

ADEM



ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

POST OFFICE BOX 301463 • 1400 COLISEUM BLVD. 36110-2059

MONTGOMERY, ALABAMA 36130-1463

WWW.ADEM.STATE.AL.US

(334) 271-7700

JAMES W. WARR
DIRECTOR

September 30, 1999

DON SIEGELMAN
GOVERNOR

MEMORANDUM

TO: Stephen A. Cobb, Chief *SAC*
Hazardous Waste Branch
Land Division

FROM: S. Scott Story *SSS*
Industrial Facilities Section
Hazardous Waste Branch
Land Division

SUBJECT: Evaluation of Occidental Chemical Company, Mobile Facility's status under the RCRIS
Corrective Action Environmental Indicator Event Codes (CA725 and CA750)
EPA I.D. Number: ALD 008 163 388

Facsimiles: (334)
Administration: 271-7950
General Counsel: 394-4332
Air: 279-3044
Land: 279-3050
Water: 279-3051
Groundwater: 270-5631
Field Operations: 272-8131
Laboratory: 277-6718
Mining: 394-4326
Education/Outreach: 394-4383

I. PURPOSE OF MEMO

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

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

Concurrence by the Hazardous Waste 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 second evaluation for Occidental Chemical Company, Mobile Facility (Occidental-Mobile). The first evaluation was completed in September 1998, and the results of this memo were IN for CA 725 and NO for CA 750. The discussions, interpretations, and conclusions presented during the 1997 evaluation regarding contamination and exposures at the facility were based on the following reference documents:

- | | |
|--|---------------|
| • Semi-Annual Report, Former Brine Sludge Lagoon | July 1998 |
| • RCRA Facility Investigation Work Plan | April 1997 |
| • Revised RCRA Facility Investigation Work Plan | July 1994 |
| • RCRA Facility Assessment Report | December 1992 |
| • RCRA Facility Investigation, Volume I of III | October 1992 |
| • EPA, Region IV Correspondence File | Several |
| • Interim RCRA Facility Assessment Report | May 1988 |

Birmingham
110 Vulcan Road
Birmingham, Alabama 35209-4702
(205) 942-6168
(205) 941-1603 [Fax]

Decatur
2708 6th Avenue, SE, Suite B
Decatur, Alabama 35603-1508
(256) 353-1713
(256) 340-9359 [Fax]

Mobile
2204 Perimeter Road
Mobile, Alabama 36615-1131
(334) 450-3400
(334) 479-2593 [Fax]

Mobile - Coastal
4171 Commanders Drive
Mobile, Alabama 36615-1421
(334) 432-6533
(334) 432-6598 [Fax]



Printed on Recycled Paper

The CA 725 conclusion was that there is not enough relevant information available to make a determination as to whether human exposures are controlled. Groundwater, soil, and surface water assessment is not complete, therefore, it is not possible to determine if human exposures are controlled. It was recommended that CA725 IN be entered into RCRIS.

The CA750 conclusion was that releases from SWMUs and/or AOCs have contaminated groundwater at concentrations above relevant action levels. The existing groundwater recovery system controls groundwater mercury contamination. Perchloroethylene and carbon tetrachloride were detected at high concentrations (1,700 ug/l and 7,500 ug/l respectively; relevant action levels are 5 ug/l for both) in areas outside the influence of the groundwater recovery system. Additionally, the full extent of groundwater organics contamination has not been assessed. Although the groundwater is contaminated above relevant action levels, control measures for the perchloroethylene and carbon tetrachloride plume have not been implemented. Since all groundwater contamination at or emanating from the facility is not controlled, it was recommended that CA750 NO be entered.

III. FACILITY SUMMARY

Occidental-Mobile owns and operates a chlor-alkali plant located in Mobile, Alabama. Brine sludge from chlorine production electrolytic cells was historically managed in a lagoon in the northern portion of the active process area. The brine sludge was removed in 1989 and the lagoon was backfilled with native soil and capped with a clay cover. A groundwater recovery system was designed and began operation in March 1989. In May 1989, this facility was issued a RCRA Post-Closure Care Permit, including a corrective action plan, for the closed surface impoundment. Groundwater and recovery system sampling is conducted quarterly. The corrective action plan requires that the corrective action program continue until the groundwater protection standard has been met for a period of three consecutive years. Also, as a part of the permitting process, the Environmental Protection Agency (EPA) conducted a RCRA Facility Assessment (RFA) which identified various solid waste management units (SWMUs) at the facility which required investigation. Of 21 SWMUs and two areas of concern (AOCs) identified, eight SWMUs and the two AOCs were targeted for a RCRA Facility Investigation (RFI). The RFI was conducted during the period of January 1991 and July 1992, and an RFI Report was submitted in October 1992. In September 1992, a chlorocarbon odor was detected by drillers installing a foundation study boring at the facility. In November 1992 Occidental-Mobile submitted a supplemental RFA identifying the new SWMU designated "SWMU 22". A Supplemental RFI was conducted during the period of June 1997 and May 1998 and a RFI Report was submitted to the Department in December 1998.

IV. CONCLUSION FOR CA725

The resulting entry for the CA725 entry is YE. Three complete Human Exposure pathways were shown to exist at Occidental-Mobile. Human exposure pathways were shown to exist for trespassers, workers as well as for construction activities at the facility. The completed pathways for the workers at the facility include groundwater and soil. Although groundwater contact can occur under maintenance or sampling conditions, contact with the groundwater is not of the magnitude or duration that would result in a health advisory as put forth in EPA's guidance for Drinking Water Regulations and Health advisories. Ingestion of contaminated groundwater does not occur at the Occidental-Mobile facility as a result of the effective capture of the contaminated groundwater by the corrective action system, and the impact of contact with contaminated groundwater is not significant based on dermal contact for a short duration.

In the same respect soil contamination at the site poses a risk to trespassers and workers, but does not pose a significant risk for short term exposure as would result from either unauthorized entrance onto the facility by a trespasser or from maintenance or sampling activity as conducted by workers at the facility. Finally, construction projects could pose a risk to workers in respect to soil and groundwater contamination, but at this time there are no construction projects ongoing at the facility.

V. CONCLUSION FOR CA750

The resulting entry for the CA 750 entry is YE. Groundwater contamination at the site has occurred as a result of past operating practices involving mercury to produce chlorine gas, hydrogen gas, and caustic soda.. Groundwater contamination stabilization has occurred as a result of the current corrective action system that encompasses the Former Brine Sludge Lagoon. The stabilization has occurred because the direction of groundwater flow as demonstrated by Occidental-Mobile is directly towards the corrective action system. Testing will continue to be performed as part of the Post-Closure Permit that is currently being renewed as well as part of the Supplemental RFI Work Plan that has been implemented.

VI. SUMMARY OF FOLLOW-UP ACTIONS

The follow-up actions being conducted at Occidental-Mobile include the renewal of the Post-Closure Permit as well as finalizing the Supplemental RFI addressing SWMU 22. The Post-Closure Permitting renewal process will result in the continued quarterly monitoring of recovery sump RS-1, compliance wells MW-2, MW-3, and MW-4, background well MW-5, and other additional wells MW-1R, MW-6, MW-8S, and MW-9S. Additional semiannual monitoring will include wells MW-3, MW-5, MW-8S, MW-9S, MW-13S, MW-8D, MW-12D, MW-14D, MW-21D, MW-37D, MW-38I, MW-38D, MW-43D, DW-1, DW-2, DW-3, and DW-5. The facility will also continue to operate the corrective action system until constituent concentrations are reduced to the levels set out in the permit or limits that may be approved in the future for this activity.

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: Occidental Chemical Company, Mobile Facility
Facility Address: 1300 Jarvis Road Mobile, AL 36614
Facility EPA ID #: ALD 008 163 388

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 that 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)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			Mercury, Chlorides, Carbon Tetrachloride, and Perchloroethylene
Air (indoors) ²		X		
Surface Soil (e.g., <2 ft)	X			Mercury, Chlorides, Carbon Tetrachloride, and Perchloroethylene
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			Mercury, Chlorides, Carbon Tetrachloride, and Perchloroethylene
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.

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).

²Recent 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.

Rationale and Reference(s):

Groundwater contamination is evidenced in the March 1999 Semi-Annual Groundwater Monitoring Report, which contains data from previous groundwater sampling events. For example, contaminants were observed above permit limits in monitoring wells MW-33D (120 ppb Mercury observed/2 ppb Permit Limit), MW-3 (20 ppb Mercury), and MW-34S (59 ppb Mercury).

Surface and Subsurface Soil contamination is evidenced in the April 1997 RFI Work Plan which exhibited constituents above hazardous waste criteria. For example, contaminants were observed above hazardous waste criteria in soil boring AB-5 (910 ppb Carbon Tetrachloride/500 ppb HW Criteria and 25,000 ppb perchloroethylene/700 ppb HW Criteria).

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 <u>Human Receptors</u> (Under Current Conditions)							
<u>“Contaminated” Media</u>	<u>Residents</u>	<u>Workers</u>	<u>Day-Care</u>	<u>Construction</u>	<u>Trespassers</u>	<u>Recreation</u>	<u>Food³</u>
<u>Groundwater</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	<u>No</u>
<u>Air (indoors)</u>	-	-	-	-	-	-	-
<u>Soil (surface, e.g., <2 ft)</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>Yes</u>	<u>No</u>	<u>No</u>
<u>Surface Water</u>	-	-	-	-	-	-	-
<u>Sediment</u>							
<u>Soil (subsurface, e.g., >2 ft)</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	<u>No</u>
<u>Air (outdoors)</u>	-	-	-	-	-	-	-

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have assigned spaces in the above table. 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).
- 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

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

Rationale and Reference(s):

Workers may come in contact with groundwater as a result of maintenance of the corrective action system. Exposure could occur at the groundwater treatment system or at an extraction or sampling well. Contact could result from maintenance activities or sampling activities used to ensure compliance with the facility's Post-Closure Permit which requires Semi-Annual Corrective Action Effectiveness Reports and Quarterly Groundwater Monitoring Reports to be submitted to the Department. Workers may come in contact with surface soil as a result of daily work activities or as a result of facility maintenance. However, exposure to surface soil does not frequently occur. Workers may also come into contact with surface and subsurface soils during construction projects at the facility. However, currently there are no construction projects ongoing at the site.

Construction workers such as those required to install or remove monitoring wells and erect building could come into contact with the groundwater, surface soils and subsurface soils. Again, currently there are no construction projects ongoing at the site.

Trespassers at the facility may come into contact with surface soil. However this is unlikely since the facility is enclosed with a six-foot fence which is topped with barbed wire. Also, eleven of the thirteen gates are normally locked and the main gate is electronically operated. All gates are attended by facility personnel when open.

- 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."

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

⁴If 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.

Rationale and Reference(s):

The completed pathways for the workers at the facility include groundwater and soil. Although is groundwater contact can occur under maintenance or sampling conditions, contact with the groundwater is not of the magnitude or duration that would result in a health advisory as put forth in EPA's guidance for Drinking Water Regulations and Health advisories. Ingestion of contaminated groundwater is not occurring at the Occidental-Mobile facility as a result of the effective capture of the contaminated groundwater by the corrective action system, and the impact of contact with contaminated groundwater is not significant based on dermal contact for a short duration. In the same respect soil contamination at the site poses a risk to workers and to trespassers but does not pose a significant risk to workers and trespassers for short term exposure as would result from either unauthorized entrance onto the facility by a trespasser or from maintenance, potential construction activity, or sampling activity as conducted at the facility.

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):

- 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 Occidental Chemical Corporation, Mobile Facility, EPA ID ALD 008 163 388, located at Mobile, 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 S. Scott Story Date September 30, 1999
S. Scott Story
Environmental Engineer I

Supervisor Stephen A. Cobb Date 9/30/99⁵
Stephen A. Cobb
Chief, Hazardous Waste Branch
Alabama Department of Environmental Management

Locations where References may be found:

- April 1997 RCRA Facility Investigation Work Plan, ADEM Main Office
- May 1997 Interim Measures Work Plan, ADEM Main Office
- December 1998 RCRA Facility Investigation Report, ADEM Main Office
- November 1998 Semiannual Groundwater Monitoring Report, ADEM Main Office
- January 1999 RCRA Post Closure Permit Renewal Application, ADEM Main Office
- January 1999 Semiannual Corrective Action Effectiveness Report, ADEM Main Office

Contact telephone and e-mail numbers

(Name) S. Scott Story
(Phone #) (334) 270-5600
(E-mail) sss@adem.state.al.us

⁵FINAL 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: Occidental Chemical Company, Mobile Facility
Facility Address: 1300 Jarvis Road Mobile, AL 36114
Facility EPA ID #: ALD 008 163 388

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 the 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**"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):

There are 66 groundwater monitoring wells at the Occidental-Mobile facility. Of the 66 wells, 28 wells monitor the Upper Zone, 35 wells monitor the Lower Zone, and 3 wells monitor the Very Deep Zone. Nine groundwater monitoring wells, MW-1R through MW-9S, make up the post closure monitoring system for the Former Brine Sludge Lagoon.

The constituents of concern are associated with the production of chlorine, sodium hydroxide, and sodium silicate at the site. The constituents of concern from these materials are generally inorganics (primarily mercury and chloride) and volatile organics (primarily carbon tetrachloride and perchloroethylene). This list of constituents includes mercury, chloride, cadmium, chromium, lead, carbon tetrachloride, perchloroethylene.

Groundwater contamination is evident in the March 1999 Semiannual Groundwater Monitoring Report, which contains data from previous groundwater sampling events. For example, contaminants were observed above permit limits in monitoring wells MW-33D (120 ppb Mercury observed/2 ppb Permit Limit), MW-3 (20 ppb Mercury), and MW-34S (59 ppb Mercury). Also, as evidence in the December 1998 Permit Renewal Application, volatile organic constituents were observed above MCLs in monitoring wells DW-3 (650 ppb Carbon Tetrachloride observed/5 ppb MCL) and DW-5 (3000 ppb Carbon Tetrachloride).

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"⁶ 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"⁶.
- 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):

Inorganics

The 1992 RFI report concluded that the source, nature, and extent of mercury and chloride constituents in the groundwater were well defined, and they posed no apparent threat to human health or the environment. The mercury plume in the Upper Zone is binodal with centers at the Former Brine Sludge Lagoon and the Membrane Cell Building. In the Lower Zone, the mercury plume is centered near the southwest corner of the Former Brine Sludge Lagoon. The chloride plumes in the Upper and Lower Zones are centered at the Former Salt Storage/unloading Area. The corrective action system continues to operate at approximately 3.3 times the natural groundwater flux and successfully prevents further migration of groundwater contaminated by the inorganic constituents beyond the wells that encompass the closed sludge lagoon.

Organics

The primary organics plumes consist of carbon tetrachloride (CCl₄) and perchloroethylene (PCE). These constituents are predominately present in the groundwater in the Lower Zone. Organic constituents have not been detected in the Very Deep Zone. The CCl₄ plume encompasses 10 acres in the northern portion of the plant. An isolated, and apparently separate plume, is observed in the southern part of the plant at the monitoring well MW-38 cluster. The PCE plume is elongated in the north-south direction and encompasses approximately 25 acres of the plant area, especially in the northern part. Each of these plumes is defined to the MCLs. There is an isolated PCE plume at the southern portion of the facility that is not defined to MCL do to some of the contamination being off-site. However, groundwater flow in the zone of contamination is generally to the northeast and the plume is defined on-site. Currently, this area is being evaluated to determine if the cause of the plume an off-site source.

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.

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):

Inorganics

The groundwater in the Upper Zone, which contains contamination from the Former Brine Sludge Lagoon, flows northeasterly toward Barge Canal and is influenced locally by active groundwater recovery. The corrective action system continues to function as designed and there is no evidence of constituent migration in wells farther downgradient from the former lagoon that can be attributed to the former lagoon.

Organics

Groundwater in the Lower Zone exhibits a general northeasterly flow and this zone may connect with the Barge Canal. However, the constituents are defined to MCLs in the northern portion of the facility. There are no known surface water impacts to Barge Canal by the primary constituents.

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.

⁸As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

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.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

⁹Note, 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.

¹⁰The 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?"

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):

The Groundwater Protection Standard in the current permit requires Occidental-Mobile to monitor for mercury, lead, cadmium, and chromium at the point of compliance. The Post-Closure Permit Renewal Application adds carbon tetrachloride and perchloroethylene to the list of constituents and has selected monitoring wells MW-3, MW-5, MW-8S, MW-9S, MW-13S, MW-8D, MW-12D, MW-14D, MW-21D, MW-37D, MW-38I, MW-38D, MW-43D, DW-1, DW-2, DW-3, and DW-5 for the semi-annual monitoring program. The facility will also continue to operate the corrective action system until constituent concentrations are reduced to the levels set out in the permit or to limits that may be approved in the future for this activity.

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.

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

Completed by S. Scott Story Date September 30, 1999

S.Scott Story
Environmental Engineer I

Supervisor Stephen A. Cobb Date 9/30/99 ¹¹

Stephen A. Cobb
Chief, Hazardous Waste Branch
Alabama Department of Environmental Management

¹¹ 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.

Locations where References may be found:

- April 1997 RCRA Facility Investigation Work Plan, ADEM Main Office
- May 1997 Interim Measures Work Plan, ADEM Main Office
- November 1998 Semiannual Groundwater Monitoring Report, ADEM Main Office
- December 1998 RCRA Facility Investigation Report, ADEM Main Office
- January 1999 RCRA Post Closure Permit Renewal Application, ADEM Main Office
- January 1999 Semiannual Corrective Action Effectiveness Report, ADEM Main Office

Contact telephone and e-mail numbers

(Name) S. Scott Story
(Phone #) (334) 270-5600
(E-mail) sss@adem.state.al.us

SAC/SSS/sep:L:EI MEMO

4WD-RCRA

SUBJ: Evaluation of Occidental Chemicals ' (Mobile, Alabama) status under the RCRIS
Corrective Action Environmental Indicator Event Codes (CA725 and CA750)
EPA I.D. Number: ALD 008 163 388

FROM: Maher Budeir, Environmental Engineer *MB*
South Programs Section
Waste Management Division
US Environmental Protection Agency, Region 4
Scott Story, Environmental Engineer *SSS 9/30/98*
Industrial Facilities Section
Land Division
Alabama Department of Environmental Management

THRU: Steve Cobb, Chief *SC 9/30/98*
Industrial Facilities Section
Land Division
Alabama Department of Environmental Management

TO: Gerald Hardy, Chief *GH 9/30/98*
Hazardous Waste Branch
Land Division
Alabama Department of Environmental Management

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of the status of Occidental Chemical, Mobile Alabama in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRIS):

- 1) Human Exposures Controlled Determination (CA725),
- 2) Groundwater Releases Controlled Determination (CA750).

Concurrence by the RCRA Programs 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 above. See Memo Attachment 1 for more specific information of the RCRIS definitions for CA725 and CA750.

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY

File: Occidental Chemicals TSD

AND REFERENCE DOCUMENTS

This particular evaluation is the first evaluation performed by Alabama Department of Environmental Management (ADEM) (with significant EPA assistance) for Occidental Chemical Corporation, Mobile, Alabama. The evaluation, and associated interpretations and conclusions on contamination, exposures and contaminant migration at the facility, is based on information obtained from the following documents:

Semi-Annual Report, Former Brine Sludge Lagoon	July 1998
RCRA Facility Investigation Work Plan	April 1997
Revised RCRA Facility Investigation Work Plan	July 1994
Report on RCRA Facility Assessment	December 1992
RCRA Facility investigation, Volume I of III	October 1992
EPA, Region 4 Correspondence File	Several
Interim RCRA Facility Assessment Report	May 1988

III. FACILITY SUMMARY

The Occidental Chemical Corporation, Mobile facility is a 135-acre site located in the northern portion of the City of Mobile, Alabama, between Chickasaw Creek and U.S. Highway 43. To the north and east are industrial plants and swampy areas draining to the Mobile River. To the west and south is a mixed urban, commercial and residential area of the City of Mobile.

The facility consists of a chlor-alkali plant that manufactures caustic soda (NaOH), potassium hydroxide (KOH), and chlorine gas (Cl₂) from halite (NaCl) and potash ((KCl) through a mercury cell reactor. Wastes generated at the facility include brine and filter cake contaminated with mercury. The mercury-cell reactor was halted in 1990 and replaced with a mercury-free membrane process. Additionally, an on-site wastewater treatment plant (WWTP) was constructed in 1979 to treat the purged brine solutions. Effluent from the WWTP is discharged to the facility's barge Canal on Hog Bay or through NPDES Outfall 003.

IV. CONCLUSION FOR CA725

As explained in Memo Attachment 2, there is not enough relevant information available to make a determination as to whether human exposures are controlled. Groundwater, soil, and surface water assessment is not complete, therefore, it is not possible to determine if human exposures are controlled. It is recommended that **CA725 IN be entered into RCRIS.**

V. CONCLUSION FOR CA750

Based on data contained in the documents referenced in Section II and summarized in the groundwater portion of Memo Attachment 2, releases from SWMUs and/or AOCs have contaminated groundwater at concentrations above relevant action levels. The existing groundwater recovery system controls groundwater mercury contamination. Perchloroethylene and carbon tetrachloride were detected at high concentrations (1,700 ug/l and 7,500 ug/l respectively; relevant action levels are 5 ug/l for both) in areas outside the influence of the groundwater recovery system. Additionally, the full extent of groundwater organics contamination has not been assessed.

Although the groundwater is contaminated above relevant action levels, control measures for the perchloroethylene and carbon tetrachloride plume have not been implemented. **Because all groundwater contamination at or emanating from the facility is not controlled, it is recommended that CA750 NO be entered.**

VI. SUMMARY OF FOLLOW-UP ACTIONS

Alabama Department of Environmental Mangement (ADEM) administors the RCRA permit for this facility including the corrective action portion of the permit. Investigation and corrective action should continue under this permit to define the extent of the organics plume, determine if surface water and soil contamination exist and if corrective action is necessary, and conduct all necessary corrective action. These activities should be performed as part of RFI, Interim Measures, and Corrective Measures Study as appropriate.

MEMO ATTACHMENT 1

A. HUMAN EXPOSURES CONTROLLED DETERMINATION (CA725)

There are five (5) national status codes under CA725. These status codes are:

- 1) YE Yes, applicable as of this date [i.e., human exposures are controlled as of this date].
- 2) NA Previous determination no longer applicable as of this date.
- 3) NC No control measures necessary.
- 4) NO Facility does not meet definition [i.e., human exposures are not controlled as of this date].
- 5) IN More information needed.

The first three (3) status codes listed above were defined in January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in June 1997 Data Element Dictionary.

Note that CA725 is designed to measure human exposures over the entire facility (i.e., the code does not track SWMU specific actions or success). Every area at the facility must meet the definition before a YE or NC status code can be entered for CA725. The NO status code should be entered if there are current unacceptable risks to humans due to releases of hazardous wastes or hazardous constituents from any SWMU(s) or AOC(s). The IN status code is designed to cover those cases where insufficient information is available to make an informed decision on whether or not human exposures are controlled. If an evaluation determines that there are both unacceptable and uncontrolled current risks to humans at the facility (NO) along with insufficient information on contamination or exposures at the facility (IN), then the priority for the EI recommendation is the NO status code.

In Region 4's opinion, the previous relevance of NA as a meaningful status code is eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NC status codes. In other words, YE, NC, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA725. Therefore, it is Region 4's opinion that only YE, NC, NO and IN should be utilized to categorize a facility for CA725. No facility in Region 4 should carry a NA status code.

B. GROUNDWATER RELEASES CONTROLLED DETERMINATION (CA750)

There are five (5) status codes listed under CA750:

- 1) YE Yes, applicable as of this date [i.e., groundwater releases are controlled as of this date].
- 2) NA Previous determination no longer applicable as of this date.
- 3) NR No releases to groundwater.

- 4) NO Facility does not meet definition [i.e., groundwater releases are not controlled as of this date].
- 5) IN More information needed.

The first three (3) status codes listed above were defined in January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in June 1997 Data Element Dictionary.

The status codes for CA750 are designed to measure the adequacy of actively (e.g., pump and treat) or passively (e.g., natural attenuation) controlling the physical movement of groundwater contaminated with hazardous constituents above relevant action levels. The designated boundary (e.g., the facility boundary, a line upgradient of receptors, the leading edge of the plume as defined by levels above action levels or cleanup standards, etc.) is the point where the success or failure of controlling the migration of hazardous constituents is measured for active control systems. **Every contaminated area at the facility must be evaluated and found to have the migration of contaminated groundwater controlled before a "YE" status code can be entered.**

If contaminated groundwater is not controlled in any area(s) of the facility, the NO status code should be entered. If there is not enough information at certain areas to make an informed decision as to whether groundwater releases are controlled, then the IN status code should be entered. If an evaluation determines that there are both uncontrolled groundwater releases for certain units/areas (NO) and insufficient information at certain units/areas of groundwater contamination (IN), then the priority for the EI recommendation should be the NO status code.

In Region 4's opinion, the previous relevance of NA as a meaningful status code is eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NR status codes. In other words, YE, NR, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA750. Therefore, it is Region 4's opinion that only YE, NR, NO and IN should be utilized to categorize a facility for CA725. No facility in Region 4 should carry a NA status code.

MEMO ATTACHMENT 2

**MEDIA BY MEDIA DISCUSSION OF CONTAMINATION
AND THE STATUS OF PLAUSIBLE HUMAN EXPOSURES**

Groundwater:

The Brine Lagoon (SWMU 14) is the only RCRA Regulated Unit at this facility. Currently, this unit is under a RCRA Post-closure Permit. A groundwater recovery system for controlling the mercury contamination attributed to this regulated unit is in operation under the post-closure permit. A RCRA Facility Assessment (RFA) was conducted, and a report was completed in May, 1989. A RCRA Facility Investigation (RFI) was required for eight solid waste management units (SWMUs) and two areas of concern (AOCs). A Phase-I RFI Report was approved by EPA in March 1996. An additional SWMU (SWMU 22) was discovered during the investigation process. A Phase II RFI Workplan was submitted in July, 1994 and an amended RFI Workplan in April, 1997, addressing SWMU 22. An Interim Measures Workplan (IMWP) was submitted in May, 1996. The IMWP confirmed groundwater contamination due to SWMU 22, and proposed pursuing an investigation to determine the extent and magnitude of groundwater contamination caused by SWMU 22. The major constituents of concern for this SWMU are perchloroethylene (and breakdown products) and carbon tetrachloride. An amended IMWP was approved by Alabama Department of Environmental Management (ADEM) in May 1998. To date the groundwater assessment for the organic constituents is not complete.

Groundwater mercury contamination seem to be under control via the groundwater recovery system in the post-closure permit. However, groundwater contamination with perchloroethylene, carbon tetrachloride, and their breakdown products (organics) has been confirmed. The existing groundwater recovery system does not influence the organics plume. **Hence, groundwater contamination is not controlled.** The extent of the contamination with organics has not been fully defined. Therefore, a decision on human exposures to contamination cannot be made.

Because of the uncertainty regarding the presence or absence of groundwater contamination at questionable areas of the facility, an opinion on plausible human exposures to groundwater contamination is not possible at this time.

Soil:

A decision on human exposures to soil contamination cannot be made because there is insufficient information on plausible human exposures

There are areas of the facility where information on plausible human exposures is insufficient or lacking. Mercury releases were suspected in areas near the Mercury Cell Building (SWMU 19), near the landfills (SWMUs 10, 11, 12), and other SWMUs. However, in the Phase I RFI, soil

samples were taken from borings at several intervals, but not the upper three feet of soils. Determining plausible human exposure by ingestion, inhalation, or dermal contact is not possible without knowing the extent of contamination in the upper three feet of soil. In an April, 1996 letter to EPA, Occidental stated that human exposure is "minimized" due to the fact that some of the surfaces where mercury contamination is suspected are paved and other areas are covered with vegetation. Further investigation is necessary to quantify contamination and human exposure at areas that are not paved.

Because of the uncertainty regarding whether plausible human exposures to soil contamination exist at the facility, an opinion on plausible human exposures to soil contamination is not possible at this time.

Surface Water:

A decision on human exposures to contamination cannot be made because there is insufficient information on surface water quality at the entire facility

Information on the presence or absence of surface water contamination is lacking at Gales Branch and the Barge Canal. These areas of the facility correspond to locations where surface water contamination could be present given the proximity of SWMUs, the facility operations, and the reported groundwater contamination.

Because of the uncertainty regarding the presence or absence of surface water at the facility, an opinion on plausible human exposures to surface water contamination is not possible at this time.

Air:

Releases to air from soil, groundwater and/or surface water contaminated by SWMUs and/or AOCs at the facility is not expected to be occurring above relevant action levels. **Therefore, there is no human exposure to contamination via an air route.**