September 21, 2000

4WD-RPB

SUBJ: Reevaluation of the Pascagoula Chevron refinery's status under the RCRIS Corrective Action Environmental Indicator Event Codes (CA725)
EPA I.D. Number: MSD 054 179 403

FROM: Jay V Bassett
South Programs Section

THRU: Doug McCurry, Chief
South Programs Section

TO: Narindar M. Kumar, Chief
RCRA Programs Branch

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Chevron Pascagoula refinery's (hereafter called "Chevron") 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)

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 at the appropriate location within Attachment 1.

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

This particular evaluation is a reevaluation of Chevron's evaluation performed by EPA. In August 1999, a revised EI memo was signed that documented changing the EI status code from "NO" to "IN". The "IN" status was assigned as data from the Phase II RFI had not yet been submitted or reviewed by EPA. In July 2000, Chevron submitted a documented titled "Documentation of Environmental Indicator Determination" that provided a summary of the phase II effort in support of a CA725 evaluation. The submittal included data tables and figures presenting results of the phase II efforts. Based on this submittal, EPA has conducted a reevaluation of CA 725 to document that current exposure to human health is controlled. CA 750 will not be evaluated in this memo, as interim/corrective measures will be required to demonstrate

attainment of CA 750 -- Migration of Contaminated Groundwater Under Control

III. FACILITY SUMMARY

Chevron Products Company is located in Pascagoula MS. The facility is 3,000 acres of which 1,000 acres consists of the refinery. The remaining 2,000 acres is mostly salt water marsh, fresh water marsh, pine savannah, and upland hardwood. The Phase I RFI and Phase II RFI workplan was conditionally approved in September 1998. As part of the Phase I investigation, 59 SWMU's and AOC's were determined as NFA. 28 SWMUS' and AOC's had been carried forth for additional characterization in the Phase II efforts. Chevron submitted a report titled "Documentation of Environmental Indicator Determination" for purposes of reevaluating CA 725. This report was submitted in July 2000 (revised September 2000). The RFI Phase II report is due by the end of September 2000. It is expected a CMS will be required. In addition, contaminated groundwater was found at 10 SWMUs or AOCs that will require additional corrective action to meet attainment of CA 750. It is expected that a CMS workplan and report will be required in FY 02, with CMI implementation in FY 03.

IV. CONCLUSION FOR CA725: Current Human Exposures under Control

Complete pathways to soil contamination were determined to exist at this site for workers, construction workers and trespassers. It should be noted that although groundwater contamination exists at the site, there are no drinking water wells present (i.e., no exposure points; hence, a complete exposure pathway is not possible). Despite the three (3) above noted complete pathways to soil contamination, unacceptable current human exposures are deemed to not be occurring. The actual or realistic exposure to soil contamination is expected to be much less than the corresponding assumptions found in the generic risk levels used to help establish potentially unacceptable levels of soil and sediment contamination. In other words, the exposure frequency and duration is expected to be much less than the estimates made in the default generic risk based levels which are 250 days/year and 25 years, respectively. For example, the soil contamination is located in remote areas of the facility, and EPA deems it to be unreasonable to assume that a trespasser or construction worker would be expected to visit the internal drainage ditch for 250 days out of the year. For workers, these individuals are to be covered under an adequate Health and Safety Plan. Lastly, the facility is fenced and a security force monitors access. In other words, the contamination is not in areas where untrained workers would routinely visit. The recommendation is that CA725 YE be entered into RCRIS.

VI. SUMMARY OF FOLLOW-UP ACTIONS

Since current human exposures are under control based on current land usage, follow-up actions are not needed for CA725. However, additional work is needed before the migration of groundwater contamination can be considered under control.

It is projected that CA750 will reach YE for Chevron in Fiscal Year 2003

Attachments: 1. CA725: Current Human Exposures Under Control

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures Under Control

Facility Name: Chevron Products Company – Pascagoula Refinery
Facility Address: 250 Industrial Road, Hwy. 611 South, Pascagoula, MS 39567
Facility EPA ID No.: MSD 054179403

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

_X_ If yes – check here and continue with No. 2 below.

____ If no – re-evaluate existing data, or

____ If data are not available skip to No. 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).

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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).

CHEVRON SPECIFIC DATA

Data has been collected since 1994 as part of Chevron's phased approach to complete the RFI activities at the Refinery. All media (soil, groundwater, surface water and sediment) data from both the Phase I and Phase II RFI were used in this determination. Chevron has investigated 53 SWMUs and AOCs during the RFI through the installation of 235 piezometers and groundwater wells, and the collection and analysis of the following list of sample totals:

- 218 groundwater samples, including 19 duplicates,
- 253 soil samples, including 19 duplicates,
- 24 surface water samples, including 1 duplicate, and
- 199 sediment samples, including 19 duplicates (Attachment 1).

Background samples were also collected including 34 soil samples, 20 sediment samples and six (6) groundwater samples. Background concentrations were developed for soil, sediment and groundwater for comparison to on-site concentrations (Attachment 2). For soil, there are four sets of background data; three representing various types of soil and one set for sediment. The three types of soil include two types of imported fill (one from Grand Bay, Alabama called Alabama Red and another from mixed dredge sediments from Bayou Casotte), with the third type being native soil.

Background groundwater samples were collected from four (4) background monitoring wells. Analytical data from the analysis of samples collected from these wells over the last ten years were compiled into two data sets. One data set from wells on the west side of the Refinery property and one data set from wells located on the east side of the Refinery. These data sets were used to develop concentration limits for each side of the refinery. The division of the background data sets is based on the presence of two groundwater flow regimes identified in the hydrogeological model.

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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)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	X	___	___	See Table 1 (attached)
Air (indoors)[1]	___	X	___	See rationale below
Surface Soil (e.g., <2 ft)	X	___	___	See Table 2 (attached)
Surface Water	X	___	___	See Table 3 (attached)
Sediment	X	___	___	See Table 2 (attached)
Subsurface Soil (e.g., >2ft)	X	___	___	See Table 2 (attached)
Air (outdoors)	X	___	___	See Table 4 (attached)

____ If no (for all media) – skip to No. 6, and enter "YE," status code after providing or citing appropriate "levels," are not exceeded.

X If yes (for any media) – continue after identifying key contaminants in each "contaminated" medium citing appropriated "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 No. 6 and enter "IN" status code.

Rationale and Reference(s):

For each medium, the maximum concentration of any chemical detected at the Solid Waste Management Unit (SWMU) or Area of Concern (AOC) was compared to the RBC's and/or MCL's. If the maximum concentration was greater than the Protective Level in any SMWU or AOC, then that medium was considered "contaminated"
Groundwater and Surface Water - The Maximum Contaminant Level (MCL) or EPA Region III Risk-Based Concentration (RBC) for tap water consumption for chemicals without MCLs was selected as the Protective Level (Tables 1 & 3). Metals found at concentrations below background were not compared to Protective Levels and

[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).

were not. The Phase I and II RFI data supports that while groundwater associated at certain units is contaminated, contaminated groundwater appears not be migrating and has not migrated off the Chevron facility. Therefore, exposure to contaminated groundwater can be controlled by the facility

Surface and Subsurface Soil and Sediment - For naturally occurring inorganic chemicals, any chemical detected was included if the maximum concentration was above the representative background concentration for that area. As noted on Table 2, 10 of the 12 concentrations of arsenic (3.8ppm) are slightly above the background statistic and RBC. Based on expected sampling variance, isolated exceedances, and relatively low concentrations there is no evidence of a significant release or indication that an unacceptable risk to workers exists.

For naturally-occurring inorganic chemicals present at concentrations above background and for all organic chemicals detected in any sample, the EPA Region III Risk-Based Concentrations (RBCs) for Residential and Industrial Land Use were selected as the Protective Level. In accordance with EPA Region IV guidance, the RBC for non-carcinogens was adjusted downward by a factor of 10 to represent a non-cancer Hazard index of 0.1 and for the Residential and Industrial Protective Levels.

Indoor Air - This medium is not a concern because there is no reasonable likelihood that chemicals in groundwater or soil will volatilize into indoor air. There are no buildings over areas of impacted soil or groundwater at the 13 SWMUs or AOCs where volatile chemicals were identified. One or more of the ten volatile organic chemicals (benzene, toluene, ethyl benzene, xylene, 2-butanone, carbon disulfide, chloroform, chlorobenzene, 2-methylnaphthalene and naphthalene) were identified in groundwater at maximum concentrations above Protective Levels at 12 SWMUs or AOCs and in soil at one AOC location. These SWMUs and AOCs and the maximum concentration found are identified on Table 1 for groundwater and Table 2 for soil.

As an additional level of protection, all control rooms located in the Refinery have positive air pressure systems which draw air from vents above the control room. These systems would prevent the build up of any vapors within the control room above levels in ambient air.

Outdoor Air Protective Levels - OSHA and ACGIH levels for workers and ambient air EPA Region III RBCs for residential land use were selected as the Protective Levels. Note that OSHA PELs are the applicable air standard for workers. ACGIH TWAs and STELs were also included for comparison purposes. The concentrations in outdoor air (Table 4) for volatile chemicals from groundwater and soil were calculated using a model prepared by Groundwater Solutions Incorporated (GSI) to support ASTM's Risk-Based Corrective Action (RBCA) risk assessment program. The maximum concentration of each volatile organic chemical in groundwater or soil was input into the model. The estimated outdoor air concentration was then compared to the OSHA standard. Inspection of Table 4 shows that the maximum estimated air concentration is several orders of magnitude below OSHA standards.

For off-site residential exposure, estimated concentrations of volatile chemicals from groundwater and soil are below the Region III RBC except for benzene from soil. The estimated concentrations of benzene at the Refinery is twice the Region III RBC. This finding is discussed in Question 4 of this form.

One of five samples from surface water in SWMU 5, Landfill E, had a detection of chloromethane. This is the only time this chemical was ever detected. Evaluation of potential sources and distance to receptors indicates that there is no reasonable likelihood that residential air is contaminated with chloromethane from SWMU 5, Landfill E.

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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)						
Contaminated Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[2]
Groundwater	No	Yes	No	Yes	No	No	No
Air (indoors)	No	No	No	No	No	No	No
Soil (surface e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Surface Water	No	Yes	No	Yes	No	No	No
Sediment	No	Yes	No	Yes	No	No	No
Soil (subsurface e.g., >2ft)	No	Yes	No	Yes	No	No	No
Air (outdoors)	No	No	No	No	No	No	No

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

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

___ If unknown (for any "Contaminated" Media – Human Receptor combination) - skip to No. 6 and enter "IN" status code

Rationale and Reference(s)

Residents, Day Care, Trespassers, and Recreational – There is no reasonable likelihood that any of these receptors could be exposed to contaminated media. Chevron is an active facility with rigorous control of site access including 24-hour security with security gates at each entrance, roving security guards and perimeter fencing with posted signs. The site is used exclusively for industrial processes involving workers and construction workers. In addition, the facility is located in an industrial park setting and the immediate area includes heavy manufacturing, construction, chemical and transportation industries.

Refinery Workers and Construction Workers – Construction workers are considered similar to Refinery Workers except that Construction Workers could spend more time in contact with subsurface soil. Groundwater is not used for ingestion or any other purpose.

There are two areas where sediment concentrations are above the Protective Levels but there is no completed exposure because the sediment samples were collected at locations that are under water.

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The site is strictly industrial and there is no residential or commercial agriculture. There is no reasonable likelihood that chemicals in groundwater or soil will migrate into wetlands and create a potential exposure via ingestion of aquatic life by people. There is a detection of benzene in soil in AOC 76, Wharf Area Revetment. However, this area is beneath a concrete revetment at the wharf and there is evidence that benzene should not migrate into the water. The area is covered with concrete that is relatively new, uncracked and impermeable to infiltrating rain water. The data show that no benzene was detected in the deeper soil below the sample with benzene and none was detected in the sediments at the base of the revetment. Therefore, the benzene is not migrating.

For groundwater, there is no evidence that concentrations of constituents above Protective Levels are being released into wetlands or open water. There are sentry wells (MW10-1, 2, 3 and 4 and MW68-1, 2 and 3) on the eastern perimeter of the Refinery, adjacent to Lagoon No. 3 and a wetland area with commercial oyster beds, respectively. In MW10-4, lead is identified as a contaminant based on a total lead concentration of 85 mg/L as compared to the Protective Level of 15 mg/L. However, the dissolved lead in this sample and all other sentry well samples was below the detection limit. Therefore, there is no soluble lead present that could migrate into the adjacent wetlands. Surface water sample results support this conclusion.

On the southwest portion of the Refinery, naphthalene at 46.8 mg/L compared to the Protective Level of 6.5 mg/L was detected in a well at SWMU 14, Corning Wastewater Lagoons. It is unlikely that naphthalene would migrate to the wetlands approximately 1000 feet to the south at concentrations above the Protective Level.

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4. Can the exposures from any of the complete pathways identified in No. 3 be reasonably expected to be "significant"[3] (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 No. 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 No. 3) are not expected to be "significant.".

    NO 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 No. 3) are not expected to be "significant.".

    ___ If unknown (for any complete pathway) – skip to No. 6 and enter "IN" status code.

Rationale and Reference(s):

Exposure of Refinery Workers and Construction Workers to Chemicals in Surface Water and Groundwater: Groundwater is not used for ingestion or any other purpose. Construction activities that could bring workers in contact with groundwater are controlled by Chevron's Health and Safety Plans. Surface water on-site is contained in permitted lagoons and ditches which constitutes a physical control. Also, contact with the surface water in the lagoons and ditches is restricted and under control by Chevron's Health and Safety Plans.

Exposure of Refinery Workers and Construction Workers to Chemicals in Soil and Sediment: Actual exposure to soil and sediment would be substantially less than the exposure assumptions used to calculate the RBCs by a factor of at least 100. The RBCs for industrial exposure assume that the worker is in contact with the maximum concentration in soil for 250 days a year, 8 hours a day for 25 years. However, none of the SWMUs or AOCs have full time refinery workers at that location. At a specific SWMU or AOC more reasonable exposure duration, frequency and contact rate would be 25 days a year, 2 hours a day for 10 years. These assumptions would increase the unadjusted RBC by a factor of 100. Sediments are associated with permitted water discharge systems at the Refinery. For sediment, there is no completed exposure because the sediment samples were collected at locations that are under water. In addition, contaminated soils are located below concrete slabs and containment structures, therefore, limiting any potential exposures.

[3] 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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For all workers, Chevron has an established work permit system that restricts any work within the Refinery areas until it has been reviewed by operations' personnel, the workers have been informed of personal protection equipment requirements, and any potential exposure is defined. In addition, Chevron performs continuous air monitoring, as well as work-site spot checks, to conform with OSHA requirements.

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5. Can the "significant" exposures (identified in No. 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):

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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):

X YE – Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Chevron Products Company, Pascagoula Refinery Facility, EPA ID No. MSD054179403, located at Pascagoula, Mississippi 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 _____ Date: _____
Jay V Bassett
Project Manager

Supervisor _____ Date: _____
Doug McCurry
Chief, South Programs Section
Region IV EPA

Locations where References may be found:

Phase I RFI – EPA files
Phase II RFI – EPA files
Documentation of Environmental Indicator Determination – EPA files

Contact telephone and e-mail numbers

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

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TABLES 1 - 4

[3] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests 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.

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