TXD 098818339
H2/RC/EN

OCT 16 2002

Susan Zachos, Exq.
Kelly, Hart & Hallman
301 Congress Avenue, Suite 2000
Austin, Texas 78701

Subject: EPA Designated Project Manager for the RCRA § 7003 Order issued to Elementis Chromium, Corpus Christi, Texas

Dear Susan:

This letter serves as notice that Sue Westbrook is the designated Project Manager for Administrative Order on Consent RCRA-VI-7003-01-02, according to Paragraph VIII of the Order.

Sue Westbrook
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If you have any questions, please contact me at (214)665-8321.

Sincerely Yours,

Sue Westbrook, Project Manager
Technical Section
Hazardous Waste Enforcement Branch

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REGIONAL HEARING CLERK
EPA REGION VI

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 6
DALLAS, TEXAS

IN THE MATTER OF: ELEMENTIS CHROMIUM, L.P., (formerly American Chrome and Chemical) EPA ID NO. TXD098818339 CORPUS CHRISTI, TEXAS RESPONDENT	)	ADMINISTRATIVE ORDER ON CONSENT U.S. EPA DOCKET NO RCRA-VI-7003-01-02 Proceeding Under Section 7003 of the Resource Conservation and Recovery Act, as Amended, 42 U.S.C. § 6973

I. JURISDICTION

This Administrative Order on Consent ("Order") is issued to protect public health and the environment pursuant to Section 7003 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act ("RCRA"), and further amended by the Hazardous and Solid Waste Amendments of 1984 ("HSWA"), 42 U.S.C. § 6973. Section 7003(a) of RCRA authorizes the Administrator of the U.S. Environmental Protection Agency ("EPA") to issue an Order whenever the Administrator receives evidence that the past or present handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste may present an

imminent and substantial endangerment to health or the environment. The authority to issue this Order has been delegated by the Administrator of EPA to the Regional Administrator, EPA Region 6, by EPA Delegation Nos. 8-22-A and 8-22-C, dated May 11, 1994, and No. 8-23, dated March 6, 1986, and further delegated to the Director of the Compliance Assurance and Enforcement Division, EPA Region 6 ("Director") by Delegation No. R6-8-22-A, dated July 27, 1995, and No. R6-8-23, dated July 27, 1995.

This Order is issued to Elementis Chromium, L.P., 3800 Buddy Lawrence Drive, Corpus Christi, Nueces County, Texas.

Elementis Chromium, L. P. (formerly American Chrome and Chemical) operates facilities located at 3800 Buddy Lawrence Drive, Corpus Christi, Nueces County, Texas, and occupies about 425 acres on property located adjacent to the facilities of El Paso CGP Corp. (formerly The Coastal Corporation and referred to herein as "Coastal") and along the southern bank of the Inner Harbor Ship Channel.

In this Order the "Facility" is defined as the area of contamination beyond the Coastal Refinery property boundary north, northeast and east of the Coastal Refinery East Plant-North, and extending onto or under the portion of the Elementis Chromium property located East of Cantwell Lane and to the Inner Harbor Ship Channel. The definition of Facility will be expanded to include areas west of Cantwell Lane in the IM Area (as defined below in Section VII.1.B.(i)) should investigation indicate that contamination is contiguous extending west of Cantwell Lane in the IM Area. See Section VII.1.B.(ii). The Facility does not include any portion of the Inner Harbor Ship Channel and not withstanding anything in this Order to the contrary, this Order does not require Respondent to fully delineate or to remediate contamination in the Inner Harbor Ship Channel.

For the purpose of entering this Order on consent, Respondent does not contest EPA's jurisdiction to issue this Order and to enforce its terms against Respondent. Further, Respondent expressly waives any rights to contest EPA's jurisdiction to issue this Order, to enforce its terms against Respondent, and to compel compliance with the terms of this Order in any subsequent enforcement proceedings, either administrative or judicial. In addition, Respondent expressly waives any right to contest EPA's jurisdiction to impose sanctions for violations of this Order to the extent provided by law. Finally, Respondent agrees not to contest the validity of this Order, and expressly waives any defense concerning the validity of this Order, or any particular provision contained herein.

This Order is entered solely for the purpose of resolving the disputed claims by EPA against Respondent, and resolves all claims by EPA against Respondent and its affiliates concerning the contamination addressed in this Order. In consenting to the entry of this Order, Respondent does not admit to any of the allegations made by EPA.

II. PARTIES BOUND

1. This Order is issued to Elementis Chromium, L.P. (hereinafter "Elementis" or "Respondent"), 3800 Buddy Lawrence Drive, Corpus Christi, Nueces County, Texas.

2. The obligations of this Order, as set forth below for Respondent, shall apply to, and be binding upon, Respondent, its officers, directors, employees, agents, trustees, receivers, successors, and assigns.

3. No change in the corporate or partnership status of Respondent, will in any way alter, diminish, or otherwise affect the obligations of Respondent under this Order. Respondent shall be responsible for and liable for completing all of its obligations pursuant to this Order, regardless of whether said activities are to be performed by employees, agents, contractors or consultants of Respondent. Respondent shall be liable for its failure, or the failure of its employees, agents, contractors or consultants, to completely perform any or all of said activities, or to satisfy each of the terms and conditions herein. The undersigned representative of Respondent certifies that he or she is fully authorized to enter into the Order to legally bind Respondent to the terms and conditions of this Order.

4. In the event of any change in the ownership, control, and/or operational responsibility of Respondent's property or operations to another party during the pendency of this Order, Respondent shall notify EPA in writing, no later than thirty (30) calendar days prior to such change, of the nature and effective date of such change. Any documents transferring ownership, control, and/or operational responsibility of Respondent's facilities to another party during the pendency of this Order shall include written notice of this Order. Further, Respondent shall provide a copy of this Order to any successor(s) prior to such change during the pendency of the Order.

5. Respondent agrees to undertake and complete all of the obligations required by the terms and conditions of this Order including any obligations of this Order incorporated by reference into this Order.

III. STATEMENT OF PURPOSE

In entering into this Order, the mutual objectives of EPA and Respondent are, to identify, investigate, contain and stop migration of COCs, above remediation goals, into the Inner Harbor Ship Channel, and remediate hazardous wastes, hazardous constituents and/or solid wastes that have been released, as of the effective date of this order, to the environment on or under the Facility and ensure that corrective action activities deemed necessary by EPA are designed and implemented to protect human health and the environment as specified below.

To further accomplish the objectives of this Order, EPA has also issued an order pursuant to RCRA § 7003 to Coastal in U.S. EPA Docket No. RCRA-VI-7003-01-01 (the Coastal Order) addressing contamination as defined in the Coastal Order. Respondent and Coastal shall coordinate their respective obligations under their respective Orders. This coordination will necessitate the cooperation and assistance of Elementis as required in this Order and, accordingly, an additional mutual objective of EPA and Respondent in entering into this Order is to require Respondent to:

A. provide access to the Facility for performance of tasks by Coastal pursuant to the Coastal Order,

B. to cooperate with Coastal's actions under the Coastal Order; and

C. to accept and manage recovered ground water from the Facility containing specified concentrations of Chromium constituents after treatment by Coastal.

This Order requires Respondent to: (1) perform Interim/Stabilization Measures at the Facility as set out in VII.1.; (2) conduct a Facility investigation and conduct a Corrective Measures Study as set out in VII.2.; and (3) implement the corrective measure or measures as required by VII.3.

IV. NOTICE TO THE STATE

Notice of the issuance of this Order was provided in writing to the State of Texas through the Texas Natural Resource Conservation Commission ("TNRCC") pursuant to Section 7003(a) of RCRA, 42 U.S.C. §6973(a).

V. FINDINGS OF FACT

All documents cited in this section of the Order are part of the Administrative Record, which is available as specified in Section IX of this Order. The documents are identified in this Order by exhibit number (e.g., "Ex 1").

1. Elementis is a "person" as defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15), and Elementis is doing business in the State of Texas.

2. Elementis operates sodium dichromate, chromium oxide and chromic acid plants at 3800 Buddy Lawrence Drive in Corpus Christi, Nueces County, Texas, and its facilities occupy approximately 425 acres on property located along the south bank of the Inner Harbor Ship Channel. (Ex 1).

3. The Elementis property is located to the north, east, northeast and northwest of the Coastal property boundary, adjacent to and down-gradient of the Coastal facilities. The Elementis property extends down-gradient to the Inner Harbor Ship Channel.

4. The Part A permit application for American Chrome and Chemicals, dated October 31, 1980, identifies wastes generated by the chromium manufacturing operations, including handling of the following (Ex 1):

Waste Number	Description
D001	Ignitable wastes
D007	Chrome sludge, treated
D007	Chrome bearing solids
K006	Waste water treatment sludge

5. A Texas Department of Water Resources Notice of Registration, dated October 30, 1984, identifies waste generated at the Elementis facility, including the following EPA Hazardous Waste Nos. (Ex 1b):

Waste Number	Description
D007	Chromate-bearing solids
D004, D007, D008	Monoethanolamine (MEA) Reclaimer Bottoms

6. Samples were collected on or about the Elementis property by EPA Region 6 on February 2 - 8, 1997, identified releases of hazardous waste and /or hazardous constituents from the facility to the soil/sediment, ground water and surface water. All EPA analytical results of the these samples may be found in Ex 22.

7. The U.S. Fish & Wildlife Service ("USFWS") contacted EPA Region 6 by telephone on April 4, 2000, and by Memorandum dated April 27, 2000, to notify EPA that on or about February 9, 2000, a mixed plume of contaminants was observed seeping from the bluff into the Inner Harbor Ship Channel. Also, on March 2, 2000, USFWS observed oily waste seeping into the surface water from more than one seep along the bluff at Elementis property extending up to 100 feet east of the coffer dam near the CITGO property line. Oily liquid bubbled from below the water surface releasing a sheen on the surface water. According to USFWS the release to surface water constituted a potential endangerment to shorebirds (Ex 12).

8. On February 25, 2000, the TNRCC collected on the surface water a sample of oily liquid seeping from Elementis property into the Inner Harbor Ship Channel within the boomed area. Results of sample analyses indicated that the sample was a mixed product containing elemental chromium at levels reported to be 20 ppm and hydrocarbons with, benzene, and cumene (Ex 15).

9. The TNRCC has established Texas State Surface Water Quality Standards (30 TAC §§ 307.– 307.10). Criteria for Aquatic Life Protection - Saltwater (chronic) for Chromium VI is 49 ug/l (Ex 23).

10. The designated uses for the Inner Harbor Ship Channel in Segment No. 2484 of the Nueces River Basin include non-contact recreation (not involving significant risk of water ingestion) and fishing, commercial and recreational boating, limited human body contact to shoreline activity, and intermediate quality aquatic habitat. Human consumption of fish is allowed and protection of aquatic life is provided, as cited in the Texas Surface Water Quality Standards, July 26, 2000 (Ex.23).

11. A general reference discussing toxicity-related characteristics of various chemicals, including the chemicals referenced in this Order and the Coastal Order, can be found in "Chemical, Physical and Biological Properties of Compounds Present at Hazardous Waste Sites", prepared by Clement Associates, Inc., dated September 27, 1985, PA's

Integrated Risk Information System (IRIS), and Clinical Toxicology of Commercial Products, Fifth Edition, 40 C.F.R. Part 141 (Ex 24, part 2 of 3).

12. Hazardous wastes, hazardous constituents, and/or solid wastes have migrated or may have migrated from Elementis into the environment through various environmental media.

VI. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above and the Administrative Record, the Administrator has determined that:

1. Respondent is a "person" as that term is defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15) and 40 C.F.R. §260.10.

2. Respondent, in connection with its chromium manufacturing operations, is a past or present generator, past or present transporter, or past or present owner or operator of a waste treatment, storage or disposal facility.

3. Certain wastes and constituents found, handled, and managed at the Facility are hazardous wastes, hazardous constituents, and/or solid wastes as defined or set forth by Section 1004(5) and (27) of RCRA, 42 U.S.C. § 6903(5) and (27), Section 3001 of RCRA, 42 U.S.C. § 6921, and 40 C.F.R. Part 261.

4. There is, or has been, a release(s) from the Coastal property and Elementis property into the environment of hazardous wastes, hazardous constituents, and/or solid wastes, (as defined or set forth by Section 1004(5) and (27) of RCRA, 42 U.S.C. § 6903(5) and (27), Section 3001 of RCRA, 42 U.S.C. § 6921, and 40 C.F.R. Part 261).

5. Elementis is the owner of real property upon which hazardous wastes, hazardous constituents, and/or solid wastes (as defined or set forth by Section 1004(5) and (27) of RCRA, 42 U.S.C. § 6903(5) and (27), Section 3001 of RCRA, 42 U.S.C. § 6921, and 40 C.F.R. Part 261) have been released and/or are migrating.

6. The past and/or present handling, storage, treatment, transportation or disposal and releases of hazardous wastes, hazardous constituents, and/or solid wastes at the facility, may present an imminent and substantial endangerment to human health and the environment, within the meaning of Section 7003 of RCRA, 42 U.S.C. § 6973.

7. Respondent has contributed to the handling, storage, and disposal of solid waste, hazardous waste and/or hazardous substances which may present an imminent and substantial endangerment to human health or the environment.

8. The corrective actions required by this Order are consistent with RCRA and are necessary to protect human health and/or the environment.

Based on the foregoing, Respondent agrees to and is hereby ORDERED to perform the following actions in the manner and by the dates specified below:

VII. WORK TO BE PERFORMED

Respondent shall undertake, continue to take, and complete each of the following obligations established herein to the satisfaction of EPA pursuant to Section 7003 of RCRA, 42 U.S.C. § 6973. All work undertaken pursuant to this Order shall be developed and performed in compliance with RCRA and its implementing regulations and other applicable Federal and State laws, and consistent with all relevant EPA guidance documents as applicable, including but not limited to, those documents referenced in Attachment I, and any other documents determined by EPA to be relevant during the course of this action. Any noncompliance with terms of this Order shall be construed as a violation of the terms of this Order, subject to Stipulated Penalties outlined in Section XXII.

Oral advice or approvals given by EPA representatives will not relieve Respondent of its obligation to obtain formal written approvals required by this Order. Respondent may incorporate and utilize ongoing work and/or any other work previously completed by Respondent or by others. As to data previously generated or data generated by others, data showing detectable contaminants is usable, but data showing non-detect is not usable to show contamination is not present unless the detection level for the analysis meets the data quality objectives set out in VII. 1.B.(i)(c), VII.2.A.(ii), and VII.2.B.(v). Reference in this Order to State statutes, regulations and/or standards refers to laws, statutes, regulations and/or standards enacted or adopted by the State of Texas and its agencies and expressly includes the Texas Risk Reduction Program (TRRP) or Risk Reduction Rules, as were in effect at the relevant time. The term "days" as set forth herein shall refer to calendar days unless otherwise specified. To the extent a deadline falls on a weekend, holiday, or any day that EPA Region 6 is closed, the deadline is extended to the next regular business day. The date of "EPA Approval" is defined as the date that Respondent receives written notice of such approval.

Respondent shall provide Coastal and its contractors and subcontractors with access to the Elementis property at such times and locations as are necessary to undertake the actions required by the Coastal Order pursuant to separate agreement of Coastal and Elementis.

1. INTERIM /STABILIZATION MEASURES ("IM")

The scope and schedule of the IM to be performed by the Respondent are specified in the following paragraphs.

A. IM Preliminary Remediation Goals (IM PRGs) Report

(i) Within one hundred twenty (120) days of the Effective Date of this Order, Respondent shall submit an IM PRG Report to EPA for review and approval. The IM PRG Report shall propose ground water IM PRGs to be established for Chromium, both hexavalent and trivalent (such forms of Chromium collectively referred to herein as the "COCs" or "Chromium"). The IM PRG Report shall include the basis and justification for the development of the IM PRGs. IM PRGs

are health and environmental-based concentrations derived by using up-to-date chemical-specific toxicity data and standardized exposure assumptions under current and reasonably expected future land use scenarios consistent with the Conceptual Site Model, below. The IM PRGs shall be based on appropriate ground water cleanup standards, human health and environmental criteria (including but not limited to aquatic ecological receptor exposure to surface water and sediment), source control, information gathered during investigations and performance of any interim measures, EPA guidance, and the requirements of any applicable State and federal statutes and regulations.

For purposes of the IM investigation, containment system implementation and monitoring requirements of this Order, Texas State Surface Water Quality Standards, 30 Tex. Admin. Code ch 307, shall be used as IM PRGs for ground water. The IM PRG concentration for each COC in ground water shall be equal to its respective Texas State Surface Water Quality Standard for aquatic life protection (saltwater chronic criteria). When such surface water quality standards do not exist, PRGs shall be developed based on an evaluation of human health and the environment including aquatic ecological receptor exposures. These risk assessment procedures shall be in accordance with the Risk Assessment Guidance for Superfund (RAGS) and other appropriate EPA guidance based on current and reasonably expected exposure scenarios. EPA Region 6 Media Specific Screening Levels, Ambient Water Quality Standards, federal criteria, or State standards may be proposed for IM PRGs if, based on specific physical conditions at the Facility and current or reasonably anticipated exposure assumptions, they are shown to be protective of human health and the environment.

(ii) The IM PRG Report shall include a Conceptual Site Model (CSM) that addresses the Facility. The CSM is a three-dimensional depiction of site conditions that conveys what is known or suspected about the contaminant sources, releases, release mechanisms, exposure pathways, migration routes, potential human and ecological receptors, and potential risks. The CSM shall be based on available information, and may evolve as more information becomes available. Written descriptions and supporting maps, cross sections, analytical data, site diagrams that illustrate actual or potential receptors, and/or other illustrations of conditions will be included to document the CSM.

(iii) Prior to initiating fieldwork at the Facility, Respondent shall develop a Health and Safety Plan ("HASP") for IM, investigations and corrective action activities at the Facility. The HASP will be submitted with the IM PRG Report; however, the Respondent may commence fieldwork at the Facility as soon as the HASP has been developed and prior to EPA review or approval of the IM PRG Report. The Respondent, based on a consideration of site conditions, activities (including activities required by or being performed pursuant to the Coastal Order), and risks, may amend the HASP at any time. Major elements of the HASP shall include, but not be limited to, the following: (1) a list of key personnel and alternates responsible for site safety, response operations, and for protection of public health; (2) levels of protection to be worn by personnel in work areas; (3) a

description of decontamination procedures for personnel and equipment; and (4) site emergency procedures. The HASP shall be consistent with federal, state, and local regulations and guidance including:

(a) NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
(b) EPA Order 1440.1 – Respiratory Protection;
(c) EPA Order 1440.3 – Health and Safety Requirements for Employees engaged in Field Activities;
(d) EPA Standard Operating Safety Guide (1984); and
(e) OSHA regulations, particularly in 29 C.F.R. 1910 and 1926.

B. Interim Measures Ground Water Investigation / Implementation:

(i) IM Ground Water Investigation Work Plan

Within one hundred twenty (120) days of the effective date of the Order, Respondent shall submit to EPA for review and approval an Interim Measures Ground Water Investigation Workplan (IM Investigation Work Plan). The objective of the IM Investigation Work Plan is to address COC contaminated ground water in the IM Area. The IM Area is defined as that portion of the Facility within 350 feet landward of the mean high tide mark as shown on the USGS Corpus Christi Quadrangle Map The IM Investigation Work Plan shall include a sampling plan and a quality assurance plan.

The IM Investigation Work Plan shall:

(a) Set out a plan to characterize and determine the lateral and vertical extent of COC contamination to decreasing concentrations to below the IM PRGs in ground water at the IM Area.

(b) Provide maps which include sample locations and acceptable existing data to show current conditions of COC contaminated ground water and proposed locations for additional samples to be collected to characterize and determine the extent of COCs in the ground water. Also, appropriate cross sections, tabulated analytical data, site diagrams, potentiometric surface maps, isopleth maps illustrating the distribution of COCs may be included as needed to show the current conditions of COC contaminated ground water at the IM Area; and

(c) Propose locations for additional temporary sampling points, monitoring wells and/or piezometers to be installed and to collect adequate samples sufficient to investigate to characterize and determine the extent of COC contamination in ground water in the IM Area to decreasing COC concentrations to less than the IM

PRGs. Samples shall be collected and analyzed in accordance with EPA approved procedures and SW846 analytical methods with detection limits less than Texas State Surface Water Quality Standards; (EPA QA/G-4, October 6, 1993; EPA/540/g-87/003 & 004 Directive 9335.0-7B, March 1991).

(ii) IM Ground Water Investigation

Within ninety (90) days of EPA approval of the IM PRG Report and IM Investigation Work Plan, Respondent shall complete the IM Ground Water Investigation, according to the approved Work Plan.

If IM COCs (as defined in Section VII.1.A.(ii)) are contiguous extending west of Cantwell Lane in the IM Area, Respondent shall continue the IM Investigation to the west of Cantwell Lane in the IM Area.

(iii) IM Ground Water Investigation Report

Within one hundred fifty (150) days of EPA approval of the IM Investigation Work Plan, Respondent shall submit an IM Ground Water Investigation Report to EPA for review and approval. The IM Ground Water Investigation Report shall include the following:

(a) Analytical data collected for, and a summary of the IM Ground water Investigation pursuant to the requirements of this Order; and

(b) Maps with sample and / or data location, cross sections that indicate the nature and extent of COC-contaminated ground water, flow net maps, as well as potentiometric surface contour maps, and an updated CSM for the IM Area

(iv) IM Implementation Work Plan:

Within one hundred eighty (180) days of EPA approval of the Coastal IM Ground Water Investigation Work Plan, Respondent shall submit to EPA for review and approval any Interim Measures Implementation Work Plan (IM Implementation Plan) required by this Order. An IM Implementation Plan is required only if the IM Ground Water Investigation demonstrates that chromium contamination is present in the ground water at or exceeding IM PRG's in an area where no hydrocarbons, or other constituents of concern as defined in the Coastal Order ("Coastal Constituents of Concern "), are detected in the ground water. Such an area shall be referred to as a Chromium Only Area. For each Chromium Only Area detected, Respondent shall prepare and implement the IM Implementation Plan, as set forth below, to address the chromium contaminated ground water in the Chromium Only Area. EPA and Respondent intend that the Respondent's IM Implementation Plan shall

be submitted to EPA 30 days after the submission to EPA of the Coastal IM Implementation Work Plan required by the Coastal Order.

The IM Implementation Plan shall set out a plan to accomplish the following tasks:

(a) To provide sufficient information to support design and implementation of the Chromium Only Area Containment System, described in VII.1.B.(v), to be installed and operated along the entire lateral extent of the COC only contamination exceeding the PRGs in ground water in a Chromium Only Area . This information will include the presentation, as appropriate, of IM Investigation data including cross-sections, tabulated analytical data, site diagrams, potentiometric surface maps, and isopleth maps illustrating the distribution of COC contaminated ground water in the Chromium Only Area. Existing recovery and treatment equipment may be incorporated into the Chromium Only Area Containment System, and Respondent may cooperate with Coastal to utilize Coastal's IM Containment System.

(b) To present specifications for implementation of the Chromium Only Area Containment System to contain, treat and monitor COCs in the ground water to meet the specified performance criteria described in Section VII.1.B.(v) below; and

(c) To propose a monitoring schedule for the Chromium Only Area Containment System.

(v) IM Installation and Operation:

Within one hundred eighty (180) days of EPA approval of the Coastal IM Implementation Plan, Respondent shall have installed and begun operation of the Chromium Only Area Containment System in accordance with the approved IM Implementation Plan. The Chromium Only Area Containment System shall be installed and operated along the entire lateral extent of the COC only contamination exceeding the PRGs in ground water in a Chromium Only Area.

The Chromium Only Area Containment System shall meet the performance goal to contain the release of COCs at concentrations not to exceed the IM PRGs.

As part of the Chromium Only Area Containment System, Respondent shall install sufficient temporary sampling points, monitoring wells and piezometers to adequately monitor the effectiveness of the Chromium Only Area Containment System. Ground water quality in addition to hydraulic gradient reversal shall be monitored quarterly for one year to determine whether the Chromium Only Area Containment System is operating effectively to meet the performance goal. The performance goal

shall be applied in the ground water at the ground water/surface water interface in the Chromium Only Area Containment System monitoring wells. If monitoring wells cannot be installed down gradient of a pre-existing containment system, e.g., cofferdam, due to the close proximity of the containment system to the surface water, Respondent shall maintain reversal of hydraulic gradient to achieve total containment of the COC contaminated ground water in the Chromium Only Areas. After the first year of quarterly monitoring and determination that the Chromium Only-Area Containment System is meeting the performance goal, operation shall continue and semi-annual monitoring may be implemented until the Facility Final Remediation Goals are met for COC's in the Chromium Only Area. If it is determined that the Chromium Only Area Containment System is not meeting the performance goal, Respondent shall take immediate actions, to enhance/increase the capability of the containment system and continue quarterly monitoring as necessary to meet the requirements of this Order.

If hydrocarbons, LNAPL or dissolved phase, or other Coastal Constituents of Concern are discovered in the ground water in a Chromium Only Area, Respondent will immediately provide a notice to Coastal and EPA, which shall include data demonstrating the presence of the hydrocarbons or other Coastal Constituents of Concern. Sixty (60) days after delivery of a notice Respondent's obligations shall cease for that portion of the Chromium Only Area impacted by the Coastal COC contamination. During that 60 days, Respondent shall coordinate with Coastal, including, providing all relevant data and operating records.

(vi) Interim Measures Report:

Within one hundred eighty (180) days of completion of the installation of any Chromium Only Area Containment System, Respondent shall submit an Interim Measures Report (IM Report) to EPA for review and approval that includes the following elements:

(a) synopsis of the Chromium Only Area Containment System and certification of the design and construction;
(b) listing of the COC-specific criteria, established before the Interim Measures were initiated, for judging the functioning of the Interim Measures;
(c) results of monitoring activities for the Chromium Only Area and an evaluation of the extent to which the Interim Measures will meet or exceed the performance goal; and
(d) description of the operation and maintenance (including monitoring) to be undertaken for the Chromium Only Area.

2. FACILITY INVESTIGATION / CORRECTIVE MEASURES STUDY

Concurrently with the IM actions, Respondent shall conduct a Facility Investigation and Corrective Measures Study (FI/CMS). The FI/CMS shall address COC contamination in Media as defined in VII.2.A.(i). The FI/CMS shall consist of a (1) Facility Investigation and Corrective Measures Study; (2) Risk Assessment and (3) FI/CMS Report. The FI/CMS Report shall include the IM Ground Water Investigation Report; the Facility Investigation; Risk Assessment; Corrective Measures Study; and proposed Final Remedy.

A. Facility Investigation / Corrective Measures Study Work Plan (FI/CMS Work Plan):

(i) Within one hundred fifty (150) days of the effective date of the Order, Respondent shall submit to EPA for review and approval a FI/CMS Workplan to address COC contamination in Media (as defined below) at that part of the Facility not addressed in the IM Investigation. The FI/CMS Work Plan shall include a sampling plan and a quality assurance plan either directly or by reference .

"Media" shall mean ground water and contaminated soils in seep areas where the soil contamination is contributing to or is attributable to COC ground water contamination.

(ii) Samples shall be collected and analyzed in accordance with EPA approved procedures and SW 846 Methods and detection limits less than Facility PRGs.

(iii) Facility PRGs shall be established for COCs. For purposes of the Facility Investigation, the Facility PRGs shall be consistent with available protective, risk-based cleanup levels (e.g., ambient water quality standards, State cleanup levels, etc.) applicable to current and reasonably expected future land use scenarios and environmental exposure scenarios consistent with the CSM. When such cleanup levels do not exist, Facility PRGs shall be developed based on an evaluation of human health and the environment, including aquatic ecological receptor exposures. In development of Facility PRGs, risk assessment procedures shall be in accordance with the Human Health and Ecological Risk Assessment Guidance for Superfund (RAGS) and other appropriate EPA guidance based on current and reasonably expected exposure scenarios. EPA Region 6 Media Specific Screening Levels, Ambient Water Quality Standards, federal criteria, or State standards may be proposed for Facility PRGs if, based on specific physical conditions at the Facility and current or reasonably anticipated exposure assumptions, they are shown to be protective of human health and the environment.

B. Facility Investigation

Within 360 days of EPA approval of the FI/CMS Workplan, Respondent shall complete the Facility Investigation field activities according to the FI/CMS Workplan.

During the investigation Respondent shall:

(i) install adequate wells and collect sufficient samples to determine the extent of COC contaminated Media to decreasing concentrations to below the appropriate Facility PRGs.

(ii) characterize the presence, magnitude, concentration profile, and direction and rate of migration, and extrapolate movement of COCs at or from the Facility;

(iii) characterize the potential pathways of COC migration.

(iv) identify actual or potential receptors including human populations and environmental systems that are susceptible to exposure to the COC contamination at or from the Facility

(v) collect and analyze all samples in accordance with EPA approved procedures and EPA approved SW846 Methods with method detection limits less than the Facility PRGs. Samples shall be analyzed for hexavalent and trivalent chromium.

(vi) collect data to support the development of alternatives or support a presumptive remedy from which corrective measure(s) will be recommended by Respondent and selected by EPA.

(vii) provide an updated CSM, including maps with sample and/or data locations, cross sections that indicate the nature and extent of COC contamination within Media, flow net maps, as well as potentiometric surface contour maps.

All COC analytical data collected for all investigations and a summary of all investigations implemented pursuant to the requirements of this Order shall be included in the FI/CMS Report. The Facility investigation may utilize sampling results from previously acquired analytical data or data generated by others if it meets the criteria of the second paragraph of Section VII.

C. Risk Assessment

In setting Final Remediation Goals (FRGs) for the COCs, Respondent may select one of the two following options: (1) Respondent may conduct an assessment of the base line risk posed by Appendix IX constituents; and FRGs for the COCs will be determined by the Risk Assessment; or (2) Respondent may apply the applicable PRGs as FRGs. Under either of the above options, the FRGs will apply in ground water at the ground water/surface water interface as measured in the monitoring wells located down gradient of the IM Containment System for performance monitoring of the Containment System. If such monitoring wells cannot be installed down gradient of a pre-existing containment system, e.g., cofferdam, due to the close proximity of the containment

system to the surface water, reversal of hydraulic gradient shall achieve total containment of COC contamination in ground water. Respondent may use fate and transport modeling to determine COC levels throughout the remainder of the Facility that will achieve the FRGs in the ground water at the ground water/surface water interface, as measured in the monitoring wells located down gradient of the IM Containment System for performance monitoring of the Containment System. Within 180 days of the effective date of the Order, Respondent shall select one of the two above options for setting FRGs.

If either the Respondent or Coastal chooses to conduct a risk assessment, FRGs for both Respondent and Coastal will be based on the risk assessment.
If Respondent chooses to conduct a risk assessment under the first option, Respondent will conduct the Risk Assessment in accordance with RAGS. Although the process of conducting a Risk Assessment shall involve sediment sampling, notwithstanding any provision to the contrary, nothing in this Order requires Respondent to fully delineate or to remediate sediment contamination.

If Respondent chooses to conduct a risk assessment, Respondent shall submit a Risk Assessment for the potential human health and environmental risks posed by 40 CFR Part 264 Appendix IX constituents in Media at or from the Facility in the absence of any remedial action. The risk assessment shall include potential risk posed by 40 CFR Part 264 Appendix IX constituents in surface water and sediment considered to be site specific and adjacent to the Facility, but not limited to the cofferdam area. The risk assessment shall estimate human health and ecological risk under reasonable maximum exposure for both current and reasonably expected future land use scenarios and environmental exposure scenarios. The risk assessment shall be conducted in accordance with the appropriate EPA and State guidance. Respondent will utilize appropriate conservative screening values when screening to determine whether further investigation is required. Appropriate screening values may include those derived from EPA Region 6 Human Health Media Specific Screening Levels and available Ambient Water Quality State Standards or federal criteria. Appropriate screening values to evaluate human health risks may include, but are not necessarily limited to those derived from TNRCC Protective Concentration Levels and/or TNRCC Risk Based Exposure Levels. Appropriate screening values to evaluate environmental risks include, but are not necessarily limited to, State and Federal Water Quality Standards criteria, Sediment Screening Values and Soil Screening Values (Texas Eco Risk Guidance). If potential current and future exposures do not correspond to the exposure at or from the Facility exceed screening level risk calculations then a Risk Assessment must be conducted to determine appropriate site-specific cleanup levels protective of human health and the environment.

(i) For human health risks, the effort will involve the following components:

(a) Data collection and Evaluation
(b) Exposure assessment;
(c) Toxicity assessment; and
(d) Risk characterization.

(ii) The ecological risk assessment shall be in accordance with the guidance titled "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments: Interim Final", dated June 5, 1997 (RAGs Guidance). The ecological risk assessment shall be completed in two Steps. Step 1 shall be a preliminary screening evaluation conducted in accordance with Steps 1 and 2 described in the above referenced EPA RAGS Guidance. If the Phase 1 evaluation finds that ecological risk is within acceptable levels (HQ < 1), then no further ecological risk assessment is necessary. Should the Phase 1 evaluation find that there may be an unacceptable risk (HQ $\geq$1), then a baseline ecological risk assessment shall be required. A baseline ecological risk assessment will include the following components:

(a) Problem formulation;
(b) Exposure assessment;
(c) Ecological effects assessment; and
(d) Ecological risk characterization.

D. Corrective Measures Study (CMS)

The Investigation/ CMS Report shall include a CMS, which shall identify and evaluate corrective measure alternatives necessary to protect human health and the environment from all current and future unacceptable risks due to releases of COC contamination in Media at or from the Facility. Respondent may evaluate a presumptive remedy and an existing remedy in lieu of evaluating other corrective measures alternatives as set out in paragraph VII.2.E.(iv) below.

The CMS shall include the following:

(i) A description of all interim measures or corrective measures implemented at the Facility since the effective date of this Order.

(ii) Appropriate FRGs as discussed in VII.2.D. above and points of compliance under current and reasonably expected future land use scenarios and environmental exposure scenarios with a description of the basis and justification for these decisions. If Respondent conducts a Risk Assessment, the FRGs shall be based on Media cleanup standards, the findings of human health and environmental criteria, source control, information gathered during the investigation and interim measures, EPA guidance, and shall be consistent with the requirements of any applicable State and Federal statutes and regulations;

(iii) A description of how final FRGs will be verified with adequate samples collected, sufficient to verify that COC concentrations are less than FRGs;

(iv) A description of all other Corrective Measures evaluated by Respondent;

(v) A description of how the proposed final Corrective Measures will attain the FRGs in Media and how the Corrective Measures will prevent exposure to COCs at concentrations exceeding risk based levels;

(vi) A detailed explanation of why the proposed final Corrective Measures were preferred by Respondent, including consideration of:

(a) Long-term reliability and effectiveness;
(b) Reduction of toxicity, mobility, or volume;
(c) Short term effectiveness;
(d) Ease or difficulty of implementation; capital and operation and maintenance costs;
(e) Community acceptance; and
(f) State acceptance;

(vii) Cost estimates for the final Corrective Measures evaluated; and

(viii) A detailed schedule for design, construction and implementation of the final Corrective Measures, and for submittal of the Final Remedy Construction Completion Report. This schedule will provide that as much of the initial construction work as practicable will be completed within one year after EPA selects the Final Corrective Measures and that all Final Corrective Measures will be completed within a reasonable period of time such that human health and the environment are protected.

EPA may require supplemental information from Respondent if EPA determines that the proposal and supporting information do not provide an adequate basis for selection of Final Corrective Measures that will protect human health and the environment from the release of COC contamination in Media at or from the Facility. Respondent will provide such supplemental information in a timely manner as directed in writing by EPA.

3. CORRECTIVE MEASURES IMPLEMENTATION (CMI)

EPA will provide the public with an opportunity to review and comment on its proposed Final Corrective Measure(s), including a detailed description and justification for the proposal (the Statement of Basis). Following the public comment period, EPA will select the Final Corrective Measures to be implemented by Respondent, and provide notification of its decision and rationale in a Final Decision and Response to Comments Report ("Final Decision").

A. Respondent shall accept for treatment and disposal the recovered ground water that is generated by Coastal pursuant to the Coastal Order at the Facility, and that contains total chromium in concentrations that exceed 2.0 mg/l subject to conditions agreed to by Coastal and Elementis.

B. Upon notification by EPA, Respondent shall implement the Final Corrective Measures selected in EPA's Final Decision and in accordance with the schedule therein. Respondent shall design, construct, operate, maintain, and monitor the performance of the selected Final Corrective Measures to protect human health and the environment until the FRGs have been achieved in Media.

C. At the completion of construction of the Corrective Measures, Respondent shall submit to EPA for review and approval a Final Corrective Measures Construction Completion Report.

D. If ongoing monitoring or operation and maintenance is required after construction of the selected final Corrective Measures, Respondent shall include an Operations and Maintenance Plan in the Final Corrective Measures Construction Completion Report. Upon approval, Respondent shall implement the approved Operation and Maintenance plan in accordance with the schedule and provisions contained therein.

E. Respondent shall prepare and submit a Corrective Measures Completion Report to EPA when the FRGs have been achieved.

F. EPA will provide the public with an opportunity to review and comment on the Corrective Measures Completion Report. Following the public comment period, EPA will either approve, disapprove, require revisions to, or modify the Corrective Measures Completion Report.

G. EPA recognizes that Respondent maintains ongoing industrial operations at the Facility. Respondent shall conduct its ongoing operations in a manner that minimizes, to the extent practical, interference with activities required under this Order. However, if operations may interfere with timely implementation of the requirements of this Order or the Coastal Order or may substantially impact the quality or type of data to be, or that can be, collected, Respondent shall notify EPA as soon as practical, but not less than ten (10) days before implementation of such ongoing or proposed activities. The notification shall generally describe the activities, the schedule and the potential interference with or impacts on implementation of required actions or data collection under this Order or the Coastal Order. The notification shall include ways to minimize these interferences or impacts; and alternatives to the proposed activities. EPA shall respond to Respondent's notice in writing within ten (10) days of receipt. The Project Managers shall attempt to resolve all issues related to the alleged interference or impact including any proposed modifications to any approved plan, sampling and analysis plan or schedule.

4. SUBMISSIONS / AGENCY APPROVAL

A. Beginning with the month following the Effective Date of this Order, Respondent shall provide EPA with quarterly progress reports, due on the tenth (10) day of the month following the end of the quarter. The frequency of progress reports may be

revised as agreed to in writing by EPA and Respondent. The progress reports shall, at a minimum:

(i) describe the tasks and other work pursuant to this Order that Respondent has completed during the period since the last report was prepared;

(ii) provide the results of the sampling and testing performed under this Order since the last progress report was prepared;

(iii) describe the tasks and other work pursuant to this Order that Respondent plans to undertake before the next scheduled progress report; and

(iv) identify any problems encountered or anticipated, including, but not limited to, failure to complete Order requirements.

B. Three (3) copies of all deliverables shall be hand-delivered or sent by certified mail, return receipt requested, to the EPA Project Manager. Additionally, one (1) copy shall be sent to the TNRCC and (1) copy shall be sent to Coastal. Respondent shall also submit to EPA a copy of all report submittals on 3.5 inch computer or compact disk ("CD"). The text shall be in a format compatible with WordPerfect® versions 5.1 or later or MS Word® version 5.0 or later, and data shall be in a format compatible with Lotus 123® version 2.2 or later or Microsoft Excel® version 4.0 or later. Drawings will be submitted in JPG format.

C. For all submittals requiring EPA approval, EPA may approve, disapprove, require revisions to or modify any document or submission required under this Order. All decisions, determinations, and approvals required to be made by EPA under this Order must be in writing. If EPA requires revisions, Respondent shall submit a revised version of the submission that includes the necessary revisions to EPA's satisfaction within sixty (60) days of receipt of EPA's notification of the required revisions, or such longer time period as approved by EPA. EPA may, at its sole discretion, modify a submission upon EPA's first review or after Respondent has revised and resubmitted a document.

D. If upon resubmission EPA determines that the document does not adequately address the comments provided by EPA, EPA may modify the document, or replace the document with an EPA document, and will provide Respondent with a copy of the modified document, which shall be implemented in accordance with the modifications.

E. If Respondent's resubmission is determined by EPA to be inadequate by reason of inadequate investigations or other activities required by the Order, EPA may substitute a workplan consistent with this Order that specifies the necessary investigations or other activities necessary to support an adequate submittal. Respondent shall implement the substituted workplan in accordance with the requirements, standards, specifications, and schedule described in the workplan.

F. EPA's determination that any submission does not conform to the requirements of this Order or any EPA drafted workplan, shall be subject to the Dispute Resolution procedures set forth in Section XVIII below; however, invocation of Dispute Resolution shall not stay Respondent's obligations to perform work required by an approved or modified document.

G. Any deliverable required by this Order shall be incorporated into this Order upon approval by EPA. Any noncompliance with such EPA-approved deliverable may be construed as a violation of the terms of this Order and may be subject to the stipulated penalties specified in Section XXIII of this Order. Oral advice or approvals given by EPA representatives will not relieve Respondent of its obligation to obtain any formal, written approval required by this Order.

H. In all instances of required written submissions to EPA, each submission must be accompanied by the following certification signed by a "responsible official":

I certify, to the best of my knowledge, that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information under 18 U.S.C. Section §1001.

For the purpose of this certification, a "responsible official" means any person in charge of a principal function for Respondent, or any other person who performs similar decision making functions for Respondent.

I. All field work performed pursuant to this Order shall be under the direction or supervision of an engineer, geologist, or environmental professional with appropriate experience in hazardous waste site cleanup.

J. Respondent shall notify EPA in writing of the name, title, and qualifications of its engineer, geologist, or environmental professional, and of any contractors or subcontractors and their principal personnel to be used in carrying out the terms of this Order no later than thirty (30) days after the Effective Date of this Order, or upon entering into such a contract or subcontract.

K. EPA may determine, or Respondent may propose, that certain tasks and deliverables, including investigatory work, engineering evaluation, or procedure/methodology modifications, are necessary in addition to, or in lieu of, the tasks and deliverables specified herein, provided such additional work and deliverables are necessary and consistent with this Order to satisfy the objectives of Section III: (Statement of Purpose). If EPA determines that Respondent shall perform additional work consistent with this Order, EPA shall notify Respondent in writing and specify the basis for its determination that the additional work is necessary. Within thirty (30) days after the receipt of such determination, Respondent shall have the opportunity to meet or confer with EPA to discuss the additional work. Respondent shall perform the additional work in accordance with the schedule and provisions contained in the notification.

L. Respondent shall have the right to review and file formal written comments with EPA concerning all data, reports, studies, proposals and other submissions required pursuant to the Coastal Order, and EPA shall consider and reply in writing to such submissions by Respondent.

5. **ADDITIONAL REQUIREMENTS:**

A. Respondent shall establish a publicly accessible repository for information regarding its site activities and conduct public outreach and involvement activities.

B. The parties to this Order will communicate frequently and in good faith to assure successful completion of the requirements of this Order, and will meet on at least a quarterly basis to discuss the work proposed and performed under this Order.

VIII. PROJECT MANAGER

1. Within ten (10) days of the Effective Date of this Order, EPA and Respondent shall each designate a Project Manager and notify each other in writing of the Project Manager it has selected. Each Project Manager shall be responsible for overseeing that Respondent's implementation of this Order. The EPA Project Manager will be EPA's designated representative for the Facility. All communications between Respondent and EPA, and all documents, reports, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the parties' respective Project Manager. All communications from EPA to Respondent, and all documents, reports and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order, shall be directed through the parties' respective Project Managers.

2. The parties shall provide written notice within ten (10) days after changing Project Managers.

3. The absence of the EPA Project Manager shall not be cause for the stoppage or delay of work.

IX. ADMINISTRATIVE RECORD

This Order is based upon the Administrative Record compiled by EPA, which is available through the Freedom of Information Act ("FOIA") for public examination at the EPA Region 6 offices, 1445 Ross Avenue, Dallas, Texas, 75202-2733, during normal business hours, Monday through Friday.

X. NOTICE

Whenever, under the terms of this Order, notice is required to be given, or a document is required to be forwarded to EPA, it shall be directed to the address specified below, unless notice is given in writing to Respondent of a change in address or unless it is otherwise specifically provided in the Order. All correspondence shall include a reference to the case caption (RCRA-VI-7003-01-02) and be addressed to:

U.S. EPA, Region 6
Technical Section (6EN-HX)
Compliance Assurance and Enforcement Division
1445 Ross Avenue
Dallas, Texas 75202-2733
Attention: Elementis Project Manager

Whenever under the terms of this Order notice is required to be given or a document is required to be forwarded to Respondent, it shall be directed to the address specified below, unless notice is given in writing to EPA of a change in address or unless it is otherwise specifically provided in the Order. All correspondence shall include a reference to the case caption (RCRA-VI-7003-01-02) and be addressed to:

Elementis Chromium, L.P.
3800 Buddy Lawrence Drive
Corpus Christi, Texas 78403
Attention: Robbin Jackson

XI. EPA APPROVALS / DISAPPROVALS

All decisions, determinations, and approvals required to be made by EPA under this Order must be in writing. If EPA does not approve any plan, report, or other item required to be submitted to EPA for its approval pursuant to this Order, Respondent shall address any deficiencies as directed by the EPA, and resubmit the plan, report, or other item for the EPA's approval within the time period specified in this Order.

XII. SAMPLING AND DATA/DOCUMENT AVAILABILITY

1. Respondent shall submit to EPA the results of its respective sampling and tests or other data generated by employees and/or consultants with respect to the implementation of this Order. Respondent shall also provide a summary of all the analytical data which shall be in tabular format contrasting the data point with the appropriate PRG, remediation goal or level, regulatory or risk screening level and/or standard.

2. Respondent shall submit these results in progress reports as described in Paragraph VII.4.A of this Order.

3. EPA will make available to Respondent the results of sampling and/or tests or other data similarly generated from the Facility by EPA or Coastal.

4. Respondent will specify the name and address of the laboratory to be used for sample analysis. EPA reserves the right to conduct a performance and Quality Assurance and Quality Control ("QA/QC") audit of the above specified laboratory before, during, or after sample analysis. If the audit reveals deficiencies in lab performance or QA/QC, re-sampling and analysis may be required.

5. At the request of EPA, Respondent shall allow split or duplicate samples to be collected by EPA, and/or its authorized representatives, of any samples collected by Respondent pursuant to the implementation of this Order. Respondent shall notify EPA not less than fourteen (14) days in advance of its well installation or sample collection activity required under this Order. In the event EPA conducts any additional sampling, Respondent will be offered the opportunity to split samples.

6. In the event of unforeseen situations in the field where well installation or sample collection must occur within a time frame that does not allow for fourteen day advance notice to EPA, Respondent shall inform the EPA Project Manager of same by telephone and request approval to proceed within a shorter time frame. Thereafter, Respondent's verbal request for approval shall be documented in writing to EPA within ten (10) days.

XIII. QUALITY ASSURANCE

Throughout all sample collections and analysis activities, Respondent shall use EPA-approved quality assurance, quality control, and chain-of-custody procedures, which shall be part of proposed and approved plans. In addition, Respondent shall:

1. Follow all relevant EPA guidance for sampling and analysis unless determined by EPA not to be applicable;

2. Ensure that laboratories used by Respondent for analyses perform such analyses according to EPA methods (SW-846, 3rd Edition, or as superseded) or other methods deemed satisfactory to EPA. Method detection limits shall be less than the Texas State Water Quality Standards. If methods other than EPA methods are to be used, Respondent shall submit all protocols to be used for analyses to EPA for approval no later than thirty (30) days prior to the commencement of analyses and shall not implement such protocols until receipt of EPA approval;

3. Ensure that EPA personnel and EPA-authorized representatives have reasonable access to the laboratories and personnel used for analyses by Respondent; and

4. Ensure that laboratories used by Respondent for analyses participate in a quality assurance and quality control program equivalent to that which is followed by EPA. As part of such a program, and upon request by EPA, such laboratories shall perform analysis of a reasonable number of known samples provided by EPA to demonstrate the quality of the analytical data.

XIV. PUBLIC ACCESS TO DOCUMENTS AND SAMPLING DATA

Respondent may assert a business confidentiality claim covering all or part of any information submitted to EPA pursuant to this Order. Analytical data generated pursuant to this Order shall not be claimed as confidential. Confidentiality claims shall be submitted to EPA in accordance with the procedures outlined in 40 C.F.R. Part 2, in particular, 40 C.F.R. § 2.203(b), and shall include a written statement explaining how the information claimed to be confidential meets the substantive criteria for use in confidentiality determinations found in 40 C.F.R. § 2.208, or such claim shall be deemed waived. If EPA approves the claim, EPA will afford the information confidential status, as specified in 40 C.F.R. Part 2, Subpart B. Information determined not to be confidential may be made available to the public without further notice to Respondent. If Respondent makes no claim of confidentiality for information submitted pursuant to this Order, EPA will make the information available without further notice to Respondent.

XV. PUBLIC COMMENT AND PARTICIPATION IN CORRECTIVE MEASURES SELECTION

1. As provided in Section VII.3.A., following interim EPA approval or modification of the FI/CMS Report, EPA will provide the public with an opportunity to review and comment for a period of thirty (30) days on the Proposed Final Corrective Measure(s), including EPA's justification for proposing such corrective measure(s) (the "Statement of Basis").

2. After the public review and comment period, EPA will notify Respondent in writing of any modifications or additional work to be performed, which EPA finds to be necessary after a review of the public comments.

3. Following final EPA approval or modification of the FI/CMS Report, EPA will provide notification to Respondent of its decision and rationale for selecting the corrective measure(s) through publication of a Final Decision and Response to Comments Report (Final Decision).

XVI. PARTICIPATION IN COMMUNITY RELATIONS ACTIVITIES

Respondent shall be given notice of, provide support, and shall participate in public meetings, as appropriate, which may be held or sponsored by EPA to explain activities at or concerning the Facility, including findings of the Statement of Basis.

XVII. SITE ACCESS AND RECORD RETENTION

1. EPA and/or any EPA authorized-representative(s) are authorized, allowed, and permitted, pursuant to Section 7003(a) of RCRA, 42 U.S.C. § 6927(a), to enter onto and to be escorted around all property of Respondent at all reasonable times for the purposes of enforcing the requirements of RCRA.

2. All parties under Respondent's control with access rights to the Facility shall comply with applicable health and safety requirements found in 29 C.F.R. Part 1910, and Respondent's requirements and procedures with respect to movement within the property., and all other access requirements established in this Order.

3. If Respondent denies any aspect of access, Respondent shall provide a written explanation, including reference to the applicable statute(s) or regulation(s), within forty-eight (48) hours, stating the reason for the denial and providing a recommendation for accommodating the requested access in an alternate manner.

4. Respondent shall permit any EPA and/or authorized-representative(s) to inspect and copy all records, files, photographs, documents, including all sampling and monitoring data in any way pertaining to work undertaken pursuant to this Order.

5. Nothing in this Section is intended to limit, affect or otherwise constrain EPA's rights of access to property and records pursuant to applicable law.

6. All data, information, and records created or maintained in connection with the implementation of work under this Order, including Respondent's contractors shall be made available to EPA upon request. Respondent shall retain all such data, information or records for five (5) years after termination of the Order and provide notification to EPA and the State sixty (60) days prior to the destruction of any such documents.

XVIII. DISPUTE RESOLUTION

1. Any dispute which arises under or with respect to this Order shall in the first instance be the subject of informal negotiations between the parties to the dispute. The parties to the dispute shall be Respondent and the EPA. If resolution cannot be achieved informally, the procedures of this Section shall be implemented to resolve a dispute.

2. All disputes arising under this Order shall be subject to the dispute resolution provisions of this Section. If Respondent disagrees, in whole or in part, with any EPA disapproval or modification or other decision or directive made by EPA in writing pursuant to this Order, Respondent shall notify EPA in writing of his objections, and the basis therefore, within twenty (20) days after receipt of EPA's written disapproval or modification or other decision or directive. Said notice shall set forth the specific points of the dispute, the position Respondent maintains should be adopted consistent with the requirements of this Order, the basis for Respondent's position, and any matters which Respondent considers necessary for EPA's determination. Within fourteen (14) days after receipt of said notice from Respondent, EPA shall provide to Respondent its decision on the pending dispute.

3. An administrative record of the dispute shall be maintained by the agency that issued the disputed decision and shall contain all notices and decisions, including supporting documentation, pursuant to this Section. Where appropriate, the agency that issued the disputed decision may allow submittal of supplemental information by Respondent.

4. EPA's decision pursuant to Paragraph XVIII.2. shall be binding upon Respondent, unless Respondent within fourteen (14) days of receipt of the decision, notifies EPA in writing of its continued objection(s). Respondent may request the Compliance Assurance and Enforcement Division Director for Region 6, or his designee ("Division Director"), to convene an informal conference for the purpose of discussing the objections of Respondent and the reasons for EPA's determination. During the conference pursuant to this paragraph, Respondent may present a case in favor of its position on the dispute.

5. The Division Director will issue a final administrative decision resolving the dispute based on the administrative record described in this Section. The Division Director shall issue a written decision within fourteen (14) days from the date of the notice of continued objection(s) pursuant to paragraph (4) of this Section, or the informal conference if later, which shall be binding on Respondent and incorporated into this Order subject to any rights of appeal by Respondent. The failure to invoke these Dispute Resolution procedures shall constitute a waiver of the right to contest a specific requirement of this Order.

6. The existence of a dispute as defined herein, and EPA's consideration of such matters as placed into dispute, shall not toll, suspend, or excuse any compliance obligation or deadline required pursuant to this Order, unless Respondent prevails in its dispute resolution or EPA either unilaterally or upon written request by Respondent, modifies any requirement of this Order.

7. During the pendency of the dispute resolution process, Stipulated Penalties with respect to the disputed matter shall accrue, but payment of Stipulated Penalties shall be stayed pending resolution of the dispute. Stipulated Penalties shall be calculated for each day of noncompliance with this Order beginning with the first day of noncompliance and including the period which the Dispute Resolution procedures were ongoing. If, however, the dispute is ultimately resolved in favor of Respondent, no Stipulated Penalties shall be due on the disputed issue.

8. All documents and materials submitted or exchanged during the Dispute Resolution process shall be considered part of the Administrative Record.

9. Nothing herein shall be construed to pre-empt, conflict or otherwise interfere with the jurisdiction of the United States District Court in Civil Action No. H-01-0233; *Elementis Chromium L.P. and Elementis Chromium Inc. v. Coastal States Petroleum Company, et al.*; In the United States District Court for the Southern District of Texas, Houston Division, or with the rights, claims and/or defenses of any party thereto.

XIX. REIMBURSEMENT OF OVERSIGHT COSTS

Oversight costs are those reasonable costs incurred by the EPA after the Effective Date of this Order for EPA's contractor costs regarding the activities required by this Order. Respondent shall pay EPA for its necessary oversight costs, documented by contractor invoices, directly related to implementation of this Order, in the following manner:

1. Upon request from EPA, Respondent shall pay such costs, which shall not exceed $100,000 in the aggregate for any 12-month period covered by the duration of this Order. These costs shall not be subject to pre-payment dispute by Respondent. EPA's contractors shall allocate and document their fees and expenses according to each task required by this Order so that the oversight costs can be fairly and properly assessed to Respondent. Respondent's payment of such oversight costs shall not waive or impair its right to use the dispute resolution provisions of the Order to dispute the reasonableness of oversight costs.

2. Payments to EPA for all EPA oversight costs shall be made by certified check, company check, electronic funds transfer, or cashier's check payable to the "Treasurer of the United States" within thirty (30) days of receipt of EPA's request, and shall be submitted to the following address:

   Regional Hearing Clerk (6C)
   U.S. EPA, Region 6
   P.O. Box 360582M
   Pittsburgh, PA 15251

3. Document No. RCRA-VI-7003-01-02 should be clearly typed on the check to ensure proper credit. Respondent shall send simultaneous notices of such payments, including copies of the certified check, company check, electronic funds transfer, or cashier's check to the following:

   Section Chief, Technical Section, (6EN-HX)
   Hazardous Waste Enforcement Branch
   U.S. EPA, Region 6
   1445 Ross Avenue
   Dallas, TX 75202-2733

   RCRA Team Leader
   Legal Branch (6RC-EW)
   U.S. EPA, Region 6
   1445 Ross Avenue
   Dallas, TX 75202-2733

4. If EPA does not receive payment from Respondent within thirty (30) days of receipt of EPA's request for oversight costs, interest will accrue on the amount due from the due date at the current annual rate prescribed and published by the Secretary of the Treasury, pursuant to 31 U.S.C. § 3717, in the Federal Register and the Treasury Fiscal Requirements Annual Bulletin per annum through the date of payment.

5. The parties acknowledge and agree that EPA's approval of any submittal does not constitute a warranty or representation that the required cleanup or performance standards will be achieved.

6. If the payment is overdue, EPA will also impose a late-payment handling charge of $15.00, with an additional delinquent notice charge of $15.00 for each subsequent 30-day

period over which an unpaid balance remains. A penalty of 6% per annum shall be assessed on any unpaid principal amount not paid within ninety (90) or more days of receipt of EPA's request for oversight costs.

XX. RIGHT OF ENFORCEMENT

With respect to the areas of Elementis' property that are outside the Facility (the "Western Side") and thus not subject to the requirements of this Order, EPA shall have a separate right to enforce against Respondent the requirements of the May 10, 1988 Agreed Order of the Texas Water Commission ("1988 AO") (Exhibit 26), as if the requirements of the 1988 AO that pertain to the Western Side were set forth in this Order.

XXI. RESERVATION OF RIGHTS

1. EPA expressly reserves all statutory and regulatory powers, authorities, rights, remedies, both legal and equitable, which may pertain to the failure of Respondent to comply with any of its requirements in this Order including, without limitation, the assessment of civil penalties under Section 7003(b) of RCRA, 42 U.S.C. § 6973(b). If Respondent does not comply with its obligations in this Order, EPA may use any other authorities available to it to compel compliance with Section 7003. This Order shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, and/or authorities, civil or criminal, which EPA has under RCRA, CERCLA, or any other statutory, regulatory, or common law enforcement authority of the United States.

2. EPA reserves the right to disapprove of work performed by Respondent not in accordance with this Order and to require that Respondent perform additional tasks consistent with this Order.

3. This Order shall not limit the rights or responsibilities of any federal, State or local agency or authority to take action which is not inconsistent with the terms of this Order pursuant to any other statutory provision, nor shall the entry of this Order limit or otherwise preclude the EPA from taking additional enforcement action under any other available legal authority, should the EPA determine that such actions are warranted. Nor shall this Order be construed to affect or limit in any way the obligation of Respondent to comply with all federal, State, and local laws and regulations governing the activities required by this Order.

4. If EPA determines that activities in compliance or noncompliance with this Order have caused or may cause a release of hazardous waste, hazardous constituents, and/or solid wastes, or a threat to human health and/or the environment, or that Respondent is not capable of undertaking any of the work ordered, EPA may order Respondent to stop further implementation of this Order for such period of time as EPA determines may be needed to abate any such release or threat and/or to undertake any action which EPA determines is necessary to abate such release or threat. Failure to comply with EPA's stop work order may result in a penalty not to exceed $5,000 per day of continued non-compliance with EPA's stop work order pursuant to RCRA Section 7003(b) of RCRA, 42 U.S.C. § 6973(b).

5. In the event EPA suspends the work or any other activity being performed at the Facility pursuant to this Order, EPA shall extend affected schedules under this Order for a period of time equal to that of the suspension of the work plus reasonable additional time for resumption of activities. If the delay pursuant to this Section is caused by Respondent or its contractor's noncompliance with this Order, then any extension of the compliance deadlines shall be at EPA's sole discretion. Any extensions in the schedules set out in this Order must be made by EPA in writing, and incorporated by reference into this Order.

6. Notwithstanding any other provision of this Order, Respondent shall remain responsible for obtaining any required federal, State, or local permit, or any other form of authorization, for its activities at the Facility including those necessary for the performance of the work and for the operation or closure of the Facility.

7. Notwithstanding any other provision of this Order, no action or decision by EPA pursuant to this Order, shall constitute final agency action giving rise to any right of judicial review prior to EPA's initiation of a judicial action to enforce this Order, including an action for penalties or an action to compel Respondent's compliance with the terms and conditions of this Order.

8. In any action brought by EPA for a violation of this Order, Respondent shall have the burden of showing that EPA's position, including without limitation any interpretation of the terms and conditions of this Order and of applicable federal and/or State law and regulations, was arbitrary and capricious or otherwise not in accordance with applicable law.

XXII. SUBSEQUENT MODIFICATION OF THE FINAL ORDER

After consultation with and concurrence of the Respondent, this Order may be modified by EPA to ensure protection of human health and the environment. Such amendments shall be in writing, and shall be effective and incorporated into the Order on the date that such amendments are signed by EPA. Any reports, plans, specifications, schedules, and attachments required by this Order are, upon written approval by EPA, incorporated into this Order. Upon the request of Respondent, EPA may extend the deadlines set forth in this Order.

XXIII. STIPULATED PENALTIES

1. Unless there has been a written modification of a schedule herein by EPA, or the Force Majeure provisions of this Order are invoked, in the event Respondent fails to meet any scheduled requirement set forth in this Order, including inadequate or late submittals, EPA may assess a stipulated penalty and Respondent shall pay, upon written notification by EPA, a stipulated penalty as follows. The following Stipulated Penalties apply to all requirements of this Order except as provided in Paragraph 2 below:

Period of Failure to Comply	Penalty Per Violation Per Day
1st day through 30th day	$ 1,500.00
31st day through 60th day	$ 3,000.00
61st day and beyond	$ 5,000.00

2. Unless there has been a written modification of a schedule herein by EPA, or the Force Majeure provisions of this Order are invoked, in the event Respondent fails to meet any scheduled requirement set forth in this Order for progress reports, EPA may assess a stipulated penalty and Respondent shall pay, upon written notification by EPA, a stipulated penalty as follows:

Period of Failure to Comply	Penalty Per Violation Per Day
1st day through 15th day	$ 500.00
16th day through 30th day	$ 1,000.00
31st day and beyond	$ 1,500.00

3. Failure or delay of EPA to notify Respondent will not stop or suspend accrual of any Stipulated Penalties.

4. Stipulated Penalties under this Section shall be paid within thirty (30) days after Respondent's receipt of written notification of noncompliance from EPA. Such Stipulated Penalties shall be paid by certified check, company check, electronic funds transfer, or cashier's check made payable to the "Treasurer of the United States" and mailed to:

U.S. EPA, Region 6
Regional Hearing Clerk (6C)
P.O. Box 360582M
Pittsburgh, PA 15251

5. Document No. RCRA-VI-7003-01-02 should be clearly typed on the check to ensure proper credit. Respondent shall send simultaneous notices of such payments, including copies of the certified check, company check, electronic funds transfer, or cashier's check to the following:

U.S. EPA, Region 6
Technical Section, (6EN-HX)
Compliance Assurance and Enforcement Division
1445 Ross Avenue
Dallas, TX 75202-2733
Attention: Coastal / Elementis Project Manager

U.S. EPA, Region 6
Legal Branch (6RC-EW)
Office of Regional Counsel
1445 Ross Avenue
Dallas, TX 75202-2733
Attention: Coastal / Elementis Project Manager

6. Respondent may dispute EPA's right to the stated amount of penalties by invoking the Dispute Resolution procedures set forth in Section XVIII of this Order. If Respondent does not prevail upon resolution of the dispute, EPA shall collect all penalties which accrued prior to and during the period of dispute. If Respondent prevails upon resolution of the dispute, no penalties on the disputed issue shall be payable.

7. The Stipulated Penalties set forth in this Section do not preclude EPA from pursuing any other remedies or sanctions which may be available to EPA by reason of Respondent's failure to comply with any of the requirements of this Order.

XXIV. TERMINATION AND SATISFACTION

1. Respondent may seek termination of this Order by submitting to EPA a written document which indicates compliance with all requirements of this Order and the associated dates of approval correspondence from EPA. The provisions of this Order shall be deemed satisfied upon Respondent's and EPA's execution of an "Acknowledgment of Termination and Agreement to Record Preservation and Reservation of Rights" ("Acknowledgment") by Respondent and EPA. The Acknowledgment will specify that Respondent has demonstrated to the satisfaction of EPA that the terms of the Order, including any additional tasks required by EPA pursuant to this Order, have been satisfactorily completed. Respondent's execution of the Acknowledgment will affirm Respondent's continuing obligation: (i) preserve all records as required in Section XVII (Site Access and Record Retention); and (ii) to recognize EPA's Reservation of Rights-as required in Section XXI, after all other requirements of the Order are satisfied.

2. This Order may also be terminated upon the Respondent's receipt of written notice from EPA that Respondent has demonstrated that the terms of the Order, including any additional tasks required by EPA pursuant to this Order, have been satisfactorily completed. This notice shall also affirm Respondent's continuing obligation to: (i) preserve all records as required in Section XVII Site Access and Record Retention; and (ii) to recognize EPA's Reservation of Rights as required in Section XXI after all other requirements of the Order are satisfied.

XXV. LIMITATION OF EPA LIABILITY

EPA shall not be liable for any injuries or damages to persons or property resulting from acts or omissions of Respondent, its officers, directors, employees, agents, receivers, trustees, successors, assignees, or independent contractors, in carrying out activities pursuant to this Order, nor shall the EPA be held out as a party to any contract entered into by Respondent in carrying out activities pursuant to this Order.

XXVI. OTHER ENFORCEMENT AUTHORITY

The failure or refusal of Respondent to carry out its obligations in this Order in a manner deemed satisfactory to EPA may subject Respondent to a civil enforcement action and penalties in an amount not to exceed $5,000 for each day of non-compliance with this Order, in accordance with Section 7003(b) of RCRA, 42 U.S.C. § 6973(b).

XXVII. FORCE MAJEURE

1. Respondent shall perform all the requirements of this Order according to the time limits set forth herein unless such performance is prevented or delayed by events which constitute a Force Majeure.

2. For purposes of this Order, a "Force Majeure" is defined as any event arising from a cause(s) beyond the control of Respondent, which could not have been prevented or mitigated through the exercise of due diligence, that delays or prevents the performance of any obligation under this Order. Such events do not include increased costs of performance, economic hardship, changed economic circumstances, normal precipitation events, or failure to submit timely and complete applications for federal, State, or local permits.

3. Respondent has the burden of proving by clear and convincing evidence to EPA that any delay is or will be caused by events beyond Respondent's control. EPA shall make the final determination as to whether certain events constitute a Force Majeure.

4. In the event of a Force Majeure, the time for performance of the activity delayed by the Force Majeure shall be extended for the period of the delay attributable to the Force Majeure plus reasonable additional time for resumption of activities. The time for performance of any activity dependent on the delayed activity shall be similarly extended, except to the extent that the dependent activity can be implemented in a shorter period of time. EPA shall determine whether subsequent requirements are to be delayed and the time period granted for any delay. Respondent shall adopt all reasonable measures to avoid or minimize any delay caused by a Force Majeure.

5. In the event of a Force Majeure, Respondent shall immediately notify EPA by telephone within twenty-four (24) hours after Respondent becomes aware of the event and shall, within seven (7) days of the oral notification, notify EPA in writing of the cause and anticipated length of the delay. The notification shall also state the measures taken and/or to be taken to prevent or minimize the delay, and the timetable by which Respondent intends to implement the delayed activity. Failure of Respondent to comply with the Force Majeure notice requirements will be deemed a forfeiture of the right to invoke the Force Majeure provisions.

XXVIII. STATEMENT OF SEVERABILITY

If any provision or authority of this Order, or the application of this Order to any party or circumstance, is held by any judicial or administrative authority to be invalid, the remaining

provisions and authority of this Order and the application of this Order to other parties and circumstances shall not be effected thereby, unless compliance with such remaining provisions or authority, or the application of this Order to such remaining parties or circumstances, is effectively precluded or substantially impaired.

XXIX. SURVIVABILITY/PERMIT INTEGRATION

The requirements of this Order shall not terminate upon the issuance of a RCRA permit or permit modification, air quality permit, post-closure permit, corrective action order, or other form of permit or order, unless all of the requirements of this Order are expressly integrated into or superceded by such permit or order, or if all provisions not expressly integrated into or superceded by such permit or order have been fully completed to EPA's satisfaction.

XXX. EFFECTIVE DATE

This Order shall not become effective until it has been executed by each of the persons designated below and following the public comment period and following execution of the Coastal Order by each of the persons designated therein; at which point the Effective Date of this Order shall be the date of execution by the last party executing this Order or the Coastal Order, whichever is later. Because this Order was entered with the consent of all parties, Respondent explicitly waives its right to request a hearing on this matter and consents to the issuance of this Order without a hearing.

IT IS SO AGREED AND ORDERED:

Date: 7/26/02 By: Robbin H. Jackson

Ms. Robbin H. Jackson
Vice President – Health, Safety & Environmental
Elementis Chromium, L.P.
3800 Buddy Lawrence Drive
Corpus Christi, Texas 78403

Date: 6 Sep 02 By: Samuel Coleman

Mr. Samuel Coleman, P.E., Director
Compliance Assurance & Enforcement Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

CERTIFICATE OF SERVICE

I hereby certify that on the 16th day of September, 2002, the original of the foregoing Administrative Order on Consent, styled "In the Matter of: Elementis Chromium, L.P., Corpus Christi, Texas, RCRA Docket No. VI-7003-01-02," was filed with the Regional Hearing Clerk, EPA Region 6, Dallas, Texas, and a true and correct copy of such Administrative Order was sent to the following by certified mail, return receipt requested, on the 16th day of September, 2002:

CERTIFIED MAIL - RETURN RECEIPT REQUESTED 7000 0520 0022 2558 6961

Ms. Robbin H. Jackson
Vice President Health, Safety & Environmental
Elementis Chromium, L.P.
3800 Buddy Lawrence Drive
Corpus Christi, Texas 78403

Lori Jackson

ATTACHMENT I

REFERENCE LIST

CORRECTIVE ACTION REFERENCE LIST

The following list comprises guidance documents and other information sources which may be useful in implementing corrective action activities at RCRA facilities. Contacts for additional information are included at the end of this list.

"***RCRA Corrective Action Plan - Final***," EPA 520-R-94-004, May 1994.

"***Interim Final RCRA Facility Investigation (RFI) Guidance***," Volumes I-IV, EPA/530/SW-89-031, May 1989.

"***Preparation of Soil Sampling Protocols: Sampling Techniques and Strategies***", EPA/600/R-92/128, July 1992.

"***Identification and Compilation of Unsaturated/Vadose Zone Models***", EPA/600/R-94/028, March 1994.

"***Handbook: Stabilization Technologies for RCRA Corrective Actions***," EPA/625/6-91/026, August 1991.

"***Innovative Treatment Technologies: Annual Status Report (Sixth Edition)***," EPA 542-R-94-005, Number 6, September 1994.

"***Terms of Environment - Glossary, Abbreviations, and Acronyms***," EPA 175-B-94-015, Revised April 1994.

"***Evaluation of Technologies for In-Situ Clean-up of DNAPL Contaminated Sites***," EPA 600/R-94/120.

"***Subsurface Characterization and Monitoring Techniques***," A Desk Reference Guide, Volume I, Solids and Ground Water, Appendices A and B, EPA/625/R-93/003a, May 1993.

"***Subsurface Characterization and Monitoring Techniques***," A Desk Reference Guide, Volume II, The Vadose Zone, Field Screening and Analytical Methods, Appendices C and D, EPA/625/R-93/003b, May 1993.

"***Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA***," Interim Final EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.

"***RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD)***," OSWER Directive 9950.1, September 1986.

"***Handbook: Ground Water***," Volumes I and II, EPA/625/6-90/016 (a&b), September 1990 and July 1991.

"***Ground-Water Modeling: An Overview and Status Report***," EPA/600/2-89/028, December 1988.

"Region 6 Human Health Media Specific Screening Levels."
URL:www.epa.gov/earth1r6/pd/rcra-c/pd-n/screen.htm

"***Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities***," Interim Final, EPA/530/SW-89/026, April 1989.

"***Data Quality Objectives for Remedial Response Activities***," EPA/540/G-87/003 & 004, OSWER Directive 9335.0-7B, March 1987.
"***Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors***," OSWER Directive 9285.6-03, March 25, 1991.

"***Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)***," OSWER Directive 9585.7-01A; Interim Final, EPA/540/1-89/002, December 1989

"***Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Preliminary Remediation Goals)***," OSWER Directive 9585.7-01B.

"***Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part C, Risk Evaluation of Remedial Alternatives)***," OSWER Directive 9585.7-01C.

"***Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual. Supplemental Guidance: "Standard Default Exposure Factors***". OSWER Directive 9285.6-03.

"***Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual***," Interim Final, EPA/540/1-89/001, March 1989.

"***Final Guidance for Data Useability in Risk Assessment***," (Parts A & B), OSWER Directive 9285.7-09A, April 1992.

"***Supplemental Guidance to RAGS: Calculating the Concentration Term***," OSWER Directive 9285.7-08I.

"***Exposure Factors Handbook***," Office of Health and Environmental Assessment. EPA/600/8-89/043.

"***Integrated Risk Information System - (IRIS)***," On-line Computer Service.

"***Health Effects Assessment Summary Tables,***" Office of Emergency and Remedial Response. Publication 9200.6-303.

"***Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference Document,***" EPA 600/3-89/013, March 1989.

"***Framework for Ecological Risk Assessment,***" EPA/630/R-92-001 (January 1992).

"***A Review of Ecological Assessment Case Studies from a Risk Assessment Perspective,***" EPA/630/R-92/005 May 1993.

"***Ecological Risk Assessment guidance for Superfund: Process for Designing and conduction Ecological Risk Assessment Interim Final,***"
USEPA Environmental Response Team, June 5, 1997.
"***A Review of Ecological Assessment Case Studies from a Risk Assessment Perspective, Volume II,***" EPA/630/R-94/003, July 1994.

"***ECO Update, Ecological Assessment of Superfund Sites: An Overview,***" Publication 9345.0-05I,
Vol. 1, No. 2 (December, 1991).

"***ECO Update, Developing A Work Scope for Ecological Assessment,***" Publication 9345.0-05I, Vol. 1, No. 4 (May 1992).

"***Checklist for Ecological Assessment/Sampling,***" Draft, Office of Solid Waste and Emergency Response (January 1993).

"***A Compendium of Superfund Field Operations Methods,***" Two Volumes, EPA/540/P-87/001a&b, OSWER Directive 9355.0-14, August 1987.

"***Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities,***" EPA 530/SW-86/031, OSWER Directive 9472.003, October 1986.

"***Corrective Measures for Releases to Ground Water from SWMUs,***" Draft Final, EPA/530-SW-88-020, March 1985.

"***Basics of Pump-and-Treat Ground Water Remediation Technology,***" EPA/600/8-90/003, March 1990.

"***Technical Guidance for Corrective Measures--Determining Appropriate Technology and Response for Air Releases,***" Draft Final, EPA/530-SW-88-021, March 1985.

"***Air/Superfund National Technical Guidance Study Series,***" Volumes I-IV, EPA 450/1-89-001,002,003,004 (1989 and 1990).

"*Corrective Measures for Releases to Soil from SWMUs*," Draft F EPA/530-SW-88-022, March 1985.

"*Technical Guidance for Corrective Measures -- Subsurface Gas*," EPA/530-SW-88-023, March 1985.

"*Guide for Conducting Treatability Studies under CERCLA*," Interim Final, EPA/540/2-89/058.

"*Guide for Conducting Treatability Studies under CERCLA: Aerobic Biodegradation Remedy Screening*", EPA/540/2-91/013B, July 1991.

"*Guide for Conducting Treatability Studies under CERCLA: Chemical Dehalogenation*," EPA/540/R-92/013B.

"*Guide for Conducting Treatability Studies under CERCLA: Soil Vapor Extraction*," EPA/540/2-91/019B, September 1991.

"*Guide for Conducting Treatability Studies under CERCLA: Soil Washing*," EPA/540/2-91/020B, September 1991.

"*Selected Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation*," EPA/540/8-91/092, 1991.

"*Synopses of Federal Demonstrations of Innovative Site Remediation Technologies*," EPA/540/8-91/009, May 1991.

"*Bibliography of Federal Reports and Publications Describing Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation*," EPA/540/8-91/007, May 1991.

"*Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments*," EPA/530/SW-89/047, July 1989.

"*Handbook on In-Situ Treatment of Hazardous Waste-Contaminated Soils*," EPA/540/2-90/002, January 1990.

"*Stabilization/Solidification for CERCLA and RCRA Wastes*," EPA/625/6-89/022, May 1989.

"*Technology Screening Guide for Treatment of CERCLA Soils and Sludges*," EPA/540/2-88/004, September 1988.

"*Health and Safety Requirements of Employees Employed in Field Activities*," EPA Order 1440.2, July 12, 1981.

"***Handbook of RCRA Ground-Water Monitoring Constituents: Chemical and Chemical Properties***," EPA/530/R-92/022, September 1992.

"***RCRA Ground-Water Monitoring: Draft Technical Guidance***," EPA/530/R-93/001, November 1992.

"***Statistical Training Course for Ground-Water Monitoring Data Analysis***," EPA/530/R-93/003, 1992.

"***Literature Survey of Innovative Technologies for Hazardous Waste Site Remediation: 1987 - 1991***," EPA/542/B-92/004, July 1992.

"***Characterizing Heterogeneous Wastes: Methods and Recommendations***," EPA/600/R-92/033, February 1992.

"***Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells***," EPA/600/4-89/034, April 1989.

"***RCRA Public Involvement Manual***," OSWER, EPA/530/R-93/006, September 1993.

"***Soil Vapor Extraction Technology, Reference Handbook***," ORD, EPA/540/2-91/003, February 1991.

"***Guidance on RCRA Corrective Action Decision Document: The Statement of Basis and Response to Public Comments***," OSWER Directive 9902.6, February 1991.

"***Contaminants and Remedial Options at Wood Preserving Sites***," EPA/600/R-92/182, 1992.

"***Test Methods For Evaluating Solid Waste, Physical/Chemical Methods (3rd Edition)***, SW-846, 1988.

"***Common Cleanup Methods at Superfund Sites***," EPA 540/R-94/043, August 1994.

"***Common Chemicals Found at Superfund Sites***," EPA 540/R-94/044, August 1994.

"***Guidance for Design, Installation and Operation of Ground Water Extraction and Product Recovery Systems***," PUBL-SW183-93, August 1993.

"***Guidance for Design, Installation and Operation of Soil Venting Systems***," PUBL-SW185-93, July 1993.

"***Guidance for Design, Installation and Operation of In-Situ Air Sparging Systems***," PUBL-SW186-93, September 1993.

QUALITY ASSURANCE

"***Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans***," QAMS-005/80, December 29, 1980.

AIR GUIDANCE

"***Air/Superfund NTGS Series: Volume I, Overview of Air Pathway Assessments for Superfund Sites***" (Revised), EPA-450/1-89-001a, November 1992.

"***Air/Superfund NTGS Series: Volume II, Estimation of Baseline Air Emissions at Superfund Sites***", EPA-450/1-89-002a, August 1990.

"***Air/Superfund NTGS Series: Volume III, Estimation of Air Emissions from Clean-up Activities at Superfund Sites***", EPA-450/1-89-003, January 1990.

"***Air/Superfund NTGS Series: Volume IV, Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analysis***", EPA-450/1-89-002a, July 1989.

"***Air/Superfund NTGS Series: Volume IV - Guidance for Ambient Air Monitoring at Superfund Sites***", (Revised) (Partially Replaces EPA-450/1-89-004), EPA-451/R-93-007, May 1993.

"***Air Stripper Design Manual***", EPA-450/1-90-003, May 1990.

"***Comparisons of Air Stripper Simulations and Field Performance Data***", EPA-450/1-90-002, March 1990.

"***Development of Example Procedures for Evaluating the Air Impacts of Soil Excavation Associated with Superfund Remedial Actions***", EPA-450/4-90-014, July 1990.

"***Guidance on Applying the Data Quality Objectives Process for Ambient Air Monitoring Around Superfund Sites***", (Stages I & II), EPA-450/4-89-015, August 1989.
"***Guidance on Applying the Data Quality Objectives Process for Ambient Air Monitoring Around Superfund Sites***", (Stage III), EPA-450/4-90-005, March 1990.

"***Review and Evaluation of Area Source Dispersion Algorithms for Emission Sources at Superfund Sites***", EPA-450/4-89-020, November 1989.

"***Soil Vapor Extraction VOC Control Technology Assessment***", EPA-450/1-89-017, Sept. 1989.

"***Superfund Air Pathway Analysis Review Criteria Checklists***", EPA-450/1-90-001, January 1990.

"***User's Guide for the Fugitive Dust Model***", EPA-910/9-88-202R, May 1990.

"***TSCREEN: A Model for Screening Toxic Air Pollutant Concentrations***", EPA-450/4-90-013, January 1991.

"***Estimation of Air Impacts for Air Stripping of Contaminated Water***", EPA-450/1-91-002, May 1991.

"***Database of Emission Rate Measurement Projects***", EPA-450/1-91-003, June 1991.

"***Emission Factors for Superfund Remediation Technologies***", EPA-450/1-91-001, March 1991.

"***Guidance on the Application of Refined Dispersion Models for Air Toxics Releases***", (Revises EPA-450/4-91-007), EPA-454/R-93-002, May 1993.

"***Contingency Plans at Superfund Sites Using Air Monitoring***", EPA-450/1-90-005, January 1990.

"***Estimation of Air Impacts for Soil Vapor Extraction (SVE) Systems***", EPA-450/1-92-001, January 1992.

"***Guideline for Predictive Baseline Emissions Estimation Procedures for Superfund Sites***", EPA-450/1-92-002, January 1992.

"***Screening Procedures for Estimating the Air Impacts of Incineration at Superfund Sites***", EPA-450/1-92-003, February 1992.

"***Estimation of Air Impacts for the Excavation of Contaminated Soil***", EPA-450/1-92-004, March 1992.

"***Models for Estimating Air Emission Rates from Superfund Remedial Actions***", EPA-451/R-93-001, March 1993.

"***Contingency Analysis Modeling for Superfund Sites and Other Sources***", EPA-454/R-93-001, January 1993.

"***Control of Air Emissions from Superfund Sites***", EPA-625/R-92/012, November 1992.

"***A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants***", EPA-450/4-88-009, September 1988.

"*Applicability of Open Path Monitors for Superfund Site Cleanup*", EPA-451/R-92-001, May 1992.

"*Assessing Potential Indoor Air Impacts for Superfund Sites*", EPA-451/R-92-002, September 1992.

"*Evaluation of Short-term Air Action Levels for Superfund Sites*", EPA-451/R-93-009, May 1993.

"*Air Emissions from Area Sources: Estimating Soil and Soil-gas Sample Number Requirements*", EPA-451/R-93-002, April 1993.

"*Estimation of Air Impacts from Area Sources of Particulate Matter emissions at Superfund Sites*", EPA-451/R-93-004, April 1993.

"*Estimation of Air Impacts for Bioventing Systems Used at Superfund Sites*", EPA-451/R-93-003, April 1993.

"*Estimation of Air Impacts for Solidification and Stabilization Processes Used at Superfund Sites*", EPA-451/R-93-006, April 1993.

"*Estimation of Air Impacts for Thermal Desorption Units Used at Superfund Sites*", EPA-451/R-93-005, April 1993.

"*Options for Developing and Evaluating Mitigation Strategies for Indoor Air Impacts at CERCLA Sites*", EPA-451/R-93-012, September 1993.

"*Compilation of Information on Real-Time Air Monitoring for Use at Superfund Sites*", EPA-451/R-93-008, May 1993.

"*Air/Superfund Guide to Pollutant Toxicity*", EPA-451/R-94-002, July 1994.

GENERAL INFORMATION:

"*OSWER Directives - System Catalog,*" OSWER Directive 9013.15-3D, March 1992. (Provides a list of OSWER Directives published through March 1991.)

"*Technical Support Services for Superfund Site Remediation and RCRA Corrective Action,*" (third edition), EPA/540/8-91/091, March 1992.

"*Accessing Federal Data Bases for Contaminated Site Clean-Up Technologies,*" EPA/540/8-91/008, May 1991.

"*Memorandum on the Use of Supplemental Environmental Projects, Amendment to GM 22,*" James M. Strock, February 12, 1991.

"*Catalog of Office of Waste Programs Enforcement Publications*," EPA/540/8-90/016, November 1990.

"*A Catalogue of Hazardous and Solid Waste Publications*," EPA 530-SW-91-013, May 1991.

USEFUL TELEPHONE NUMBERS:

RCRA/CERCLA/UST Hotline: (800) 424-9346

EPA's Office of Research and Development publishes occasional ground water and engineering issue papers. For information contact ORD Publications Office, Center for Environmental Research

Information (CERI): (513) 569-7562
National Technical Information Services (NTIS): (703) 487-4650.

Robin Hood
Lone Ranger
Flash Gordon
Captain Marvel
Zorro
Tarzan
Doc Savage
→ Texas Map
→ DC stamps!
Mwro
Dick Dole
Lin Wray

EL PASO'S OCTOBER 24, 2005 RESPONSE TO
EPA'S
TECHNICAL REVIEW AND COMMENT
CONDITIONS OF APPROVAL
August 17, 2005

PRELIMINARY REMEDIATION GOALS REPORT
and
INTERIM MEASURES GROUND WATER INVESTIGATION WORK PLAN
EL PASO ENERGY-PETROLEUM COMPANY (Coastal Refining)
CORPUS CHRISTI, TEXAS
EPA ID No. TXD0081322268

Below are El Paso's responses to EPA's August 17, 2005 comments on the Preliminary Remediation Goals Report ("PRG Report") and the Interim Measures Groundwater Investigation Work Plan ("IM WP").

KEY ISSUES

1. *Continued Operation of the On-Going Containment, Recovery, Monitoring and Treatment System*

El Paso operates the on-going containment, recovery, monitoring and treatment system including the Cofferdam Recovery and Hydrocarbon Treatment System located on the Elementis property to prevent migration of contamination into the Inner Harbor Ship Channel until the Interim Measures Containment System is operational. The Interim Measures Ground Water Investigation Work Plan discusses operation of the ground water recovery and treatment system to address LNAPL and dissolved-phase impact to ground water. The Work Plan shall be revised to clearly state that the purpose for El Paso to operate the on-going containment, recovery, monitoring and treatment system is to contain and stop migration of LNAPL and dissolved phase contamination into the ship channel.

Components of the existing recovery and treatment system are discussed including the Cofferdam, recovery wells and treatment system. The Work Plan did not discuss monitoring the system nor the schedule for monitoring to determine whether the containment/recovery system was stopping migration of contamination into the Inner Harbor Ship Channel. The Work Plan shall be revised to discuss how the containment/recovery system is monitored to determine the effectiveness of the recovery system and provide the schedule for monitoring to determine whether the system achieves the requirement to contain and stop migration of contamination, LNAPL and dissolved phase, into the Inner Harbor Ship Channel.

Response: El Paso's obligations under the AOC, pursuant to the August 30, 2002 letter amendment, is to "continue to operate the current containment, recovery, monitoring and

hydrocarbon treatment system including the Cofferdam Recovery and Hydrocarbon Treatment System to prevent migration of contamination into the Inner Harbor Ship Channel until the Interim Measures Containment System is operational."[1] El Paso has revised Section 2.3 of the IM WP to reflect its obligation under the AOC and the August 30, 2002 letter amendment.

The IM WP does not contain information on the monitoring of the current system because a request for such information is beyond the scope of what is to be in the IM WP pursuant to section VII.1.B.(i). Under the AOC, the IM WP is to include, among other things, "proposed additional sampling points, monitoring wells and piezometers to be installed and adequate samples to be collected, sufficient to investigate to characterize and determine the extent of groundwater contamination...." AOC, section VII.1.B.(i).(c).ii. The work proposed in the IM WP is intended to delineate contamination, not to monitor the effectiveness of any current measures. — Why not? Any IM workplan should explain how its performance will be evaluated.

El Paso has addressed the substantive issues raised by this comment – the effectiveness of the current system and the monitoring procedures for the system – in its response to EPA's Request for Information Pursuant to Section 3007 of RCRA.

2. <u>*Data from Seeps*</u>

Seeps in the area adjacent to the ship channel along the bluff line are reported to discharge phase-separated hydrocarbons (PSH) to the Inner Harbor. Also, dissolved phase contamination is potentially migrating into the ship channel. Both situations represent a completed migration pathways. The PRG Report and Work Plan shall be revised to include existing analytical data from media samples collected from seeps or in the seep areas. Data shall be integrated into the site conceptual model.

<u>Response</u>: A map of the approximate locations of known historic seeps is provided as Attachment A. As stated in the AOC Section V.20, the Texas Natural Resource Conservation Commission (TNRCC) (now the Texas Commission on Environmental Quality or TCEQ) collected a sample of oily liquid seeping from Elementis into the Inner Harbor Ship Channel (IHSC) in February 2000. The laboratory report describes the sampled media as "Org. Waste." Analytical data from three samples are documented in Exhibit 15 of the AOC. However, based on our review of the letter report prepared by the U.S. Fish & Wildlife Service (USFWS) regarding this incident, and as discussed in our response to EPA's Request for Information Pursuant to Section 3007 of RCRA, this incident occurred outside the IM Area and was not associated with the Corpus Christi Inner Harbor Ship Channel. — not the case, based on our discussion.

After El Paso assumed the operation of the Cofferdam Hydrocarbon Recovery and Treatment System in July of 2002, two additional incidents resulted in the appearance of a sheen on the surface water of the IHSC. Both incidents were reported to local agencies as well as to EPA. The exact release location for the 2002 incident is unknown. This

[1] Consistent with the AOC, contamination means those constituents on the Skinner List, except for MTBE and chromium.

incident occurred during an extreme storm event resulting in rainwater collecting behind the cofferdam and releasing through a crack in the concrete structure above the water line, and therefore is not classified as a groundwater to surface water seep. The crack was repaired immediately. Due to the rip-rap composition comprising the shoreline and the small estimated release quantities from the 2004 incident, only an approximate location of discharge could be determined for the release in 2004. No analytical data were required to be collected and thus, no analytical data were collected from either of these incidents. Visual inspections of the shoreline continue to be conducted to verify that no sheens are visible. – has there been any sampling performed to evaluate ground water-surface water interactions? That's really the only way to resolve this. Any sed. samples?

El Paso has modified the Conceptual Site Model (CSM) to include potential exposure pathways relating to this historical seep area and potential dissolved phase component of the source of contamination. The revised CSM integrating the above referenced data is provided as Attachment B. The figure provided in Attachment B (Revised Figure 3-1) replaces Figures 3-1 through 3-3 of the PRG Report.

3. *Verification of PRG Values*

Many of the PRG values presented in Table 4-1 of the PRG Report could not be verified against source documents. In addition different units are used, and the potential exists for errors in conversion. The PRG Report and Work Plan shall be revised to provide PRG values in Table 4-1 which can be verified and appropriate units used consistently to prevent errors in conversion.

Response: El Paso has reviewed the PRG values and documentation listed in Table 4-1 of the PRG Report. The following changes have been made to the table:

a. Human health Texas Surface Water Quality Standard (TSWQS) values were changed from an incidental to a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin.
b. For chemicals without a human health TSWQS, the Risk Based Exposure Levels (RBELs), if available, were selected. The RBELs used were taken from the TCEQ "Human Health Surface Water Risk-Based Exposure Limits" table updated 5/19/05.
c. For chemicals without human health TSWQS or RBELs, the values were calculated using the most recent toxicological criteria recommended by TCEQ (Toxicity Factors – Table for Texas Risk Reduction Program Rule) updated March 31, 2004.
d. For chemicals without an ecological TSWQS, the RBELs, if available, were selected. The RBELs used were taken from the TCEQ "Aquatic Life Surface Water Risk-Based Exposure Limits" Table updated April 2002.

* Completed pathway interaction between gw & any surface water

While the TCEQ values should be okay, why are they being used? This is an EPA order. Has there been any evaluation of those TCEQ values for the applicability of the exposure parameters to this site?

In addition, minor unit issues and additional footnotes were altered for clarification purposes. Attachment C is a revised Table 4-1, including updates to Appendices B and C (upon which Table 4-1 is based) of the PRG Report.

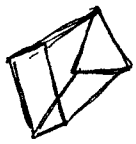
4. *Use of the Rapid Optical Screening Tool™ (ROST™)*

El Paso proposes to use the Rapid Optical Screening Tool™ (ROST™) to delineate LNAPL in ground water in the IM Area. EPA's evaluation of the technology in 1995 shows the ROST™ works well for poly nuclear aromatics (PNAs), but they appear to be serious limitations to detecting the presence of the aliphatic (straight chain) compounds, chlorinated aliphatics, and single-ring aromatic compounds. In addition direct measurements shall be taken for verification and to determine the extent of LNAPL in ground water.

Response: Section 5.1 (page 11) of the IM WP states, "ROST probes will be completed as a screening process to preliminarily define the lateral extent of LNAPL at the IM Area." As documented by EPA in 1995, the application of ROST technology is limited when applied as a quantitative tool for analysis of chemical concentrations, particularly for co-mingled chemicals of concern. However, the qualitative application of the CPT/ROST technology is acknowledged by the EPA in the 1995 Innovative Technology Evaluation Report for stratigraphy and as an indicator of relative percent hydrocarbon/chemical presence, based on a standard. El Paso proposes to use CPT for stratigraphy and ROST technology as an indicator for whether or not there is a relative percent, based on a standard, of hydrocarbon/chemical present in the soil column, which can therefore offer an indication of the presence of phase separated compounds. Therefore, as set out in section 5.1 the IM WP, El Paso is proposing use of the ROST technology as a qualitative screening of the phase separated plume boundary location so that permanent piezometers may be more effectively located and constructed for direct measurement of LNAPL to delineate the free phase plume. Proposed use of the ROST technology by El Paso is not intended for delineation purposes of chemicals of concern (COCs).

Delineation of COCs will be based on the collection of groundwater samples for laboratory analysis of the complete Skinner List. Groundwater samples collected from monitoring wells for COC delineation will be analyzed for Skinner List VOCs by method 8260B, Skinner List SVOCs by method 8270C, cyanide by method 9010B/9014, and hydrogen sulfide by method 376.2, as referenced in Section 6.1 of the IM WP.

As described in Section 5.2 of the IM WP, if existing and new well locations are not sufficient to delineate LNAPL and dissolved phase COCs within the IM Area, additional step-out wells will be installed within the IM Area for collection of groundwater samples for laboratory analysis. Attachment D is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach proposed for COC delineation within the IM Area. This decision chart, which reflects the decision making process originally proposed in the IM WP, is incorporated as Figure 5-2a, to the IM WP, solely for the purposes of clarifying our proposed delineation work.



Hoo Hah! HOO-HAH

5. *Product Thickness*

The product thickness measurements vary significantly in several of the wells. The source of the variations is not understood, monitoring wells shall be evaluated for thickness variations in the well.

Response: Table 3-1 of the IM WP Groundwater Investigation Report summarizes product thickness measurements collected from IM Area wells between 1999 and 2002. Many of these wells are recovery wells. Variation in product thickness in recovery wells may be a result of historical pump settings and operation. There does not appear to be significant variation in product thickness measurements in non-pumping wells in the IM Area. Please note that, although not footnoted as pumping wells within the previously submitted Table 3-1, RWEC-03, RWEC-04, and RWEC-08 should be designated as pumping wells. We are submitting a revised Table 3-1 (Attachment J) to the IM WP to reflect this correction. Regardless, these wells are outside the boundary of the IM Area and will be evaluated further as part of the Facility Investigation. El Paso will also evaluate product thickness measurements in the IM Area in future groundwater monitoring events, including data collected during the IM groundwater investigation.

6. *Indicator Compounds*

Benzene and Toluene are proposed to be used as indicator compounds for screening and siting permanent ground water monitoring wells. Use of benzene and toluene as indicator compounds is not representative of all constituents on the "Skinners List," Constituents of Concern (COC) for Wastes from Petroleum Processes, which serves as the basis for the IM COCs. Specifically, no consideration is given for the aliphatics, semi-volatiles, organics, and poly-nuclear aromatic hydrocarbons (PAHS) present at the site. Benzene and toluene shall not be used as indicator compounds for screening purposes or siting locations for permanent ground water monitoring wells. The Work Plan shall be revised to include the Skinners List as the IM COC list of constituents to be used for screening and to site locations for ground water monitoring wells. During field screening, one of each four samples collected for field screening shall be submitted to the laboratory to be analyzed for Skinners List constituents. Detected Skinners List constituents are considered to be a potential contaminants of concern (PCOC).

EPA SW-846 Analytical Method 8021B, Test Methods for Evaluating Solid Waste, is proposed as the analytical method to be used for screening. Analytical Method 8021B does not include a wide range of constituents on the "Skinners List" and shall not be used as the analytical method for screening. The Work Plan shall be revised to include use of an SW946 Analytical Method(s) which includes a wide range of compounds with detection limits less than Texas Surface Water Quality Standards to provide positive identification of constituents on the Skinners List for screening and used to determine the extent of contamination.

Response: As explained in Sections 5.1 and 5.2 of IM WP, preliminary sampling of existing wells and temporary sampling points for only benzene and toluene is not intended to replace delineation sampling of monitoring wells for the complete AOC Skinners List. A phased installation of permanent step-out monitoring wells sampled for AOC Skinners List COCs will be used to delineate COCs to PRGs. Therefore, delineation of the free phase plume will be based on direct measurements of LNAPL in piezometers, and delineation of COCs will be based on the collection of groundwater samples for laboratory analysis. For purposes of clarity, we are adding the following text to sections 5.1 and 5.2 of the IM WP: "The following procedure will be applied in the IM Area:

1. CPT/ROST, and benzene and toluene samples will be collected from temporary sampling points to identify locations of permanent sampling points.
2. Piezometers will be installed in locations where LNAPL is not expected, and new monitoring wells will be installed for groundwater sampling within the IM Area.
3. Piezometer measurements will be used to delineate LNAPL and samples from monitoring wells will be collected to delineate AOC Skinner List COCs.
4. If any piezometer detects LNAPL, an additional step-out piezometer will be installed.
5. If any COC concentration is greater than the respective PRG within the IM Area, at least one additional step-out monitoring well will be installed within the IM Area for further AOC Skinner List COC sampling."

This information is a summary of the procedures originally set out in sections 5.0 through 5.2 of the IM WP.

Submittal of one in four screening samples to the laboratory to be analyzed for Skinners List constituents is unnecessary because, as set out in Section 5.2 of the IM WP, complete Skinners List analysis will be performed for delineation sampling. As set out in Section 6.1 of the IM WP, groundwater samples collected from monitoring wells for COC delineation will be analyzed for Skinner List VOCs by method 8260B, Skinner List SVOCs by method 8270C, cyanide by method 9010B/9014, and hydrogen sulfide by method 376.2.

Attachment D, which is included in the IM WP as Figure 5-2a, is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach proposed for COC delineation. This decision chart reflects the decision process originally proposed in the IM WP and is provided solely for the purposes of clarifying our proposed delineation work.

INTERIM MEASURES PRELIMINARY REMEDIATION GOAL REPORT

I. GENERAL COMMENTS

EPA comments are in italics

1. *Figure 2-2, Cross-Section A-A', in the El Paso Corporation Preliminary Remediation Goals (PRG) Report depicts a continuous clay layer across most of the Interim Measures (IM) Area.*

   There is a concern that the clay layer may not be continuous, particularly between wells CPT-74 and MW-U6. At the very least, the upper and lower bounds of the clay layer should be dashed beneath CPT-7 because its presence is not substantiated by the borehole data used to construct Cross-Section A-A'.

   Given the uncertainties in the area of CPT-73 and the implications for contaminant transport, the clay layer shall be carefully mapped during the IM Groundwater Investigation. The interpretation of the clay layer and conceptual site model shall be refined based on the additional data collected during the IM Groundwater Investigation.

   El Paso Corporation and Elementis Chromium have presented conflicting well completion information for Well P-6, which was used to construct El Paso's Cross-Section A-A'. As illustrated on Elementis PRG Report Plate 6, Well P-6 is presented to have been completed (and screened) in the Upper Water-Bearing Zone with hexavalent chromium concentrations present in the Upper Water-Bearing Zone. Well P-6 total depth is at 26.2 feet, in the Upper water bearing zone (Table I, Well Completion Information). However, El Paso's Figure 2-(3), Cross-Section A-A', indicates Well P-6 to be completed beneath the clay acquitard in the lower water bearing zone at a total depth of 31 feet below ground surface. The depth of the well screen is not indicated. Based on recently provided well logs and conversation with the Elementis, Well P-6 was completed open ended in the upper water-bearing zone at 26.2 feet below ground surface. (Nearby MWU-33 is screened from 10 to 30 feet; total depth is at 30 feet in the confining clay.) Figure 2-2 Cross-Section A-A' shall be revised to show that P-6 is screened in the Upper Water-Bearing Zone with a total depth of 30 feet below ground surface.

   Response: A revised Figure 2-2 (cross section A-A') of the PRG Report is provided as Attachment E and depicts the corrected total depth of P-6 (26.2 ft bgs). The clay layer will be further investigated during the IM investigation through use of CPT technology and well construction boring logs. Revised Figure 2-2 has been appended to the PRG Report.

2. *It is not clear that all seep locations adjacent to or along the ship channel are actually outside the IM Area.*

The PRG Report shall be revised to include a map which clearly indicates the location of any and all historical and existing seeps locations adjacent to the ship channel or along the ship channel in relation to the IM Area. In addition, the PRG Report shall be revised to consider any available analytical data for the seeps and the Conceptual Site Model shall be revised to integrate the data.

The PRG Report shall be revised to indicate that existing or historical seeps/seep area adjacent to or along the ship channel will be sampled during the IM Groundwater Investigation. Similarly, the IM Groundwater Investigation Work Plan (Work Plan) shall be revised to include delineation of contamination, dissolved phase as well as phase-separated hydrocarbon, around the seep areas.

Response: A map of the approximate locations of known historic seeps is provided as Attachment A. As stated in the AOC Section V.20, the Texas Natural Resource Conservation Commission (TNRCC) (now the TCEQ) collected a sample of oily liquid seeping from Elementis into the Inner Harbor Ship Channel (IHSC) in February 2000. The laboratory report describes the sampled media as "Org. Waste." Analytical data from three samples are documented in Exhibit 15 of the AOC. However, based on our review of the letter report prepared by the U.S. Fish & Wildlife Service (USFWS) regarding this incident, and as discussed in our response to EPA's Request for Information Pursuant to Section 3007 of RCRA, this incident occurred outside the IM Area and was not associated with the Corpus Christi Inner Harbor Ship Channel.

After El Paso assumed the operation of the Cofferdam Hydrocarbon Recovery and Treatment System in July of 2002, two additional incidents resulted in the appearance of a sheen on the surface water of the IHSC. Both incidents were reported to local agencies as well as the EPA. The exact release location for the 2002 incident is unknown. This incident occurred during an extreme storm event resulting in rainwater collecting behind the cofferdam and releasing through a crack in the concrete structure above the water line, and therefore is not classified as a groundwater to surface water seep. The crack was repaired immediately. Due to the rip-rap composition comprising the shoreline and the small estimated release quantities from the 2004 incident, only an approximate location of discharge could be determined for the release in 2004. No analytical data were required to be collected and thus no analytical data were collected from either of these incidents. Visual inspections of the shoreline continue to be conducted to verify that no sheens are visible.

El Paso has modified the Conceptual Site Model (CSM) to include potential exposure pathways relating to this historical seep area and potential dissolved phase component of the source of contamination. The revised CSM integrating the above referenced data is provided as Attachment B (Revised Figure 3-1). The figure provided in Attachment B replaces Figures 3-1 through 3-3 of the PRG Report.

As originally proposed, the IM WP describes the investigation of both dissolved phase and phase-separated delineation within the IM Area, including any "seep areas" located

within the IM Area. Seep areas located outside of the IM Area will be included within the Facility Investigation.

3. *The PRG Report and the Health and Safety Plan (HASP) reference numerous acronyms.*

   Provide a list of acronyms specific to each document, preferably after the Table of Contents.

   Response: A list of acronyms is provided as Attachment F and will be appended to the PRG Report as Appendix G.

II. INTERIM MEASURES PRELIMINARY REMEDIATION GOAL REPORT SPECIFIC COMMENTS

1. Section 2.3, Adjacent Properties and Land Use, page 8:

The second paragraph of Section 2.3 states "public boat access and fishing is [are] prohibited by Corpus Christi City Ordinance, Code 1958 § 9.2.5." Verification of this citation indicated the section number is slightly in error. Also, boat access is addressed by an additional ordinance.

The ordinance citation shall be revised to reference: Code of Ordinances, City of Corpus Christi, Texas; Codified through Ord. No. 24893, Enacted May 28, 2002 (Supplement No. 68); Chapter 12, Boats, Bays, and Waterways; Article I, In General; Sec. 12-10, "Fishing in harbor" (Code 1958 § 9-25); and Sec. 12-14, "Small craft not allowed in harbor; exception" (Code 1958 § 9-27). In addition, documentation shall be provided to verify that the City Ordinance has jurisdiction regarding access and fishing at the Section of Inner Harbor Ship Channel located at Elementis. (See Comment No. 9, Section 4.1 below.)

Response: Human health Texas Surface Water Quality Standard (TSWQS) values were changed from an incidental to a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin. Section 2.3 of the PRG Report has been revised to reflect this change.

2. Section 2.4, Geology/Hydrogeology, pages 9-10:

The second paragraph on page 10 states: "The referenced Preliminary Review/Visual Sight Inspection (PR/VSI) Report, dated 1987 indicates that ground water in the Corpus Christi area is generally very saline and the shallow aquifers typically contain more than 3,000 parts per million (ppm) total dissolved solids (TDS), thus not used for drinking water. The report further states that a background TDS concentration of 28,000 ppm has been established for the adjacent Valero Refinery."

The text does not indicate the location of the background samples nor when these background samples were collected. The PRG Report shall be revised to provide information to demonstrate the location of the background TDS samples and documentation that the shallower aquifer is not currently used for drinking water.

Response: The TDS background samples were reported in Appendix C of the March 1999 revision to Remedial Investigation (RI)/Baseline Risk Assessment (BLRA) - Part 1 of 2 for the Coastal Refining and Marketing Facility. This data is attached as Attachment I and is included in Appendix H of the revised PRG Report. Well locations are from the

property currently owned and operated by Valero Refining – Texas, LP. The BLRA indicates that Uppermost Transmissive Zone wells MW-L18, OW-L01, OW-L09, OW-L16, OW-L25, OW-L26, OW-U46, TH-31, TH-40, MW-Q3, and MW-Q4 were sampled and analyzed for TDS using EPA Method 160.1 (TDS). These samples were identified facility-wide as TDS concentrations based on naturally occurring background levels of TDS, and not potentially affected by waste management activities or releases. A statistical evaluation of groundwater TDS calculated a mean for background TDS of 20,000 mg/L and the 95% UCL for background TDS of 28,000 mg/L. Section 2.4 of the PRG Report has been revised to reflect this comment.

As stated in Section V.9 of the AOC, shallow aquifers in Corpus Christi area are not used for drinking water. The Elementis Chromium property is in a highly industrialized area of Corpus Christi with no potential areas where unidentified water wells are likely to exist. All known properties in the area use water provided by the city.

In addition, a Groundwater Affected Property Assessment Report (APAR) was submitted to TCEQ under the Agreed Final Judgment (AFJ) in January 2004 for the Valero Refinery and potential off-site affected property west of Cantwell Lane. The Groundwater APAR included a water well survey and identified no wells used for drinking water within a one mile radius, including the Elementis property east of Cantwell Lane. A copy of the water well survey from that report is provided in Attachment G and is appended to the PRG report as Appendix I.

3. **Section 2.5, Ecological Setting, pages 10-11:**

Paragraph one states: "Due to heavy industrial use, the Facility and adjacent properties do not appear to serve as valuable habitat, foraging area or a refuse for ecological communities. Wetland area and marsh grasses are not observed."

Information is presented which indicates that a literature search was conducted to identify endangered, threatened and/or critical species and natural communities within the vicinity of the Facility; however, it is not clear if a site reconnaissance was conducted to identify any existing aquatic, terrestrial and wetland habitat types and any signs of ecological receptors. As outlined in EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 540-R-97-006, June 1997) (ERAGS), it is recommended that a site visit be conducted by qualified personnel and documentation provided as part of the problem formulation phase.

If it is determined that a site visit was conducted by qualified personnel, the PRG Report shall be revised to clearly state whether a site reconnaissance was conducted and to present any results/observations, if applicable. Alternatively, additional information shall be provided to support the statement that the Facility and adjacent properties do not serve as valuable habitat, foraging area or a refuge for ecological communities. Discuss the criteria used to determine what constitutes "valuable habitat."

The discussion in Section 2.5, fails to address the fact that the area adjacent to ship channel and the Inner Harbor ship channel could represent habitat for (and associated sources of exposures to) ecological communities. As documented in a separate Administrative Order on Consent (AOC) (reference US EPA Docket No. RCRA-VI-7003-01-02, Section V.7) between EPA Region 6 and Elementis Chromium, L.P., the U.S. Fish & Wildlife Service (USFWS) observed hydrocarbons, including benzene and cumene seeping from the bluff into the Inner Harbor Ship Channel on or about February 9, 2000. The USFWS also observed several seeps along the bluff, located up to 100 feet east of the cofferdam, discharging oily waste into the surface water on March 2, 2000. The USFWS believed "the release to surface water constituted a potential endangerment to shorebirds."

EPA would disagree that the facility and adjacent properties do not serve as a valuable habitat. The Banks Information Solution Inc. literature search indicates that there are several species nearby that could migrate to the facility. The PRG Report shall be revised to include a discussion of the ecological receptors that are using the bluff area (adjacent to the ship channel) and the Inner Harbor. The area ("seep areas") adjacent to the ship channel shall be included as potential sources of contamination and/or ecological exposure. — I agree, and the survey mentioned in the response makes the case for habitat.

Response: An ecological survey was performed on September 14, 2005 by Tod Delong of Avatar Environmental, a senior level ecologist/ecological risk assessor contracted by Weston Solutions, Inc. (resume provided in Attachment H). The ecological survey documentation and conclusions are also included as Attachment H to this response and, are appended to the revised PRG Report as a part of Appendix A. The ecological survey identified ecological site descriptors recommended by EPA in their guidance: *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (U.S. EPA, 1997) for characterizing the ecological setting.

With respect to EPA's reliance on the letter from USFWS, the letter from the USFWS does not represent the current conditions at the site. Further, the USFWS did not conduct any testing on the seeps and the report on the contents of the seep were reported without any technical support. Additionally, the area described in the letter indicates that the release did not reach the Corpus Christi Inner Harbor. The release actually occurred far west of the cofferdam (not the north) at a natural land depression that is not connected to the Corpus Christi Inner Harbor. — Even without considering the release mentioned here, has any testing been performed to determine the potential for release?

Use potential for release

4. Section 3.1, Overview of Conceptual Site Model, pages 12-13:

The last paragraph on page 12 states: "Non-Aqueous Phase Liquid (NAPL) is the primary source, which has migrated on to the Facility in the subsurface. The NAPL is the source of COCs in other environmental media, specifically surface soil, soil vapor, groundwater and surface water."

As discussed during the November 19, 2002 meeting with El Paso representatives and in subsequent written comments, EPA recommended that the Conceptual Site Model (CSM)

identify all sources of contamination in order to aid in determining potential cumulative and overall risk of exposures to receptors. Dissolved phase ground water contamination is considered to be a primary source of contamination to surface water, sediment and soil. Releases at the ground water seeps to surface water and sediment pathway shall be considered a completed pathway for purposes of the CSM. The PRG Report and the CSM Diagram Figure 3-1 shall be revised to include all sources of contamination.

Response: El Paso has modified the CSM to include potential exposure pathways relating to historical seep areas and a potential dissolved phase component of the source of contamination. The updated CSM (Revised Figure 3-1) is provided in Attachment B. Revised Figure 3-1 replaces Figures 3-1, 3-2 and 3-3 of the PRG Report.

5. **Section 3.4, Incomplete Pathways, pages 16-17:**

Human ingestion of ground water is considered an incomplete pathway.

As discussed in Specific Comment No. 2, additional information shall be provided in the PRG Report to support this statement, that is, shall clarify that shallow aquifers in the Corpus Christi area are not being used for drinking water purposes.

Response: The TDS background samples were reported in Appendix C of the March 1999 revision to Remedial Investigation (RI)/Baseline Risk Assessment (BLRA) - Part 1 of 2 for the Coastal Refining and Marketing Facility. These data are attached as Attachment I and are included in Appendix H of the revised PRG Report. Well locations are from the property currently owned and operated by Valero Refining – Texas, LP. The BLRA indicates that Uppermost Transmissive Zone wells MW-L18, OW-L01, OW-L09, OW-L16, OW-L25, OW-L26, OW-U46, TH-31, TH-40, MW-Q3, and MW-Q4 were sampled and analyzed for TDS using EPA Method 160.1 (TDS). These samples were identified facility-wide as TDS concentrations based on naturally occurring background levels of TDS, and not potentially affected by waste management activities or releases. A statistical evaluation of groundwater TDS calculated a mean for background TDS of 20,000 mg/L and the 95% UCL for background TDS of 28,000 mg/L. Sections 2.4 and 3.4 of the PRG Report have been revised to reflect this comment.

As stated in Section V.9 of the AOC, groundwater in the Corpus Christi area is generally very saline; the shallower aquifers contain more than 3,000 parts per million total dissolved solids and are not used for drinking water. The Elementis Chromium property is in a highly industrialized area of Corpus Christi with no potential areas where unidentified water wells are likely to exist. All known properties in the area use water provided by the city. → Any well surveys conducted? Any non-potable uses?

In addition, a Groundwater Affected Property Assessment Report (APAR) was submitted to TCEQ under the Agreed Final Judgment (AFJ) in January 2004 for the Valero Refinery and potential off-site affected property west of ~~Cantwell~~ Lane. The Groundwater APAR included a water well survey and identified no wells used for

→ Has TCEQ commented on this? I would be interested to know of any other, non-potable uses for ground water.

drinking water within a one mile radius, including the Elementis property east of Cantwell Lane. A copy of the water well survey from that report is provided in Attachment G and is appended to the revised PRG Report as Appendix I.

6. **Section 3.4, Incomplete Pathways, pages 16-17:**

The direct releases of non-aqueous phase liquid (NAPL) to surface water and to sediment are considered to be incomplete pathways.

As documented in a separate AOC (reference US EPA Docket No. RCRA-VI-7003-01-02, Section V.7) between EPA Region 6 and Elementis Chromium, L.P., the U.S. Fish & Wildlife Service (USFWS) observed hydrocarbons, including benzene and cumene seeping from the bluff into the Inner Harbor Ship Channel on or about February 9, 2000. The USFWS also observed several seeps along the bluff, located up to 100 feet east of the cofferdam, discharging oily waste into the surface water on March 2, 2000. Also, oily liquid bubbled from below the surface of the water, which released a sheen on the water surface. The USFWS believed "the release to surface water constituted a potential endangerment to shorebirds." Based on these documented releases of contamination to surface water and to sediment, seeps to surface water is a complete pathway. The conceptual site model shall be revised to document these pathways as complete and evaluate them for significance.

Also, the discussion of Receptor Contact with Chemicals of Concern (COCs) In Soil States: "The only migration pathway for COCs from NAPL to surface soil is sorption of vapors to soil as soil gas migrates upwards from impacted ground water or subsurface soil. Further, currently available data suggest that ground water elevations do not fluctuate enough that NAPL or impacted groundwater contacts surface soil. Therefore, surface soils are not impacted and dermal and ingestion of surface soil pathways are incomplete."

The referenced discussion does not consider the migration pathway for COCs from NAPL and/or dissolved phase contaminated ground water to surface soils at the seeps located along the bluff adjacent to the ship channel. Based on the USFWS' documented releases along the bluff as well as EPA's documented releases at seeps adjacent to the ship channel, this pathway is complete. The CSM diagram and the accompanying narrative should clearly indicate that upper trophic level ecological receptors of interest will be examined during any ecological risk assessment and should include consumption of other contaminated food sources, such as benthic macroinvertebrates. The CSM shall be revised to document this pathway as complete and evaluate it for significance.

Response: It is our understanding that EPA is requesting that the following additional pathways be included in the CSM:

- NAPL and dissolved phase seeps to surface water to shorebirds.
- NAPL and dissolved phase seeps to sediments to shorebirds.

- NAPL and dissolved phase seeps and dissolved phase GW to surface soils at seeps to eco-receptors.

Each of these potential exposures has been added to the CSM provided in Attachment B and incorporated into the PRG Report as revised Figure 3-1. Revised Figure 3-1 replaces Figures 3-1, 3-2 and 3-3 of the PRG Report.

7. 3.5 IM Pathways, p. 17 and 4.0, p. 19

This section discusses use of State Surface Water Quality Standards as IM PRGs which states: "For tidal water bodies, the Surface Water Quality Standards only address pathways related to aquatic toxicity and human ingestion of fish. Therefore, "the only significant pathways considered in the establishing IM PRGs are those pathways related to aquatic toxicity and human ingestion of fish."

No other sources of potential contamination other than NAPL in ground water were considered. EPA does not agree with the assumption used in development of the significant and insignificant exposure pathways. The CSM should be revised to include ground water as a potential source of contamination to the Inner Harbor Ship Channel in order to aid in determining potential and overall risk of exposures to receptors.

Facility PRGs will be developed for the remaining significant pathways identified in the current CSM, as well as any additional significant pathways identified during the course of the IM Investigation.

Response: El Paso has modified the CSM to include potential exposure pathways relating to historical seep areas and a potential dissolved phase component of the source of contamination. The updated CSM (revised Figure 3-1) is provided in Attachment B. Figures 3-1, 3-2 and 3-3 as originally submitted will be deleted from the PRG Report.

With respect to your discussion of the Facility PRGs, pursuant to Paragraph VII.2.D., El Paso has elected to use the applicable PRGs as FRGs. See January 30, 2003 letter from El Paso to Sue Westbrook, USEPA.

8. 4.0 Preliminary Remediation Goals, p. 19:

A. Discussion of the IM PRGs states that: "One purpose of the IM PRGs is to serve as IM Containment System performance goals – applied at the groundwater/surface water interface, as measured in IM Containment System monitoring wells.

The text shall be revised to state that the performance goal is applied in the ground water at the ground water/surface water interface.

Response A: The second paragraph of Section 4.0 of the PRG Report has been revised to state that the performance goal is applied in the groundwater at the groundwater/surface water interface.

B. IM Investigation – Boundary Line: Determination of extent may require investigation beyond the "IM Area boundary line" as depicted on Figures 1-1 and 2-2.

The extent of contamination shall be determined to decreasing concentrations to less than the IM PRG values in ground water which may require investigation to be continued beyond the IM boundary line in Fig. 1-1 and 2-2.

Response B: The Interim Measures (IM) Groundwater Investigation is intended to investigate only the IM Area - a limited portion of the Facility. See AOC VII.1.B.(i). Figures 1-1 and 2-2 accurately depict the area of land within the Facility that is designated under the AOC as the IM Area. The areas of the Facility outside the IM Area will be investigated during the Facility Investigation pursuant to section VII.2.A. and B. of the AOC. Specifically, section VII.2.A.(i). states that the Facility Investigation Work Plan will address "contamination at that part of the Facility not addressed in the IM Investigation. . . ."

9. **4.1 IM PRG Development Process, p. 30 (*See* comment 2.3)**

TCEQ numerical standards for incidental Saltwater Fishery were used because there is a Corpus Christi City ordinance prohibiting fishing from the Inner Harbor.

The TCEQ standards state that the numerical criteria applicable to an incidental fishery are 10 times the human health criteria listed in columns B and C of Section 307.6 Table 3. Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin. Per personal communication with Mr. Jim Davenport of the TCEQ Water Quality Standards Division, the Inner Harbor Ship Channel is considered to be a sustainable saltwater fishery rather than an incidental fishery. As such it is not appropriated to multiply the human criteria by a factor of 10 in the development of the IM PRGs. The IM PRGs presented in Table 4-1 and are based the human health pathway shall be corrected to reflect a value for sustainable saltwater fishery.

Response: El Paso has modified Table 4-1 to account for the designation of the Inner Harbor Ship Channel (IHSC) as a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin.

10. Table 4-1, Preliminary Remediation Goals for Interim Measures:

A. *A review of the information presented in Table 4-1 has revealed a number of discrepancies. These discrepancies are outlined in the following paragraphs.*

The footnotes to Table 4-1 indicate that the source of the many of the values presented in the Table is the "Texas Commission for Environmental Quality Surface Water Quality Criteria obtained from Tables 1 and 3 of the TCEQ 200A Texas Surface Water Quality Standards." Based on review of the values presented and per discussions with facility representatives during the March 26, 2003 conference call, the sources of the values used included not only Texas Administrative Code (T.A.C.) Chapter 307, Tables 1 and 3 (Aquatic Life and Human Health protection criteria) dated August 17, 2000, but also, risk-based exposure limits (RBELs) from Chapter 350, the Texas Risk Reduction Table dated August 13, 2002. The table shall be revised to clearly indicate the specific source of the values presented. In addition, there appears to be a 0 missing from the date of the reference (i.e., 200 versus 2000). Revise the footnote to correct this typographical error.

Response A: El Paso has reviewed the PRG values and documentation listed in Table 4-1 of the PRG Report. The following changes have been made to the table:

a. Human health Texas Surface Water Quality Standard (TSWQS) values were changed from an incidental to a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin.
b. For chemicals without a human health TSWQS, the Risk Based Exposure Levels (RBELs), if available, were selected. The RBELs used were taken from the TCEQ "Human Health Surface Water Risk-Based Exposure Limits" table updated 5/19/05.
c. For chemicals without human health TSWQS or RBELs, the values were calculated using the most recent toxicological criteria recommended by TCEQ (Toxicity Factors – Table for Texas Risk Reduction Program Rule) updated March 31, 2004.
d. For chemicals without an ecological TSWQS, the RBELs, if available, were selected. The RBELs used were taken from the TCEQ "Aquatic Life Surface Water Risk-Based Exposure Limits" Table updated April 2002.

In addition, minor unit issues and additional footnotes were altered for clarification purposes. Attachment C is a revised Table 4-1, including updates to Appendices B and C of the PRG Report, upon which Table 4-1 is based.

B. *Footnote to Table 4-1 also indicates that the human health criteria is based on the ingestion of saltwater fish from and incidental fishery.*

The TCEQ standards state that the numerical criteria applicable to an incidental fishery are 10 times the human health criteria listed in columns B and C of Section 307.6 Tale 3. Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identified the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin. Per personal communication with Mr. Jim Davenport of the TCEQ Water Quality Standards Division, the Inner Harbor Ship Channel is considered to be a sustainable saltwater fishery rather than an incidental fishery. As such it is not appropriated to multiply the human criteria by a factor of 10 in the development of the IM PRGs. The IM PRGs presented in Table 4-1 and are based the human health pathway shall be corrected to reflect a value for sustainable saltwater fishery.

In addition, El Paso proposes that two chemicals (PAHs), benzo(j) fluorine and 7,12-dimethyldibenxo(a)anthracene do not bio accumulate past the benthic macro invertebrate level. It should be noted that TCEQ does have a calculation for developing surface water quality standards for these two chemicals. Surface water quality standards shall be calculated for these two chemicals.

Response B: Neither federal nor state aquatic life criteria were available for two chemicals: benzo(j)fluoranthene (CAS No. 205-82-3) and 7,12-dimethyl-benz(a)anthracene (CAS No. 57-97-6). Therefore, the hierarchy for selecting ecological benchmarks for surface water was followed (Figure 3-4, *Guidance for Conducting Ecological Risk Assessments* U.S. EPA, 1997). Appropriate values were not found in the additional benchmarks for surface water (Table 3-2, *ibid.*). As such, an Ecotox Query was performed (29 September 2005) to search for additional toxicity data. No aquatic toxicity data were available for benzo(j)fluoranthene. For 7,12-dimethyl-benz(a)anthracene, only 11 saltwater records were available. Of these 11, two records were eliminated because the species listed (brook trout) is not a saltwater species and does not match the species noted (Chinook salmon) in the cited reference. The remaining 9 records are segregated by species as follows:

- *Oncorhnchus tshawytscha* (Chinook salmon) – 1 record
- *Mytilus galloprovincialis* (Mediterranean mussel) – 4 records
- *Gyrodinium* sp. Dinoflagellate – 1 record
- *Paracentrotus lividus* (Sea urchin) – 3 records

These particular salmon, mussel, and urchin species are not indigenous to Texas; therefore, those records were eliminated from potential use. *Gyrodinium* is a genus indigenous to Texas; however, one record is not sufficient to develop a chronic criterion in accordance with federal guidance (*Guidelines for Deriving Numerical Site-specific Water Quality Criteria*; EPA 600/3-84-099). This toxicity value also is not appropriate to use to derive a chronic value in accordance with TAC § 307.6(c)(7) since the endpoint for

the *Gyrodinium* study is cellular changes, not an LC_{50}. Therefore, a surface water benchmark for 7,12-dimethyl-benz(a)anthracene cannot be developed at this time.

As an aside, *Gyrodinium* contains species associated with red tides. It would not be appropriate to use a species such as this to develop a toxicity value. Therefore, surface water quality standards are not calculated for these two chemicals.

C. *The surface water RPG of benzene is listed as 1.09-01 mg/L and the source identified for this value is the aquatic toxicity criteria from Table 1 of the TCEQ SWQS.*

The TCEQ SWQS do not include a saltwater chronic criteria value for the protection of aquatic life for benzene but do include a human health value of 70.8 micrograms per liter (Fg/L) for benzene. (The value of 1.09E-01 mg/L appears to be taken from Chapter 350 of the Texas Risk Reduction Rule). As documented in the Administrative Order on Consent (reference US EPA Docket No. RCRA VI-7003-01-01, Section VII.1.A(i) between EPA Region 6 and El Paso CPG Company, for the purposes of the Interim Measures Investigation, the Texas SWQS (30 Tex. Administrative Code Chapter 3-7) shall be used as IM PRGs and the IM PRG concentration for each COC shall be equal to its respective Texas SWQS value, or a comparable derived value for COCs without a standard, for aquatic life and human health protection (saltwater chronic criteria). Given the fact that benzene does have a human health criteria (70.8 Fg/L listed in Table 3 of the Texas SWQS, 70.8 Fg/L shall be selected as the IM PRG for benzene. This issue also applies to the IM PRGs selected for chloroform and tetrachloroethylene. Table 4-1 and Appendix E shall be revised to address this issue.

Response C: El Paso has reviewed the PRG values and documentation listed in Table 4-1 of the PRG Report. The following changes have been made to the table:

a. Human health Texas Surface Water Quality Standard (TSWQS) values were changed from an incidental to a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin.
b. For chemicals without a human health TSWQS, the Risk Based Exposure Levels (RBELs), if available, were selected. The RBELs used were taken from the TCEQ "Human Health Surface Water Risk-Based Exposure Limits" table updated 5/19/05.
c. For chemicals without human health TSWQS or RBELs, the values were calculated using the most recent toxicological criteria recommended by TCEQ (Toxicity Factors – Table for Texas Risk Reduction Program Rule) updated March 31, 2004.
d. For chemicals without an ecological TSWQS, the RBELs, if available, were selected. The RBELs used were taken from the TCEQ "Aquatic Life Surface Water Risk-Based Exposure Limits" Table updated April 2002.

In addition, minor unit issues and additional footnotes were altered for clarification purposes. Attachment C is a revised Table 4-1, including updates to Appendices B and C of the PRG Report, upon which Table 4-1 is based.

D. In addition, Table 4-1 uses milligrams per liter (mg/L) as the unit of measure whereas the TCEQ surface water criteria (Chapter 307, Tables 1 and 3) and the calculations presented in Appendices C, D, and E are presented in Fg/L.

The conversion between mg/L and Fg/L appears to have also resulted in some errors. Table 4-I shall be reviewed and revised to ensure the accuracy of the information presented and to correct the listed sources and any conversion errors.

Response D: El Paso has reviewed the PRG values and documentation listed in Table 4-1 of the PRG Report. The following changes have been made to the table:

a. Human health Texas Surface Water Quality Standard (TSWQS) values were changed from an incidental to a sustainable fishery. Texas Administrative Code (TAC) Chapter 307.6(d)(5) indicates that all designated segments listed in Appendix A for § 307.10 are considered to have sustainable fisheries. Appendix A of Chapter 307 identifies the Corpus Christi Inner Harbor Ship Channel as designated Stream Segment Number 2484 of the Nueces River basin.
b. For chemicals without a human health TSWQS, the Risk Based Exposure Levels (RBELs), if available, were selected. The RBELs used were taken from the TCEQ "Human Health Surface Water Risk-Based Exposure Limits" table updated 5/19/05.
c. For chemicals without human health TSWQS or RBELs, the values were calculated using the most recent toxicological criteria recommended by TCEQ (Toxicity Factors – Table for Texas Risk Reduction Program Rule) updated March 31, 2004.
d. For chemicals without an ecological TSWQS, the RBELs, if available, were selected. The RBELs used were taken from the TCEQ "Aquatic Life Surface Water Risk-Based Exposure Limits" Table updated April 2002.

In addition, minor unit issues and additional footnotes were altered for clarification purposes. Attachment C is a revised Table 4-1, including updates to Appendices B and C of the PRG Report, upon which Table 4-1 is based.

11. **Section 4.2 Chemicals of Concern, p. 22: (See Comments for Section 5.0 ROST Technology)**

A. The Work Plan states "the COC list" will be revised based on the IM and Facility Investigation results. If a chemical is not detected at concentrations greater than or equal to its PRG or the Method Detection Limit (MDL) whichever is higher during the IM or Facility Investigation, then that chemical will be dropped from further consideration and not considered to be a COC.

A detection(s) of a Skinners List constituent(s), excluding metals and MTBE, not just those chemicals detected at concentrations greater than or equal to its PRG or the MDL during the IM Investigation and Facility Investigation, as well as historical data, shall be considered a potential contaminant of concern (PCOC). Based on the results of the IM and Facility Investigations, the Skinners List (PCOCs) will be adjusted to be the Constituents of Concern (COCs) list. The Method Detection Limits achieved by the analytical methodology must be low enough to determine if the concentration of COCs exceed the appropriate screening levels for each media. If the MDL is not lower than the screening value for any chemical, this issue must be addressed in the report.

Response A: Groundwater samples will be used to determine whether constituents on the Skinners List are present in the groundwater and to determine the extent of contamination. The IM COC list will be adjusted if groundwater concentrations for the IM COCs are less than respective PRGs. The analytical results of LNAPL samples will not be used to adjust the IM COC list. No COC will be removed from the project specific Skinner List of chemicals based on screening technology (i.e. ROST screening data). Section 4.2 of the PRG Report has been revised to reflect this response.

B. The Work Plan states that the COC list will be adjusted based on the analytical results from environmental media samples and the analytical results from LNAPL samples. If analysis does not result in detection of a particular chemical of interest in the LNAPL sample, El Paso proposes to eliminate the constituents from the COC list for IM monitoring.

The analytical results of LNAPL samples (fingerprinted by Fugro for various hydrocarbon types present in the area, used to calibrate the ROST technology) shall not be used to determine whether constituents on the Skinners List are present in the ground water. In addition, the analytical results of LNAPL samples shall not be used to determine the extent of contamination. Ground water samples shall be collected and SW846 analytical method with detection limits less than or equal to Surface Water Quality Standards shall be used to determine whether constituents on the Skinners List are present in the ground water and used to determine the extent of contamination. Once sufficient data has been collected and analyzed from all media of concern at the facility or impacting the Ship Channel, this includes sampling of ground water, surface water, soil, sediment and possibly air, it may be appropriate to reduce the list of COCs.

Response B: Groundwater samples will be used to determine whether constituents on the Skinners List are present in the groundwater and used to determine the extent of contamination. The IM COC list will be adjusted if groundwater concentrations for the IM COCs are less than respective PRGs. The analytical results of LNAPL samples will not be used to adjust the IM COC list. No COC will be removed from the project specific Skinner List of chemicals based on screening technology (i.e. ROST screening data). Section 4.2 of the PRG Report has been revised to reflect this response.

In part B of this comment, EPA references collecting sediment data. El Paso does not propose to sample sediments in the Inner Harbor Ship Channel during any part of its

activities pursuant to the AOC. The AOC explicitly provides that "The Facility does not include any portion of the Inner Harbor Ship Channel and notwithstanding anything in this Order to the contrary, this Order does not require Respondent to fully delineate or to remediate contamination in the Inner Harbor Ship Channel." El Paso chose to use Texas Surface Water Quality Standards (TSWQS) for the IM PRGs and to use the applicable PRGs as Final Remediation Goals (FRGs) in accordance with Sections VII.1.A(i) and VII.2.D of the AOC.

C. *The Work Plan also states: "The IM COC list will be adjusted based on the analytical results for environmental media samples and the analytical results for LNAPL samples."*

The analytical results of LNAPL samples shall not be used to adjust the IM COC list. A constituent shall not be removed from the IM COC List (Skinners List) based on Roth-technology screening. Also, a constituent shall not be removed from the COC List if the data were not collected and analyzed according to requirements of the Data Quality Objectives in the Order.

The Work Plan may be revised to propose another screening technology to determine the presence of constituents on the Skinners List. (e.g., direct push technology with soil gas sampling).

The Work Plan shall be revised to clearly reflect all the above changes in section 4.2.

Response C: As discussed in Response A above, the IM COC list will be adjusted if groundwater concentrations for the IM COCs are less than respective PRGs. The analytical results of LNAPL samples will not be used to adjust the IM COC list. No COC will be removed from the project specific Skinner List of chemicals based on screening technology (i.e. ROST screening data).

12. Appendix F, Health and Safety Plan, Section 6.0, Environmental Monitoring Plan, page 37:

Section 6.0 presents the following statements in bolded lettering in regard to the Environmental Monitoring Plan Summary Table: "This table depicts estimates of monitoring approaches only. Contact the BC H&S [Brown & Caldwell Health and Safety] staff for a finalized application of monitoring guidelines to actual field conditions."

This reference indicates that the Environmental Monitoring Plan Summary Table does not present the finalized values for the Environmental Monitoring Plan. The monitoring values shall be clarified and Section 6.0 shall be revised accordingly.

Response: The estimates of monitoring approaches and values in Section 6.0 of the Health and Safety Plan are final. Appropriate revisions have been made to section 6.0 of Appendix F.

III. INTERIM MEASURES GROUNDWATER INVESTIGATION WORK PLAN – GENERAL COMMENTS

1. *A. Under the Consent Order El Paso is required to determine the lateral extent of LNAPL to non detect thickness in the IM Area and determine the vertical and horizontal extent of dissolve phase contamination to decreasing concentrations of IM COCs to below IM PRGs in ground water. The Work Plan proposes a phased approach for IM investigation of ground water at the site. The Rapid Optical Screening Technology (ROST) is proposed to be used to determine the lateral and vertical extent of NAPL contamination in the IM Area.*

The U.S. EPA's National Exposure Research Laboratory evaluated the ROST™ technology in 1995. The details of EPA's study are published in an Innovative Technology Verification Report entitled, "The Rapid Optical Screening Tool (ROST™) Later-Induced Fluorescence (LIF) System for Screening of Petroleum Hydrocarbons in Subsurface Soils," EPA/600/R-97/020. As stated in section, Limits of the Technology, on page 13 of the report: "The ROST™ LIF system often uses 290 mm as the excitation wavelength. This wavelength is short enough to excite the fluorescence of all aromatic hydrocarbons with at least two conjugated aromatic rings. Aliphatic species and single-ring aromatics do not contribute to the ROST™ LIF signal from 290 nm."

In addition the report section, Limitations of the Technology, states on page 51: "The ROST™ LIF system is applicable only to fuels and wastes containing non-chlorinated multi-ring aromatic hydrocarbon molecules. The detection capabilities for ROST™ include, but are not limited to, jet fuel, gasoline, diesel, lubricating oils, coal tar, and creosote. Other compounds such as chlorinated hydrocarbons would require separate sensors."

Based on the above information, there appears to be serious limitations to detecting the presence of the aliphatic (straight chain) compounds, chlorinated aliphatics, and single-ring aromatic compounds, which are included on the Skinner List. According to Fugro GeoSciences, Inc., the owner of the ROST™ technology, the LIF system can be tuned across a range of wavelengths from 266-320 nm in order to capture the single-ring aromatics, such as benzene, toluene, and ethylbenzene, but does not indicate that the LIF system can now detect aliphatics. This is an important issue since the aliphatics and single-ring aromatics may be present, yet not detected, if the ROST™ LIF sensor is tuned to the standard frequency of 290 nm.

Based on the potential for serious limitations of ROST technology which may prohibit detection of constituents on the Skinners List, El Paso shall revise the Work Plan to provide the field procedure to tune the ROST technology, the LIF sensor, across a range of wave lengths to detect the compounds on the Skinner List and to ensure that the LIF system will be adjusted appropriately during sampling to detect the presence of single and multi-ring aromatic compounds. Also, El Paso shall clarify whether the LIF sensor can be tuned to detect aliphatic (straight chain) and chlorinated hydrocarbons on the

Skinner List and, if so, ensure that the LIF tuning procedure addresses these compounds as well. If the ROST technology cannot be tuned to detect the compound on the Skinner list, the ROST technology shall only be used as a screening tool for the presence of LNAPL. Alternatively, another screening technology (Level II field analysis) may be proposed to detect Skinners List constituents.

Response A: Based on an interview with CPT/ROST manager of Fugro Geosciences, Dennis Stauffer, starting in 1999 the ROST sensor can also monitor and record data for 340, 390, 440, and 490 nanometer wavelengths, resulting in the ability to detect the presence of even more compounds than when the technology was evaluated by EPA in 1995.

Regardless, Section 5.1 (page 11) of the IM Investigation Work Plan (IM WP) states, "ROST probes will be completed as a screening process to preliminarily define the lateral extent of LNAPL at the IM Area." As documented by EPA in 1995, the application of ROST technology is limited when applied as a quantitative tool for analysis of chemical concentrations, particularly for co-mingled chemicals of concern. However, the qualitative application of the CPT/ROST technology is acknowledged by the EPA in the 1995 Innovative Technology Evaluation Report for stratigraphy and as an indicator of relative percent hydrocarbon/chemical presence, based on a standard. El Paso proposes to use CPT for stratigraphy and ROST technology as an indicator for whether or not there is a relative percent, based on a standard, of hydrocarbon/chemical present in the soil column, which can therefore offer an indication of the presence of phase separated compounds. Therefore, El Paso is proposing use of the ROST technology as a qualitative screening of the phase separated plume boundary location so that permanent piezometers may be more effectively located and constructed for direct measurement of LNAPL to delineate the free phase plume. Proposed use of the ROST technology by El Paso is not intended for delineation purposes of chemicals of concern (COCs).

B. According to the Work Plan, if LNAPL is not detected at a temporary sampling point, a ground water sample will be collected near the location determined to be non-detect for LNAPL. The sample will be analyzed for Skinners List constituents, Att. 2 of the Order.

The Work Plan shall be revised to state that ground water samples shall be collected and analyzed according to EPA approved procedures and SW846 analytical methods with detection limits equal to or less than Texas State Surface Water Quality Standards to evaluate constituents on the Skinners list. If the method detection limits are not lower than the screening values for any chemical this must be clearly addressed in the report.

Response B: Delineation of COCs will be based on the collection of groundwater samples for laboratory analysis of the complete Skinner List as described in 5.1 of the IM WP. Also, as described in 6.1 of the IM WP, groundwater samples collected from monitoring wells for COC delineation will be analyzed for Skinner List VOCs by method 8260B, Skinner List SVOCs by method 8270C, cyanide by method 9010B/9014, and hydrogen sulfide by method 376.2.

As described in Section 5.2 of the IM WP, if existing and new well locations are not sufficient to delineate LNAPL and dissolved phase COCs within the IM Area, additional step-out wells will be installed within the IM Area for collection of groundwater samples for laboratory analysis. Attachment D is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach for COC delineation within the IM Area. This decision chart, which reflects the decision making process originally proposed in the IM WP, is added to the IM WP as Figure 5-2a solely for the purposes of clarifying our proposed delineation work.

2. *A. El Paso has proposed that Benzene and Toluene be used as indicator compounds for screening and siting permanent ground water monitoring wells.*

Use of benzene and toluene as indicator compounds is not representative of all constituents on the "Skinners List" (Constituents of Concern for Wastes from Petroleum Processes), which serves as the basis for the IM COCs. The Work Plan shall be revised to clearly state that benzene and toluene shall not be used as indicator compounds for screening or for siting locations for installation of permanent ground water monitoring. The constituents on the Skinners List, except metals and MTBE, shall be used for screening and for siting permanent ground water monitoring well locations.

Response A: As explained in Section 5.1 and 5.2 of the IM WP, preliminary sampling of existing wells and temporary sampling points for only benzene and toluene is not intended to replace delineation sampling of monitoring wells for the complete AOC Skinners List. A phased installation of permanent step-out monitoring wells sampled for AOC Skinners List COCs will be used to delineate COCs to PRGs. Therefore, delineation of the free phase plume will be based on direct measurements of LNAPL, and delineation of COCs will be based on the collection of groundwater samples for laboratory analysis. For purposes of clarity, we are adding the following text to Sections 5.1 and 5.2 of the IM WP: "The following procedure will be applied in the IM Area:

1. CPT/ROST, and benzene and toluene samples will be collected from temporary sampling points to identify locations of permanent sampling points.
2. Piezometers will be installed in locations where LNAPL is not expected, and new monitoring wells will be installed for groundwater sampling within the IM Area.
3. Piezometer measurements will be used to delineate LNAPL and samples from monitoring wells will be collected for AOC Skinner List COCs.
4. If any piezometer detects LNAPL, an additional step-out piezometer will be installed.
5. If any COC concentration is greater than the respective PRG within the IM Area, at least one additional step-out monitoring well will be installed within the IM Area for further AOC Skinner List COC sampling."

This information is a summary of the procedures originally set out in sections 5.0 through 5.2 of the IM WP.

B. Also the Work Plan proposed that Method 8021B (Test Methods for Evaluating Solid Waste) be used to screen benzene and toluene with no consideration for the aliphatics, semi-volatile organics, and polynuclear aromatic hydrocarbons (PAHs) on the Skinner List.

The proposed analytical Method 8021B shall not be used for screening to determine whether constituents on the Skinners List are present. An analytical method with a broad range of compounds and with detection limits equivalent to or less than the Texas Surface Water Quality Standards shall be used to provide positive identification of constituents on the Skinners List during screening. (Method 8260, in SW846, Test Methods for Evaluating Solid Waste, is typically used to analyze for the presence of all volatile organics, including benzene and toluene. The laboratory data package for Method 8260 usually presents concentration data for the whole suite for volatiles, including the Skinner List of volatile organics, since the instrumentation (i.e., gas chromatograph/mass spectrometer, or GC/MS readily provides it.)

During field screening, one of each four samples collected for field screening shall be submitted to a laboratory to be analyzed for constituents on the Skinners List.

Response B: Submittal of one in four screening samples to the laboratory to be analyzed for Skinners List constituents is unnecessary because, as set out in section 5.2 of the IM WP, complete Skinners List analysis will be performed for delineation sampling. As set out in section 6.1 of the IM WP, groundwater samples collected from monitoring wells for COC delineation will be analyzed for Skinner List VOCs by method 8260B, Skinner List SVOCs by method 8270C, cyanide by method 9010B/9014, and hydrogen sulfide by method 376.2.

Attachment D, which is included in the IM WP as Figure 5-2a, is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach proposed for COC delineation. This decision chart reflects the decision process originally proposed in the IM WP and is provided solely for purposes of clarifying our proposed delineation work.

3. *Under General Comments Number 2, addressing the PRG Report, the EPA requested any available analytical data for the seeps along the bluff line (adjacent to the ship channel) east of the cofferdam be considered.*

If no data are available for seeps, clarify this point and indicate that the seeps will be sampled during the IM Groundwater Investigation. If seep and well data are available for the IM Area, integrate the data into the site conceptual model.

If wells are not presently located in the seep area, the PRG Report and Work Plan shall be revised to indicate that permanent monitoring wells will be installed in the seep areas

and bluff-line during the IM Groundwater Investigations. Revise the Work Plan to address the delineation of any phase-separated hydrocarbon and dissolved phase plume that discharges at the bluff line seeps adjacent to the ship channel, including the sampling of any existing wells in the IM Area and the installation of additional monitoring wells in the IM Area.

El Paso shall provide detailed hydro-geologic information (i.e., flow nets, capture zone analyses, and analytical data which clearly demonstrates whether contaminated ground water is discharging to the ship channel.

Response: A map of the approximate locations of known historic seeps is provided as Attachment A. As stated in the AOC Section V.20, the TNRCC (now the TCEQ) collected a sample of oily liquid seeping from Elementis into the Inner Harbor Ship Channel (IHSC) in February 2000. The laboratory report describes the sampled media as "Org. Waste." Analytical data from three samples are documented in Exhibit 15 of the AOC. However, based on our review of the letter report prepared by the U.S. Fish & Wildlife Service (USFWS) regarding this incident, and as discussed in our response to EPA's Request for Information Pursuant to Section 3007 of RCRA, this incident occurred outside the IM Area and was not associated with the Corpus Christi Inner Harbor Ship Channel.

After El Paso assumed the operation of the Cofferdam Hydrocarbon Recovery and Treatment System in July of 2002, two additional incidents resulted in the appearance of a sheen on the surface water of the IHSC. Both incidents were reported to local agencies as well as the EPA. The exact release location for the 2002 incident is unknown. This incident occurred during an extreme storm event resulting in rainwater collecting behind the cofferdam and releasing through a crack in the concrete structure above the water line, and therefore is not classified as a groundwater to surface water seep. The crack was repaired immediately. Due to the rip-rap composition comprising the shoreline and the small estimated release quantities from the 2004 incident, only an approximate location of discharge could be determined for the release in 2004. No analytical data were required to be collected and thus no analytical data were collected from either of these incidents. Visual inspections of the shoreline continue to be conducted to verify that no sheens are visible.

Water level data, product thickness measurements, and analytical data from IM Area wells were provided in Tables 3-1 through 3-4 of the IM WP. In response to EPA's Request for Information Pursuant to Section 3007 of RCRA, El Paso developed a Cofferdam System capture zone map (Attachment J) incorporating data collected since submittal of the IM WP.

El Paso has modified the Conceptual Site Model (CSM) to include potential exposure pathways relating to this historical seep area and potential dissolved phase component of the source of contamination. The revised CSM integrating the above referenced data is provided as Attachment B (Revised Figure 3-1). The figure provided in Attachment B replaces Figures 3-1 through 3-3 of the PRG Report.

4. *Product thickness measurements are available for several of the wells in the IM Area.*

Product thickness shall be mapped during the IM Groundwater Investigation to identify the areas with the greatest quantities of free product and to identify any trends in contaminant migration since the last mapping of product thickness. The Work Plan revision shall also include an evaluation of the product thickness measurements. Include maps of the product thickness.

Response: Table 3-1 of the IM WP Groundwater Investigation Report summarizes product thickness measurements collected from IM Area wells between 1999 and 2002. Many of these wells are recovery wells. Variation in product thickness in recovery wells may be a result of historical pump settings and operation. There does not appear to be significant variation in product thickness measurements in non-pumping wells in the IM Area. Please note that, although not footnoted as pumping wells within the previously submitted Table 3-1, RWEC-03, RWEC-04, and RWEC-08 should be designated as pumping wells. We are submitting a revised Table 3-1 to the IM WP to reflect this change. Regardless, these wells are outside the boundary of the IM Area and will be evaluated further as part of the Facility Investigation. El Paso will also evaluate product thickness measurements in the IM Area in future groundwater monitoring events, including data collected during the IM groundwater investigation.

5. *As documented in a separate AOC (reference US EPA Docket No. RCRA-VI-7003-01-02, Section V.7) between EPA Region 6 and Elementis Chromium, L.P., the USFWS observed hydrocarbons, including benzene and cumene seeping from the bluff into the Inner Harbor Ship Channel on or about February 9, 2000. The USFWS also observed seeps along the bluff, located up to 100 feet east of the cofferdam, discharging oily waste into the surface water on March 2, 2000. Also, oily liquid bubbled from below the surface of the water, which released a sheen on the water surface. The USFWS believed "the release to surface water constituted a potential endangerment to shorebirds."*

Based on these observations, sampling of the seeps (seep areas) adjacent to the ship channel shall be included in the Work Plan. Any measured concentrations, including historical data, at the seep locations shall be included in the conceptual site model to establish the extent of contamination, and to identify potential exposure concentrations.

Response: A map of the approximate locations of known historic seeps is provided as Attachment A. As stated in the Administrative Order on Consent (AOC) Section V.20, the Texas Natural Resource Conservation Commission (TNRCC) (now the TCEQ) collected a sample of oily liquid seeping from Elementis into the Inner Harbor Ship Channel (IHSC) in February 2000. The laboratory report describes the sampled media as "Org. Waste." Analytical data from three samples are documented in Exhibit 15 of the AOC. However, based on our review of the letter report prepared by the U.S. Fish & Wildlife Service (USFWS) regarding this incident, and as discussed in our response to EPA's Request for Information Pursuant to Section 3007 of RCRA, this incident

occurred outside the IM Area and was not associated with the Corpus Christi Inner Harbor Ship Channel.

After El Paso assumed the operation of the Cofferdam Hydrocarbon Recovery and Treatment System in July of 2002, two additional incidents resulted in the appearance of a sheen on the surface water of the IHSC. Both incidents were reported to local agencies as well as the EPA. The exact release location for the 2002 incident is unknown. This incident occurred during an extreme storm event resulting in rainwater collecting behind the cofferdam and releasing through a crack in the concrete structure above the water line, and therefore is not classified as a groundwater to surface water seep. The crack was repaired immediately. Due to the rip-rap composition comprising the shoreline and the small estimated release quantities from the 2004 incident, only an approximate location of discharge could be determined for the release in 2004. No analytical data were required to be collected and thus no analytical data were collected from either of these incidents. Visual inspections of the shoreline continue to be conducted to verify that no sheens are visible.

El Paso has modified the Conceptual Site Model (CSM) to include potential exposure pathways relating to this historical seep area and potential dissolved phase component of the source of contamination. The revised CSM integrating the above referenced data is provided as Attachment B (Revised Figure 3-1). The figure provided in Attachment B replaces Figures 3-1 through 3-3 of the PRG Report.

6. *The Work Plan, FSP, and QAP reference numerous acronyms.*

Provide a list of acronyms specific to each document, preferably after the Table of Contents.

Response: A list of acronyms is provided as Attachment F and is included as Appendix F of the IM WP.

INVESTIGATION WORK PLAN SPECIFIC COMMENTS

1. A. **Section 2.3, Previous Implementation of Corrective Action, p. 4.**

Paragraph one states that El Paso is operating a ground water recovery and treatment system to address LNAPL and dissolved-phase impact to ground water at a portion of the IM Area.

This section of the Work Plan shall be revised to state that El Paso operates the on-going containment, recovery, monitoring and treatment system including the Cofferdam Recovery and Hydrocarbon Treatment System at the IM Area to contain and stop migration of LNAPL and dissolved phase contamination into the Inner Harbor Ship Channel until the Interim Measures Containment System is operational.

Response A: El Paso's obligations under the AOC, pursuant to the August 30, 2002 letter amendment, is to "continue to operate the current containment, recovery, monitoring and hydrocarbon treatment system including the Cofferdam Recovery and Hydrocarbon Treatment System to prevent migration of contamination into the Inner Harbor Ship Channel until the Interim Measures Containment System is operational."[1] El Paso has revised section 2.3 to reflect its obligation under the AOC and the August 30, 2002 letter amendment.

B. Components of the existing recovery and treatment system are discussed including the Cofferdam, recovery wells and treatment system. The Work Plan does not discuss the monitoring system nor the schedule to monitor for LNAPL and dissolved phase hazardous constituents in the ground water at the containment recovery treatment system monitor wells to determine whether the system stops migration of LNAPL and dissolved phase contamination into the Inner Harbor Ship Channel.

The Work Plan shall be revised to discuss how the containment and recovery system is monitored to measure the effectiveness of the recovery system to meet the requirement to contain and stop migration of LNAPL and dissolved phase contamination into the Inner Harbor Ship Channel.

Response B: The IM WP does not contain information on the monitoring of the current system because such a request is beyond the scope of what is to be in the IM WP pursuant to section VII.1.B.(i). Under the AOC, the IM WP is to include, among other things, "proposed additional sampling points, monitoring wells and piezometers to be installed and adequate samples to be collected, sufficient to investigate to characterize and determine the extent of groundwater contamination...." AOC, section VII.1.B.(i).(c).ii. The work proposed in the IM WP is intended to delineate contamination, not to monitor the effectiveness of any current measures.

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[1] Consistent with the AOC, contamination means those constituents on the Skinner List, except for MTBE and chromium.

Further, no other portion of the AOC imposes a monitoring obligation on El Paso with respect to the Cofferdam system. El Paso's obligations during the time period prior to the implementation of the IM Containment System are to "continue to operate the current containment, recovery, monitoring and hydrocarbon treatment system including the Cofferdam Recovery and Hydrocarbon Treatment System to prevent migration of contamination into the Inner Harbor Ship Channel . . . ." See August 30, 2002 letter amendment.

El Paso has addressed the substantive issues raised by this comment – the effectiveness of the current system and the monitoring procedures for the system – in its response to EPA's Request for Information Pursuant to Section 3007 of RCRA.

2. **Section 5.0, Monitoring and Data Collection Procedures, p. 10.**

(See IV Interim Measures Ground Water Investigation Work Plan General Comment, above)

Response: El Paso assumes that this comment refers to the IM Groundwater Investigation Work Plan - General Comment 4. Table 3-1 of the IM WP summarizes product thickness measurements collected from IM Area wells between 1999 and 2002. Many of these wells are recovery wells. Variation in product thickness in recovery wells may be a result of historical pump settings and operation. There does not appear to be significant variation in product thickness measurements in non-pumping wells in the IM Area. Please note that, although not footnoted as pumping wells within the previously submitted Table 3-1, RWEC-03, RWEC-04, and RWEC-08 should be designated as pumping wells. We are submitting a revised Table 3-1 (Attachment J) to the IM WP to reflect this correction. Regardless, these wells are outside the boundary of the IM Area and will be evaluated further as part of the Facility Investigation. El Paso will also evaluate product thickness measurements in the IM Area in future groundwater monitoring events, including data collected during the IM groundwater investigation.

3. **Section 5.1, ROST™ and Temporary Well Sampling, pages 10-13,**

A. The second paragraph on page 11 discusses the proposed primary and step-out ROST™ soundings for light non-aqueous phase liquid (LNAPL) floating on top of the groundwater. This discussion also states, "In addition to existing and new permanent monitor wells, piezometers will be installed as necessary to define the limit of the LNAPL plume at the IM Area."

The text shall be revised to state that at the proposed "step-out" location the proposed ROST soundings shall be replaced with an interface probe measurement to determine the presence and thickness of LNAPL. The interface probe shall also be used to measure the presence and thickness to determine the extent of the LNAPL. The interface probe shall also be used to measure the presence and thickness to determine the extent of LNAPL plume.

Response A: Section 5.1 (page 11) of the IM WP states, "ROST probes will be completed as a screening process to preliminarily define the lateral extent of LNAPL at the IM Area." As documented by EPA in 1995, the application of ROST technology is limited when applied as a quantitative tool for analysis of chemical concentrations, particularly for co-mingled chemicals of concern. However, the qualitative application of the CPT/ROST technology is acknowledged by the EPA in the 1995 Innovative Technology Evaluation Report for stratigraphy and as an indicator of relative percent hydrocarbon/chemical presence, based on a standard. El Paso proposes to use CPT for stratigraphy and ROST technology as an indicator for whether or not there is a relative percent, based on a standard, of hydrocarbon/chemical present in the soil column, which can therefore offer an indication of the presence of phase separated compounds. Therefore, as set out in section 5.1 of the IM WP, El Paso is proposing use of the ROST technology as a qualitative screening of the phase separated plume boundary location so that permanent piezometers may be more effectively located and constructed for direct measurement of LNAPL to delineate the free phase plume. Proposed use of the ROST technology by El Paso is not intended for delineation purposes of chemicals of concern (COCs).

As described in section 5.2 of the IM WP, if existing and new piezometer and well locations are not sufficient to delineate LNAPL and dissolved phase COCs within the IM Area, additional step-out wells will be installed within the IM Area for collection of groundwater samples for laboratory analysis. Attachment D is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach proposed for COC delineation within the IM Area. This decision chart, which reflects the decision making process originally proposed in the IM WP, is incorporated as Figure 5-2a to the revised IM WP, solely for the purposes of clarifying our proposed delineation work.

B. The conditions that will lead to installation of a piezometer are not described in Section 5.1, although the conditions are presented for the installation of a temporary sampling point, a temporary monitor well, and a permanent monitor well.

Describe the conditions that will lead to the installation of a piezometer.

Response B:

For purposes of clarity, we are adding the following text to sections 5.1 and 5.2 of the IM WP: "The following procedure will be applied in the IM Area:

1. CPT/ROST, and benzene and toluene samples will be collected from temporary sampling points to identify locations of permanent sampling points.
2. Piezometers will be installed in locations where LNAPL is not expected, and new monitoring wells will be installed for groundwater sampling within the IM Area.
3. Piezometer measurements will be used to delineate LNAPL and samples from monitoring wells will be collected to delineate AOC Skinner List COCs.

4. If any piezometer detects LNAPL, an additional step-out piezometer will be installed.

5. If any COC concentration is greater than the respective PRG within the IM Area, at least one additional step-out monitoring well will be installed within the IM Area for further AOC Skinner List COC sampling."

This information is a summary of the procedures originally set out in sections 5.0 through 5.2 of the IM WP.

As described in section 5.2 of the IM WP, if existing and new piezometer and well locations are not sufficient to delineate LNAPL and dissolved phase COCs within the IM Area, additional step-out wells and will be installed within the IM Area for collection of groundwater samples for laboratory analysis. Attachment D is a decision chart reflecting the preliminary use of piezometers as well as the phased step-out monitoring well installation approach proposed for COC delineation within the IM Area. This decision chart, which reflects the decision making process originally proposed in the IM WP, is incorporated as Figure 5-2a to the revised IM WP, solely for the purposes of clarifying our proposed delineation work.

C. The last sentence on page 12 states, "If benzene or toluene impact does not exceed applicable PRGs, as listed in PRG report, then a permanent monitor will may be installed at that location." (Underlining added for emphasis.)

The Work Plan shall be revised to state "if constituents on the Skinners List" are not detected, (rather than "if benzene or toluene impact does not exceed applicable PRGs) then a permanent monitor well . . . ."

Also, revise the Work Plan to state that a permanent monitor well shall be installed rather than "may be installed," at the top of the saturated zone within the uppermost transmissive unit if constituents on the Skinners List are not detected.

Response C:

As explained in Sections 5.1 and 5.2 of IM WP, preliminary sampling of existing wells and temporary sampling points for only benzene and toluene is not intended to replace delineation sampling of monitoring wells for the complete AOC Skinners List. A phased installation of permanent step-out monitoring wells sampled for AOC Skinners List COCs will be used to delineate COCs to PRGs. Therefore, delineation of the free phase plume will be based on direct measurements of LNAPL in piezometers, and delineation of COCs will be based on the collection of groundwater samples for laboratory analysis. For purposes of clarity, we are adding the following text to sections 5.1 and 5.2 of the IM WP: "The following procedure will be applied in the IM Area:

1. CPT/ROST, and benzene and toluene samples will be collected from temporary sampling points to identify locations of permanent sampling points.

2. Piezometers will be installed in locations where LNAPL is not expected, and new monitoring wells will be installed for groundwater sampling within the IM Area.
3. Piezometer measurements will be used to delineate LNAPL and samples from monitoring wells will be collected to delineate AOC Skinner List COCs.
4. If any piezometer detects LNAPL, an additional step-out piezometer will be installed.
5. If any COC concentration is greater than the respective PRG within the IM Area, at least one additional step-out monitoring well will be installed within the IM Area for further AOC Skinner List COC sampling."

This information is a summary of the procedures originally set out in sections 5.0 through 5.2 of the IM WP.

Delineation of COCs will be based on the collection of groundwater samples for laboratory analysis of the complete Skinner List. Groundwater samples collected from monitoring wells for COC delineation will be analyzed for Skinner List VOCs by method 8260B, Skinner List SVOCs by method 8270C, cyanide by method 9010B/9014, and hydrogen sulfide by method 376.2 as referenced in Section 6.1 of the IM WP.

Attachment D, which is included in the IM WP as Figure 5-2a, is a decision chart reflecting the preliminary use of the CPT/ROST data as well as the phased step-out monitoring well installation approach proposed for COC delineation. This decision chart reflects the decision process originally proposed in the IM WP and is provided solely for the purposes of clarifying our proposed delineation work.

D. Paragraph one, page 13, discusses the decision process whether to continue investigation of LNAPL or dissolved phase contamination. Investigation will continue until either (1) LNAPL or dissolved phased constituent detections do not exceed Applicable PRGs; in which case a permanent monitor well may be installed or (2) the boundary of the IM Area is reached.

(1) The test shall be revised to state that if dissolved phase constituents do not exceed the PRGs a permanent monitor well will be installed at that location;

(2) The text shall be revised to state that if the IM boundary is reached and the constituent concentration exceeds the applicable PRG the decision process will continue to investigate to determine the extent of LNAPL and/or dissolved phase contamination.

Section 5.2, page 15, paragraph 3: Characterization of extent. See above comment (2).

Response D(1):

For purposes of clarity, we are adding the following text to sections 5.1 and 5.2 of the IM WP: "The following procedure will be applied in the IM Area:

1. CPT/ROST, and benzene and toluene samples will be collected from temporary sampling points to identify locations of permanent sampling points.
2. Piezometers will be installed in locations where LNAPL is not expected, and new monitoring wells will be installed for groundwater sampling within the IM Area.
3. Piezometer measurements will be used to delineate LNAPL and samples from monitoring wells will be collected to delineate AOC Skinner List COCs.
4. If any piezometer detects LNAPL, an additional step-out piezometer will be installed.
5. If any COC concentration is greater than the respective PRG within the IM Area, at least one additional step-out monitoring well will be installed within the IM Area for further AOC Skinner List COC sampling."

This information is a summary of the procedures originally set out in sections 5.0 through 5.2 of the IM WP.

Response D(2): With respect to part D, El Paso will cease its IM investigation work at the point that it reaches the boundaries of the IM Area. To the extent that the contamination extends outside of the IM Area and further onto the Elementis property, the contamination will be investigated during the Facility Investigation. The Facility Investigation is intended to address "contamination at that part of the Facility not addressed in the IM Investigation…." See VII.2.A.(i).

4. **Section 5.3.9, Development of Monitor Wells and Piezometers, page 22.**

Section 5.3.7 does not discuss turbidity measurements to determine if well development is successful. Typically it is desirable to achieve low turbidity measurements from the well as a means of establishing that sufficient fines have been removed from the well. Section 5.3.9, Collection of Groundwater Samples, includes turbidity as a criterion for determining stabilization of well purging prior to sampling; turbidity must be less than 20 nephelometric turbidity units (NTUs) which could also be used as a well development criterion.

Revise the Work Plan to include more detailed procedures, including use of turbidity measurements, for evaluating the development of the monitoring wells.

Response: The use of turbidity for evaluating the development of monitoring wells can be complicated when the well is screened across a wide range of materials, particularly including zones of interbedded clays, silts and sands. IM Area well boring logs indicate that the sand within the first water bearing zone contains a significant amount of fines, designated by a clayey or silty sand descriptor. Visual descriptions, well volumes, and turbidity readings will be recorded during well development activities so that wells with relatively high turbidity may be evaluated further during the IM investigation. Section

5.3.9 of the IM WP describes parameter collection procedures for groundwater sampling activities.

5. **Section 5.3.9, Collection of Groundwater Samples, pages 23-25:**

The fourth full paragraph on page 24 indicates that readings will be measured with a flow cell for temperature, conductivity, pH, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity. This paragraph continues onto page 25, where it presents stabilization criteria for all of the above parameters, except temperature.

Provide the stabilization criterion for temperature.

Response: The Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA/540/S-95/504 – 1996) state, "The water quality indicator parameters monitored can include pH, redox potential, conductivity, dissolved oxygen (DO) and turbidity." Temperature is not identified as a potential indicator parameter in this document, in part due to the fact that the fluctuation in temperature is often due to ambient air temperature, intensity of the sun, and the ambient temperature of the actual flow through cell. Sufficient data to determine the stabilization of water quality is provided by monitoring conductivity, pH, DO, ORP, and turbidity. Temperature will be recorded during purging activities, but is not proposed to be a determining factor in groundwater stabilization. Section 5.3.9 is revised to reflect our response to this comment.

6. **Section 5.3.10, Decontamination, Small-Scale Equipment, page 27:**

A. The decontamination procedure for small-scale equipment does not include a hexane or isopropanol rinse following the potable water rinse. Given that the levels of contamination are expected to be quite high in many of the wells, it will be important to follow procedure that will ensure equipment is thoroughly decontaminated between sampling points.

Revise the Work Plan to include a hexane or isopropanol rinse after the potable water rinse in the decontamination procedures in Section 5.3.10

B. *Also, the discussion of Small-Scale Equipment does not discuss how the flow cell will be decontaminated after its use at each well.*

Provide the decontamination method that will be used for the flow cell.

Response: The flow through cell will be decontaminated by using a clean tap water and laboratory detergent wash, using a brush to remove particulate matter, followed by a potable water rinse, followed by a distilled water rinse. This will be followed by an isopropanol mist/rinse followed by a distilled water rinse. The use of hexane is not recommended by multiple manufacturers for cleaning the plastic surface of the flow through cell.

An isopropanol mist/rinse followed by a final distilled water rinse will be conducted following decontamination procedures defined in Section 5.3.10. Due to this change, a potable water rinse may precede the isopropanol mist/rinse.

Section 5.3.10 is revised to reflect our response to this comment.

7. **Table 3-1, Fluid Level Measurements and Groundwater Elevations in Wells at or in the Vicinity of the IM Area:**

The product thickness measurements vary significantly in several of the wells. For example, over a period of less than two years, the product thickness varied from not detectable to 3.95 feet in well MW-U29, from 0.4 feet to 3.03 feet in well MW-U30, from not detectable to 4.95 feet in well MW-U31, 0.02 feet to 1.28 feet in well R2, and from 0.01 feet to 2.75 feet in well R4. It is unclear if these variations are related to product movement down gradient toward the Inner Harbor, seasonal variations, or other factors. However, it will be important to evaluate the new monitoring wells over a period of time to allow for variations in the well data to be measured. It is also important to note that single measurements made in temporary or permanent monitoring wells may not be definitive.

The Work Plan shall be revised to ensure that product thickness variations over time will be taken into account in future evaluations of the conceptual site model.

Response: Table 3-1 of the IM WP Groundwater Investigation Report summarizes product thickness measurements collected from IM Area wells between 1999 and 2002. Many of these wells are recovery wells. Variation in product thickness in recovery wells may be a result of historical pump settings and operation. There does not appear to be significant variation in product thickness measurements in non-pumping wells in the IM Area. Please note that, although not footnoted as pumping wells within the previously submitted Table 3-1, RWEC-03, RWEC-04, and RWEC-08 should be designated as pumping wells. We are submitting a revised Table 3-1 (Attachment J) to the IM WP to reflect this correction. Regardless, these wells are outside the boundary of the IM Area and will be evaluated further as part of the Facility Investigation. El Paso will also evaluate product thickness measurements in the IM Area in future groundwater monitoring events, including data collected during the IM groundwater investigation.

8. **Appendix B, Health and Safety Plan, Section 6.0, Environmental Monitoring Plan, page 37:**

Section 6.0 presents the following statements in bolded lettering in regard to the Environmental Monitoring Plan summary table: "This table depicts estimates of monitoring approaches only. Contact the BC H&S [Brown & Caldwell Health and Safety] staff for a finalized application of monitoring guidelines to actual field conditions."

This reference indicates that the summary table does not present the finalized values for the Environmental Monitoring Plan. The monitoring values shall be clarified and Section 6.0 revised accordingly.

Response: The estimates of monitoring approaches and values in Section 6.0 of the Health and Safety Plan are final. Appropriate revisions have been made to Section 6.0 of Appendix B to the IM WP.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
GROUNDWATER AND ECOSYSTEMS RESTORATION DIVISION
P.O. BOX 1198 • ADA, OK 74820

March 16, 2010

OFFICE OF
RESEARCH AND DEVELOPMENT

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HAZARDOUS WASTE
ENFORCEMENT BRANCH

MEMORANDUM

SUBJECT: El Paso Corporation, Corpus Christi, Texas (10RC06-001)
AOC Interim Measures (IM) Implementation Work Plan, Rev. 3

FROM: Steven D. Acree, Hydrologist
Applied Research & Technical Support Branch

TO: Sue Westbrook, RPM
U.S. EPA, Region 6

As requested, the referenced work plan has been reviewed by Dr. Bruce Pivetz, Shaw Environmental & Infrastructure, Inc., and me. Shaw is an on-site contractor providing technical support services to this laboratory. The proposed remedial design is a significant improvement over the previous system design and addresses previous concerns. The following specific comments regarding the proposed performance monitoring system are provided for your consideration.

1. Section 6.1 (p. 6-2)
The plan states that the hydraulic surface will be recorded at *four* locations in the Northeast Area. However, Table 6-1 and section 6.1.1 (bottom of page 6-2) list only *three* wells. It is also noted that two of the three proposed locations are extraction wells (i.e., MW-U29 and MW-U32). Hydraulic heads measured in extraction wells may not fully reflect the hydraulic head in the aquifer immediately adjacent to the well due to borehole skin effects. It is recommended that pressure transducers be installed in PZ-05, PZ-06 and MW-U28 to confirm that groundwater elevations are below the elevation of surface water in the shipping channel.

2. Section 6.1 (p. 6-2)
This section states that dissolved phase concentrations will be monitored at *three* locations within and along the periphery of the plume. However, Table 6-1 and section 6.1.2 (bottom of page 6-2) list *four* wells in the 1st WBZ for quarterly monitoring. Clarification is recommended. It is also recommended that monitoring well EMW-U5T be included in the list of wells where dissolved contamination will be monitored, if it is located on the channel side of the barrier wall.

3. Section 6.1.1 (p. 6-2)
The plan states that water levels will be measured quarterly in all wells in the IM Area where water level measurements can be obtained. For clarity, the proposed wells should be listed in a table.

4. Section 6.1.2 (p. 6-3).
It is indicated that samples will be collected semiannually for dissolved phase contamination analysis from three wells in the 1st WBZ and three wells in the 2nd WBZ (those wells are listed). However, Table 6-1 lists four wells in each WBZ (the additional wells are EMW-U7B in the 1st WBZ and OW-L15 in the 2nd WBZ). Clarification is recommended.

5. Section 6.1.2 (p. 6-3)
The plan states that groundwater samples may be obtained from other wells within and surrounding the IM Area as part of the semiannual sampling events. It is recommended that the plan be more specific as to which wells will be sampled or the criteria used to select wells.

6. Section 6.2 (p. 6-4)
It is indicated that the Quarterly Reports will include the LNAPL thickness measurements and the water table elevations. Section 6.1.1 had indicated that the reported water table elevations will be elevations corrected for LNAPL thickness. It is recommended that the Quarterly Reports contain tables with both corrected and uncorrected measurements. That is, the actual field-measured water table elevations (i.e., water/LNAPL interface elevations), LNAPL surface elevation, and LNAPL thicknesses, should be reported in addition to the corrected water table elevation. This will facilitate understanding and review of the reports and field conditions.

7. Section 6.2 (p. 6-4)
The measurement frequency for the well-specific extraction rates is not specified but should be included in the plan. It is recommended that a weekly frequency be considered for reporting purposes.

8. Figure 6-1
Well EPZ-05 is indicated as having semi-annual sampling. However, section 6.1.2 and Table 6-1 indicate that quarterly sampling for groundwater quality is planned for this well. Quarterly sampling appears to be appropriate.

If you have any questions concerning this review, please do not hesitate to call me (580-436-8609) at your convenience. We look forward to future interactions with you concerning this and other sites.

cc: Mike Fitzpatrick (5303P)
Vince Malott, Region 6
Terry Burton, Region 6
Gregory Lyssy, Region 6