currently are not any routine activities that require workers to be in this area. Because the MCSA is a SWMU in the RCRA permit, UOP does not have any future plans for the area that would result in more frequent exposure.

References:

URS Corporation (URS). 2006. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana. January 11, 2006.

URS Corporation (URS). 2006. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Area Where Catalyst Was Observed in the Pipeline Excavation. UOP, Shreveport, Louisiana. January 15, 2007.

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be **"significant"*** (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

X If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Direct exposure to the surface soils in the MSCA are not reasonably expected to be significant, principally due to the low frequency and duration of exposure. The default exposure factors that were used in the January 11, 2006 RECAP document for the MCSA significantly overestimate risks to the workers by assuming an individual worker will be exposed to the contaminated soil 8 hours per day, 250 days per year for 25 years. There are not any current routine activities within the 0.5 acre MCSA SWMU area and therefore actual exposures are much less than estimated for development of the MO-1 standards in the RECAP document.

The potential for exposure to a construction worker is also not expected to be significant. The probability of construction activity within the soil and groundwater contamination areas is very low because the SWMUs are identified in the RCRA permit and are well documented. The facility has controls that limit construction activity in these areas. Any work in the SWMU areas would require the appropriate health and safety controls that would limit exposure.

References:

URS Corporation (URS). 2006. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana. January 11, 2006.

URS Corporation (URS). 2007. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Area Where Catalyst Was Observed in the Pipeline Excavation. UOP, Shreveport, Louisiana. January 15, 2007.

* If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

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

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the UOP facility, EPA ID # LAD 057 109 449, located at Shreveport, Louisiana under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by (signature) [signature] Date 6/12/09
(print) Karl Fohr
(title) Geologist 3

Supervisor (signature) [signature] Date 6/22/09
(print) Carey DeHarry
(title) Geologist Supervisor
(EPA Region or State) LA

Locations where References may be found:

Contact telephone and e-mail numbers

(name) ____
(phone #) ____
(e-mail) ____

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

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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

2/5/99

Interim Final

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

Migration of Contaminated Groundwater Under Control

Facility Name:	UOP LLC
Facility Address:	8725 Old Mooringsport Road, Shreveport, LA 71120
Facility EPA ID #:	LAD 057 109 449

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):

The Miscellaneous Chemical Storage Area (MCSA) SWMU is the only unit where groundwater concentrations are above the calculated protective levels. The key contaminants are chlorobenzene 1,4-dichlorobenzene, 2,2'-oxybis(1-chloropropane), 4-chloroaniline, 2,4-dinitrophenol, nitrobenzene, 1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene, and 3,4-dichloronitrobenzene. The extent of constituents in the groundwater has been defined and is contained within the property boundary. The nearest property boundary is approximately 1,200 feet downgradient from the limits of the plume. Conservative protective levels were developed following the Louisiana Department of Environmental Quality (LDEQ) Risk Evaluation Corrective Action Program (RECAP). The chloronitrobenzene isomers (1-chloro-2-nitrobenzene, 1-chloro-3-nitrobenzene, 1-chloro-4-nitrobenzene) were the only constituents that have been detected above the MO-1 limiting RECAP Standards. The following table summarizes the MO-1 Standards and results:

Groundwater COC	Limiting MO-1 RECAP Standard (mg/L)	Maximum Detected Concentration (mg/L)
1-chloro-2&4-nitrobenzene	101.2	380
1-chloro-3-nitrobenzene	114.4	128

The RECAP document was submitted to LDEQ on January 11, 2006 and was approved in a letter from LDEQ dated November 6, 2006. UOP subsequently submitted a Corrective Action Evaluation Report to LDEQ on March 3, 2008

References:

URS Corporation (URS). 2006. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana. January 11, 2006.

URS Corporation (URS). 2007. Management Option 1 Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Area Where Catalyst Was Observed in the Pipeline Excavation. UOP, Shreveport, Louisiana. January 15, 2007.

URS Corporation (URS). 2008. Corrective Action Evaluation Report. Miscellaneous Chemical Storage Area, UOP Shreveport, Louisiana, March 3, 2008.

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 MCSA SWMU was used for storage of drums containing distillation column bottoms from about 1960 to 1973. The drums apparently leaked to the surface soils and infiltrated to the groundwater during this period. Constituents in the groundwater have subsequently migrated about 900 feet downgradient of the source area. The nearest property boundary is approximately 1,200 feet downgradient from the limits of the plume. It is believed that the plume has stabilized with only limited further horizontal migration within the property at concentrations below the MO-1 risk-based concentrations. Concentrations detected at the farthest extent of the downgradient monitoring (MP-3) were 0.871 mg/l for 1-chloro-3-nitrobenzene (compared to an MO-1 standard of 114.4 mg/l) and 1.51 mg/l for 1-chloro-2&4-nitrobenzene (compared to an MO-1 standard of 101.2 mg/l). The location of MP-3 is shown on Figure A-1 in Attachment A. The seepage velocity is low (estimated to be about 3.9 to 28 feet per year). Based on the environmental chemistry of the chloronitrobenzenes and the site groundwater conditions, it is expected that natural attenuation is occurring through reductive transformations. The horizontal migration is also limited by the topography. The extent of the groundwater contamination is near a topographic low in an area where the horizontal groundwater flow gradient is also low.

The vertical boundary is defined by a clay aquitard, which is approximately 35 feet thick in the area. Therefore, the vertical limit of groundwater contamination is not expected to increase.

UOP submitted a Corrective Action Evaluation Report to LDEQ on March 3, 2008. This report provides an evaluation of different corrective action alternatives for the Miscellaneous Chemicals Storage Area that are designed to reduce the source of groundwater contamination at the site. LDEQ is currently reviewing the Corrective Action Evaluation Report.

References:

URS Corporation (URS). 2006. Management Option I Submittal Risk Evaluation Corrective Action Program (RECAP) Evaluation: Miscellaneous Chemical Storage Area, Aluminum Chloride Area, UOP, Shreveport, Louisiana January 11, 2006.

URS Corporation (URS). 2007. Corrective Action Evaluation Work Plan: Miscellaneous Chemical Storage Area, UOP Shreveport, Louisiana. January 19, 2007

URS Corporation (URS). 2008. Corrective Action Evaluation Report. Miscellaneous Chemical Storage Area, UOP Shreveport, Louisiana, March 3, 2008.

[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):

In 2002, surface water and sediment samples were collected from an intermittent stream that intersects the groundwater plume in the MCSA. None of the site constituents were detected in these samples. References that include the sampling work plan and results are listed below:

URS Corporation (URS). 2002. Phase III RFI Work Plan: Former Miscellaneous Chemical Storage Area, UOP, Shreveport, Louisiana. January 16, 2002.

URS Corporation (URS). 2002. Risk Evaluation Corrective Action Program (RECAP) Evaluation and MO-3 Work Plan: Miscellaneous Chemical Storage Area Aluminum Chloride Area Assessment, UOP, Shreveport, Louisiana. November 1, 2002.

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):

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):

[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):

UOP submitted a Corrective Action Evaluation Report on March 3, 2008. This report provides an evaluation of different corrective action alternatives for the Miscellaneous Chemicals Storage Area. Each of the alternatives that are presented has a 10-year period of groundwater monitoring. After the preferred alternative is selected, the details of the groundwater monitoring program would be described in a Corrective Action Plan. LDEQ is currently reviewing the March 3, 2008 report.

References:

URS Corporation (URS). 2008. Corrective Action Evaluation Report: Miscellaneous Chemical Storage Area, UOP Shreveport, Louisiana, March 3, 2008.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

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 UOP facility, EPA ID # LAD 057 109 449, located at Shreveport, 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) [signature] Date 6/12/09
(print) Karl Fohn
(title) Geologist 3

Supervisor (signature) [signature] Date 6/22/09
(print) Carey Dichaery
(title) Geologist Supervisor
(EPA Region or State) LA

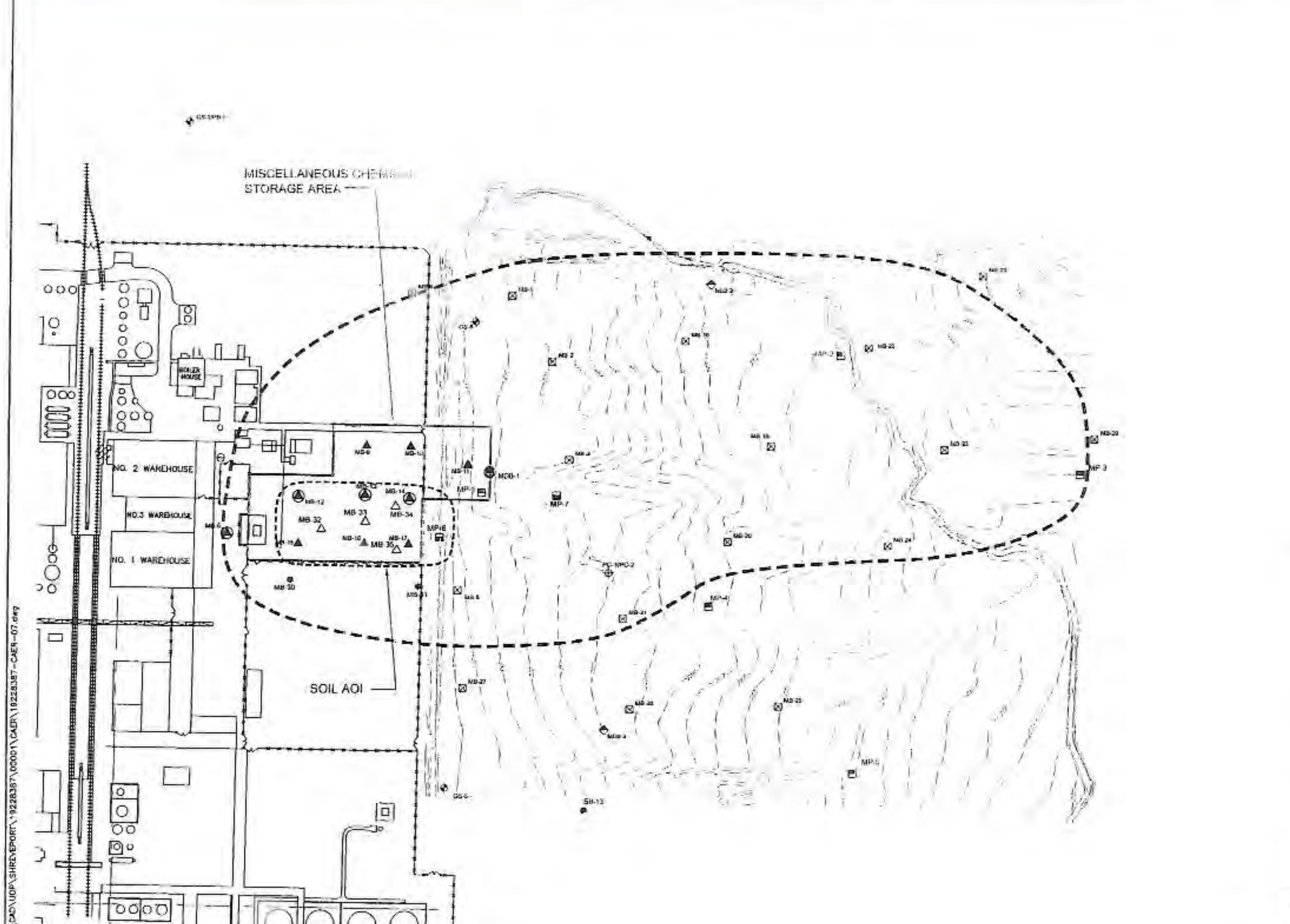
Locations where References may be found:

Contact telephone and e-mail numbers

(name) _____
(phone #) _____
(e-mail) _____

ATTACHMENT A

FIGURE



LEGEND:

- TOPOGRAPHIC CONTOUR (1-FOOT CONTOUR INTERVAL)
- MONITOR WELL INSTALLED 1991 AND 1994
- AUGUST 2001 BORING LOCATION
- RFI GEOPROBE BORING LOCATION FOR SOIL SAMPLES (1996)
- RFI GEOPROBE BORING LOCATION FOR SOIL (1996) AND GROUNDWATER SAMPLES
- PHASE II DEEP ZONE PIEZOMETER (2001)
- PHASE II DEEP ZONE BORING (2001)
- PHASE II SHALLOW ZONE PIEZOMETER (2002 AND 2004)
- RFI GEOPROBE BORING LOCATION FOR GROUNDWATER SAMPLES (1996)
- BORING COMPLETED IN 1989
- JANUARY 1999 BORING LOCATION (APPROXIMATE)
- APRIL 1999 BORING LOCATION
- MAY 1999 BORING LOCATION
- APRIL 2002 BORING LOCATION
- MB-30 SOIL BORING LOCATION (2004 SAMPLE LOCATION)
- TEMPORARY PIEZOMETER (2004/2005 SAMPLE LOCATION)
- 2007 SHALLOW ZONE PIEZOMETER
- 2007 GEOPROBE BORING FOR SOIL SAMPLES
- GROUNDWATER AOI (ADJUSTED TO INCORPORATE 2007 DATA)
- SOIL AOI (ADJUSTED TO INCORPORATE 2007 DATA)

REV	DESCRIPTION OF REVISION	BY	DATE
△			
△			
△			
△			
△			
△			

UOP
Shreveport Plant

URS
7389 Florida Blvd., Suite 300
Baton Rouge, Louisiana 70806
225/922-5700

REFERENCE DRAWINGS

SCALE 1" =150'
DESIGNED
DRAWN WCB
CHECKED GAT
PEER REVIEWED
DATE 1/15/07

MISCELLANEOUS CHEMICAL STORAGE AREA
SAMPLE LOCATIONS

REVISION △
PROJECT 19228387
FIGURE A-1

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