

US EPA ARCHIVE DOCUMENT

INTRODUCTION

This file contains the July 1999 **Region 4 Environmental Indicator (EI) Guidance Package** to be used in evaluating facilities for the two (2) RCRA Corrective Action Environmental Indicators (EIs). The Region 4 EI Guidance Package is comprised of the following two (2) components:

1. An **Introductory Memo**, which briefly explains the facility being evaluated, summarizes the conclusions of the evaluation, and outlines any necessary next steps to control exposures and/or groundwater migration, and
2. An **Attachment** to the Introductory Memo, which contains the detailed basis for the conclusions presented in the Introductory Memo. The attachment is actually the **February 5, 1999, Interim Final EI Guidance** developed by **EPA Headquarters** with input from the Regions and States.***

For a **one page flow diagram** which briefly outlines the questions covered by the Interim Final Hqs's EI Guidance, please see the following file: g:\user\shared\ei\Hqs EI Chart.

*** NOTE: The Region 4 Model Memo dated October 6, 1997, which referenced an attachment containing an evaluation guidance developed by Region 4, is now **REPLACED** by the attached guidance. EPA Region 4 strongly encourages the States to **USE** the July 1999, Region 4 Guidance Package for EI reevaluations or new evaluations performed after February 5, 1999.

QUICK REFERENCE FOR STATUS OF ENVIRONMENTAL INDICATORS					
Name and EPA I.D. Number	Location (City or Town)	Current CA725 Decision	Current CA750 Decision	If Current Decision is Negative, Projected Date for Positive EI	
				CA725	CA750
Vicksburg Chemical Company MSD 990 714 081	Vicksburg, MS	NO	NO	2003	2005

4WD- RCRA ECB

SUBJ: Evaluation of Vicksburg Chemical Company's status under the RCRIS Corrective Action Environmental Indicator Event Codes (CA725 and CA750)
EPA I.D. Number: MSD 990 714 081

FROM: Judy Sophianopoulos

THRU: Jeffrey T. Pallas

TO: Jewell Grubbs

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Vicksburg Chemical Company's status in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Act Information System (RCRIS):

- 1) Current Human Exposures Under Control (CA725),
- 2) Migration of Contaminated Groundwater Under Control (CA750).

Concurrence by the RCRA Enforcement and Compliance Branch Chief is required prior to entering these event codes into RCRIS. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing at the appropriate location within Attachments 1 and 2.

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This particular evaluation is the first evaluation for Vicksburg Chemical Company.

III. FACILITY SUMMARY

Vicksburg Chemical Company (VCC) is conducting Corrective Action at the facility subject to Consent Decree, Civil Number W92-0008B (Consent Decree), between EPA and VCC, filed April 17, 1992. EPA's RCRA Facility Assessment (RFA) report, dated August 29, 1986,

identified 34 solid waste management units (SWMUs) and 4 Areas of Concern (AOCs), which resulted from the production of pesticides from 1961 - 1987.

At the present time, VCC 's regulatory status under RCRA is that of a large quantity generator (\$ 1000 kg of hazardous waste in a month). VCC manufactures only the inorganic chemicals, nitric acid, potassium nitrate, nitrogen tetroxide, chlorine, sodium hypochlorite, and potassium carbonate. The type of waste generated by VCC is remediation waste from corrective action interim measures.

EPA approved several interim measures at VCC, in accordance with the Consent Decree, including a Temporary Unit (TU) in August 1995, with an extension until August 1997, and a Corrective Action Management Unit (CAMU) in February 1998. VCC conducted treatability studies in the TU that indicated that biotreatment could treat pesticide-contaminated soil successfully. VCC has been and will continue putting treated soil in the CAMU. Treatability study results and analytical results to date indicate that remediation of most of the contaminated soil should be completed in FY2001.

VCC is located on Rifle Range Road in the City of Vicksburg near bayous that discharge into the Mississippi River. There is a middle class residential area west of the site. Land use of the site, itself, will be restricted to industrial use.

IV. CONCLUSION FOR CA725
(Brief Outline of Issues Leading to an EI of YE, NO or IN)

Current human exposures are uncontrolled; therefore the CA725 EI is NO. Evaluation of seven SWMUs created by pesticide production, storage, or loading and unloading indicates that contamination exists above risk-based levels in soil and groundwater.

Based on interim measures treatment and analytical data, the CA725 EI is projected to be YE by 2003, because innovative biotreatment and zero-valent iron treatment have a good chance to be successful. There is also at least one vendor from EPA's VISITT data base who has a successful, cost-effective treatment method for arsenic.

V. CONCLUSION FOR CA750
(Brief Outline of Issues Leading to an EI of YE, NO or IN)

VCC has not completed groundwater assessment of the site. However, VCC did find groundwater contamination above maximum contaminant levels (MCLs). Therefore, although the plume has not been delineated, the CA750 EI is NO.

Based on interim measures analytical data and the availability of innovative technologies, the CA750 EI is projected to be YE by 2005.

VI. SUMMARY OF FOLLOW-UP ACTIONS
(Discussion of What is Needed to Get to Yes, with EI Interim Milestone Schedule)

A. CA725

VCC's interim measures continue to be bio-treatment of contaminated soils and placement of treated soils into the CAMU. VCC's RCRA Facility Investigation (RFI), which will determine the amount and extent of soil contamination, is expected to be completed in Fiscal Year (FY) 2000, and soil remediation is projected to be complete in FY 2001. CA725 is projected to be YE in FY 2003.

VICKSBURG CHEMICAL COMPANY EI INTERIM MILESTONE SCHEDULE CA725			
Activities	CA RCRIS Event Code	Scheduled Date (QUAR- TER'S LAST DAY & FISCAL YEAR)	Remarks
Stabilization Measures Implementation	CA600	3/31/00	SWMUs 1, 9, 11, 12, 15, 16, 17: continued excavation and treatment of soils contaminated with dinoseb and toxaphene above industrial risk-based concentrations (RBCs), and with arsenic above background levels; and imposition of institutional controls.
Interim Measures Progress Report Received	CA643	6/30/00	SWMUs 1, 9, 11, 12, 15, 16, 17: Report Received on Institutional Controls
Interim Measures Report Received	CA640	9/30/00	SWMUs 1, 9, 11, 12, 15, 16, 17: Report on completion of soil excavation and treatment
Stabilization Construction Complete	CA650	12/31/01	Review finds that Interim Measures undertaken have been completed at SWMUs 1, 9, 11, 12, 15, 16, 17

Activities	CA RCRIS Event Code	Scheduled Date (QUARTER'S LAST DAY & FISCAL YEAR)	Remarks
Current Human Exposures Under Control Determination	CA725	10/31/03	Revised EI Memo

A. CA750

VCC will complete groundwater assessment, begin installation of any new monitoring wells required to delineate the extent of the groundwater plume, and research innovative, cost-effective groundwater remediation technologies, such as permeable reactive barriers.

It is projected that CA750 will reach YE in FY 2005.

VICKSBURG CHEMICAL COMPANY EI INTERIM MILESTONE SCHEDULE CA750			
Activities	CA RCRIS Event Code	Scheduled Date (QUARTER'S LAST DAY & FISCAL YEAR)	Remarks
Stabilization Measures Implemented	CA600	9/30/01	SWMUs 1, 9, 11, 12, 15, 16, 17: Imposition of zero-valent iron technology to remediate toxaphene in soil and groundwater; treatability studies to find effective treatment technology for dinoseb and arsenic in groundwater
Interim Measures Report Received	CA640	9/30/02	SWMUs 1, 9, 11, 12, 15, 16, 17: Groundwater effectiveness and monitoring report for dinoseb, toxaphene, and arsenic plumes.

Activities	CA RCRIS Event Code	Scheduled Date (QUARTER'S LAST DAY & FISCAL YEAR)	Remarks
Stabilization Construction Complete	CA650	9/30/04	Review of groundwater effectiveness monitoring report shows stabilization objectives have been met.
Migration of Contaminated Groundwater Under Control	CA750	9/30/05	Revised EI Memo

VII. LEVEL OF CONFIDENCE IN REACHING A POSITIVE EI EVALUATION AND MAJOR ISSUES

The level of confidence in the milestone schedules outlined in Section VI is medium, given the fact that the zero-valent iron technology will have to be evaluated for the VCC site, and a treatability study must be conducted to determine an effective treatment for arsenic contamination.

Attachments: 1. CA725: Current Human Exposures Under Control
 2. CA750: Migration of Contaminated Groundwater Under Control

ATTACHMENT 1
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
Current Human Exposures Under Control

Facility Name: Vicksburg Chemical Company
Facility Address: P.O. Box 821003, Vicksburg, MS 39182-1003
Facility EPA ID #: MSD 990 714 081

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?

- 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

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS Event Code (CA725)**

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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).

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS Event Code (CA725)**

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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)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			Concentrations above maximum contaminant levels/dinoseb, toxaphene, arsenic
Air (indoors) ²			X	Insufficient data
Surface Soil (e.g., <2 ft)	X			Concentrations above risk-based levels/dinoseb, toxaphene, arsenic
Surface Water			X	Insufficient data
Sediment			X	Insufficient data
Subsurface Soil (e.g., >2 ft)				Concentrations above risk-based levels/dinoseb, toxaphene, arsenic
Air (outdoors)			X	Insufficient data

_____ 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): Risk Assessment Guidance for Superfund EPA/540/1-89/002; Soil

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.

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Screening Guidance: Users Guide OSWER Directive 9355.4-23 and Technical Background Document
OSWER Directive 9355.4-17A; Region 9 Preliminary Remediation Goals Table:
http://www.epa.gov/region09/waste/sfund/prg/s2_01.htm

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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)							
“Contami- nated” Media	Resident s	Workers	Day- Care	Construction	Trespasser s	Recreation	Food³
Groundwater	No	No	No	No	N/L	N/L	Yes
Air (indoors)	Insuffici- ent data	Insuffici- ent data	No	N/L	N/L	N/L	N/L
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	N/L	N/L	No
Surface Water	Yes	Yes	N/L	N/L	N/L	N/L	Yes
Sediment	No	No	N/L	N/L	N/L	N/L	Yes
Soil (subsurface, e.g., >2 ft)	N/L	N/L	N/L	Yes	N/L	N/L	No
Air (outdoors)	No	Yes	No	Yes	Yes	N/L	N/L

Instructions for Summary Exposure Pathway Evaluation Table:

1. For Media which are not “contaminated” as identified in #2, please strike-out specific Media, including Human Receptors’ spaces, or enter “N/C” for not contaminated.
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) are not assigned spaces in the above table (i.e, **N/L - not likely**). 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

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

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contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

_____ 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): Expedited RCRA Facility Investigation Report SWMU 16- Former Atrazine Production Area SWMU 1- Container (Drum) Storage Area SWMU 17 - Returned Product Storage Area, June 1997, Woodward-Clyde Consultants (WCC) File 96B315-003; Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004

- 4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**⁴ (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)?

_____ 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.”

X 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): Risk Assessment Guidance for Superfund EPA/540/1-89/002; Soil Screening Guidance: Users Guide OSWER Directive 9355.4-23 and Technical Background Document OSWER Directive 9355.4-17A; Region 9 Preliminary Remediation Goals Table: http://www.epa.gov/region09/waste/sfund/prg/s2_01.htm; Expedited RCRA Facility Investigation Report SWMU 16- Former Atrazine Production Area SWMU 1- Container (Drum) Storage Area SWMU 17 - Returned Product Storage Area, June 1997, Woodward-Clyde Consultants (WCC) File 96B315-003; Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004

- 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).

X 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

⁴ 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.

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Rationale and Reference(s): Risk Assessment Guidance for Superfund EPA/540/1-89/002; Soil Screening Guidance: Users Guide OSWER Directive 9355.4-23 and Technical Background Document OSWER Directive 9355.4-17A; Region 9 Preliminary Remediation Goals Table: http://www.epa.gov/region09/waste/sfund/prg/s2_01.htm; Expedited RCRA Facility Investigation Report SWMU 16- Former Atrazine Production Area SWMU 1- Container (Drum) Storage Area SWMU 17 - Returned Product Storage Area, June 1997, Woodward-Clyde Consultants (WCC) File 96B315-003; Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004

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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):

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 _____ facility, EPA ID # _____, located at _____ 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) _____ Date 11/22/99
(print) Judy Sophianopoulos
(title) Environmental Scientist

Supervisor (signature) _____ Date _____⁵
(print) Jewell Grubbs
(title) Chief, RCRA Enforcement and Compliance Branch
(EPA Region or State) EPA Region 4

Locations where References may be found:

10th Floor, South Enforcement and Compliance Section

Contact telephone and e-mail numbers

(name) Judy Sophianopoulos
(phone #) (404) 562-8604
(e-mail) sophianopoulos.judy@epamail.epa.gov

⁵ **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.**

ATTACHMENT 2
DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Event Code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Vicksburg Chemical Company
Facility Address: P.O. Box 821003, Vicksburg, MS 39182-1003
Facility EPA ID #: MSD 990 714 081

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**”⁶ 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): Risk Assessment Guidance for Superfund EPA/540/1-89/002; Soil Screening Guidance: Users Guide OSWER Directive 9355.4-23 and Technical Background Document OSWER Directive 9355.4-17A; Region 9 Preliminary Remediation Goals Table: http://www.epa.gov/region09/waste/sfund/prg/s2_01.htm

⁶ “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”⁷ as defined by the monitoring locations designated at the time of this determination?

_____ 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”⁷).

X If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”⁷) - 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): Expedited RCRA Facility Investigation Report SWMU 16- Former Atrazine Production Area SWMU 1- Container (Drum) Storage Area SWMU 17 - Returned Product Storage Area, June 1997, Woodward-Clyde Consultants (WCC) File 96B315-003; Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004

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): Expected to discharge to creek and bayous near south and east property lines, and ultimately the Mississippi River; please see Consent Decree, Civil Number W92-0008B (Consent Decree), between EPA and VCC, filed April 17, 1992; Corrective Action Observation Confirmatory

⁷ “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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Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No.
35092B007.C.00.03004.

5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration⁸ 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 concentration⁸ 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) providing 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 concentration⁸ 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 concentrations⁸ greater than 100 times their appropriate groundwater “levels,” providing 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 identifying if there is evidence that the amount of discharging contaminants is increasing.

 X If unknown - enter “IN” status code in #8.

Rationale and Reference(s): Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004.

⁸ 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 implemented⁹)?

_____ 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,¹⁰ 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.

 X If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s): Corrective Action Observation Confirmatory Sampling and Analysis, March 11, 1999, URS Greiner Woodward Clyde File No. 35092B007.C.00.03004.

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

⁹ 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.

¹⁰ 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.

**RCRA Corrective Action
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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 Assessment Plan has not been approved; new wells will be constructed to add to the current groundwater monitoring data; please see RCRA Facility Investigation Workplan, June 1996, WCC File 92B007C-3003; Memorandum from W. N. O'Steen to Judy Sophianopoulos, September 13, 1996; and Record of Conversation from S. T. Boswell to Judy Sophianopoulos, November 6, 1996

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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).

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 _____ facility, EPA ID # _____, located at _____. 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 11/22/99
(print) Judy Sophianopoulos
(title) Environmental Scientist

Supervisor (signature) _____ Date _____
(print) Jewell Grubbs
(title) Chief, RCRA Enforcement and Compliance Branch
(EPA Region or State) EPA Region 4

Locations where References may be found:

10th Floor, South Enforcement and Compliance Section

Contact telephone and e-mail numbers

(name) Judy Sophianopoulos
(phone #) (404) 562-8604
(e-mail) sophianopoulos.judy@epamail.epa.gov

Optional Exposure Pathway Evaluation Work Sheet
Referenced in CA725 - Question 3

Explanatory Footnotes:

Exposure Pathway Evaluation Work Sheet is a qualitative evaluation of the “completeness” of major pathways between contamination and exposures by plausible receptors. This screening only evaluates the major pathways (that are common at many/most contaminated site situations) and should not be used to reduce the scope of a site-specific risk assessment (which should include all pathways which may be significant at a given site).

Additional note: The following are special situations in which project managers should be cautious about using benchmark or other generic screening levels that have been derived with specific assumptions. In any of the situations, the risk manager should have a risk assessor provide assistance to review the use of the screening models.

- 1) The use of screening levels when multiple contaminants are present at a site; most guidances were developed for single contaminant exposures scenarios and are not appropriate to consider compounded or synergistic effects of multiple contaminants.
- 2) The use of screening levels when multiple routes of exposure are possible for given contaminant; some of the screening guidances consider multiple exposure routes but all of them do not.
- 3) The use of soil screening levels at sites with oily soils, free phase hydrocarbon on the groundwater, and free phase hydrocarbon below the water table; the guidances were developed assuming water leaching of soils not oil transport of contaminants through soils.

Optional Exposure Pathway Evaluation Work Sheet
Referenced in CA725 - Question 3

(1/5/99 Draft)

Screening Potentially Complete Pathways for Contaminated GROUNDWATER

Off-site GW Cont.	wells impacted? wells not “	Potable use Non-potable uses	Phyl/Inst. controls? (e.g., treatment @ wellhead?) Watering plants? Swimming pools? Showering??	Resident (ingestion) (inhalation) (dermal)
On-site GW Cont.	wells impacted? wells not “	Potable use Non-potable uses	Phyl/Inst. controls? (e.g., gw-use restrictions?) Process-water exposures? Watering landscaping? Showering??	Worker (M) (ingestion) (inhalation) (dermal)
On- or Off-site GW Cont.	const. into gw “ ” not “	expected? “ ” not “	Phyl/Inst. controls? (e.g., PPE/Training req?)	Const. Work. (inhalation) (dermal cont.)
On- or Off-site GW	irrigation of veg./fruit “ veg./fruit not “	expected? “ veg./fruit not “	Phyl/Inst. controls? (e.g, testing/restrictions?)	Food Supply (Ingestion) Cont.

Screening Potentially Complete Pathways for Contaminated SURFACE SOIL

Off-site SS Cont.	contam. expected contam. not “	Private yards, etc. Not heavy use areas	Phyl/Inst. controls? (e.g., vegetation, etc.)	Resident Recreator (ingestion) (dermal cont.) (inhalation)
On-site SS Cont.	contam. expected contam. not “	High use/maint. areas? Not heavy use areas	Phyl/Inst. controls? (e.g., PPE/Fencing?) (Ok for children?)	Worker (M) Trespasser (i n g e s t i o n) (inhalation) (dermal)
On- or Off-site SS Cont.	cont. construction expected? construct. not “		Phyl/Inst. controls? (e.g., PPE/Training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
On- or Off-site SS Cont.	veg./fruit/game expected? veg./fruit/game not “		Phyl/Inst. controls? (e.g., Testing/Restrictions?)	Food Supply (Ingestion)

Screening Potentially Complete Pathways for Contaminated SURFACE WATER/SEDIMENT

Off-site SW/S Cont.	contam. expected? contam. not “	Water supply intakes? ” not expected	Phyl/Inst. controls? (e.g., treated prior to)	Resident (ingestion) (inhalation) (dermal cont.)
Off-site SW/S Cont.	contam. expected? contam. not “	Private yards, etc. Not heavy use areas	Phyl/Inst. controls? (e.g., remoteness?) (children?)	Resident Recreator (ingestion) (inhalation) (dermal cont.)
On-site SW/S Cont.	contam. expected contam. not “	High use/maint. areas? Not heavy use areas	Phyl/Inst. controls? (e.g., fences/signs?) (children?)	Worker (M) Tresspassor (ingestion) (inhalation) (dermal cont.)
On- or Off-site SW/S Cont.	construct. expected? construct. not “		Phyl/Inst. controls? (e.g., PPE/training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
On- or Off-site SW/S Cont.	fish/shellfish/veg./game expected? fish/shellfish/veg./game not “		Phyl/Inst. controls? (e.g., consumption restrictions?)	Food Supply (Ingestion)

Screening Potentially Complete Pathways for Contaminated SUB-SURFACE SOIL

On- or Off-site SubSoil Cont.	construction expected? construct. not “	Phyl/Inst. controls? (e.g., PPE/training req?)	Const. Work. (ingestion) (inhalation) (dermal cont.)
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On- or Off-site SubSoil Cont.	deep rooted veg./fruit expected? “ veg./fruit not “	Phyl/Inst. controls? (e.g., planting restrictions?)	Food Supply (ingestion)
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Screening Potential Pathways for Contaminated INDOOR AIR

Contamination in groundwater, surface or subsurface soil, surface water, or sediments;

Adjacent to homes?	vapors/particulates likely?	Phyl/Inst. controls?	Resident
“ not “ “	no “ ”	(e.g., barriers/veg.)	(inhalation- indoors)

Adj. to workplace bldgs?	vapors/particulates likely?	Phyl/Inst. controls?	Worker
“ not “ “	no “ ”	(e.g., barriers/veg.)	(inhalation- indoors)

Outdoor Air - Addressed in Earlier Pathways

Examples of Exposure Controls

1. Physical Exposure Controls

- Caps
- Fences/walls
- Security Guards
- Vegetative Cover
- Natural Inaccessibility
- Remoteness/Unattractiveness
- Treatment of media (prior to exposure)
- Vapor barriers / ventilation systems

2. Institutional Exposure Controls

- Posted Signs
- Land-use Restrictions (e.g., zoning, deed, Responsible Party statements)
- Level of PPE (Personal Protection Equipment)
- Safety Training / Newsletters
- Activity Permits / Notifications (e.g., construction permits / notifications)
- Well Restrictions
- Media-use Restrictions
- Responsible Party statements of activity / use restrictions
- Testing / Monitoring (and restrictions if necessary)
- Consumption Restrictions
- Restrictions on Frequency of Exposures

