

**EPA Superfund
Explanation of Significant Differences:**

**CRYSTAL CHEMICAL CO.
EPA ID: TXD990707010
OU 01
HOUSTON, TX
03/19/1997**

EPA Superfund
Explanation of Significant
Differences for
Record of Decision:

Crystal Chemical Company Superfund Site
Houston, Texas
03/19/97

CRYSTAL CHEMICAL COMPANY SUPERFUND SITE

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**EXPLANATION OF SIGNIFICANT DIFFERENCES
TO THE SEPTEMBER 1990 RECORD OF DECISION
CRYSTAL CHEMICAL COMPANY SUPERFUND SITE
HOUSTON, TEXAS**

I. STATEMENT OF PURPOSE

This document explains the differences between the ground water remedy being implemented and the ground water remedy identified in the September 1990 Record of Decision (1990 ROD) for the Crystal Chemical Company Superfund Site.

During the course of the design for the extraction and treatment of arsenic-contaminated ground water remedy identified in the 1990 ROD, the U. S. Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) determined that restoration of the ground water is technically impracticable for portions of the Crystal Chemical Company Superfund site. Therefore, EPA has determined that the applicable or relevant and appropriate requirement (ARAR) for ground water restoration to the Maximum Contaminant Level (MCL) of 50 $\mu\text{g/l}$ for arsenic will be waived and a slurry wall will be constructed around the portions of the site where ground water cannot be restored. The extraction and treatment of arsenic-contaminated ground water remedy will be implemented on the remainder of the site, as specified in the 1990 ROD.

II. INTRODUCTION

The Crystal Chemical Company Superfund site (Crystal Chemical site) is located at 3502 Rogerdale Road, in southwestern Houston, Harris County, Texas. The Crystal Chemical site is bound on the west by the Harris County Flood Control Channel and lies immediately south of the Westpark Drive extension (Figure 1).

EPA is the lead agency for the Crystal Chemical site, and the State of Texas, through TNRCC, has been involved in all aspects of site activities. Southern Pacific Transportation Company has been identified as one of the potentially responsible parties for the Crystal Chemical site, and EPA has authorized Southern Pacific Transportation Company through an Administrative Order on Consent and an Unilateral Administrative Order to design and implement the ground water remedy for the Crystal Chemical site, as set forth in the 1990 ROD.

This Explanation of Significant Differences (ESD) is prepared in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Act, 42 U.S.C. $\text{\textcircled{0}}$ 9617(c), which provides that, after adoption of a final remedial action plan, if any remedial action is taken and if such action differs in any significant respects from the final plan, EPA shall publish an explanation of the significant differences and the reasons such changes were made.

This ESD is necessitated by the findings made during the course of the remedial design of the ground water extraction and treatment remedy. The results of the design investigations and the findings are presented in the Assessment of the Technical Impracticability of Ground-Water Remediation, February 1996 for the Crystal Chemical site (TI Assessment). Specifically, it has been determined that restoration of the arsenic-contaminated ground water is technically impracticable due to hydrogeologic as well as contaminant-related factors for portions of the Crystal Chemical site. Therefore, EPA has determined that the ARAR for the ground water restoration to the MCL 50 $\mu\text{g/l}$ for arsenic will be waived and a slurry wall will be constructed to protect human health and the environment on the portions of the site that cannot be restored. These alternative remedial strategies were selected from the list of ground water contingency measures identified in the 1990 ROD (pages 95 and 96). The ground water extraction and treatment remedy will be implemented on the remainder of the site, as specified in the 1990 ROD.

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR $\text{\textcircled{0}}$ 300.825(a)(2), this ESD and the supporting information EPA relied upon in preparing the ESD including the TI Assessment, will become part of the Administrative Record for the Crystal Chemical site. The Administrative Record file for the Crystal Chemical site is available at the following locations:

U.S. EPA, Region 6
Library, 12th floor (6MD-II)
1445 Ross Avenue
Dallas, Texas 75202-2733
(214) 665-6424 or 665-6427
facsimile (214) 665-2146
Hours of Operation: Monday through Friday 7:30 am-4:30 pm

Judson Robinson-Westchase Library
3223 Wilcrest
Houston, Texas 77042
(713) 784-0987
Hours of Operation: Monday 12:00 pm-9:00 pm; Tuesday 10:00 am-9:00 pm; Wednesday
10:00 am-6:00 pm; Thursday 12:00 pm-9:00 pm; and, Friday/Saturday 10:00 am-6:00 pm

Texas Natural Resource Conservation Commission
12118 North IH 35
Technical Park Center, Room 190, Building D
Austin, Texas 78753
(512) 239-2920
Hours of Operation: Monday through Friday 8:00 am-5:00 pm

III. SITE HISTORY AND ORIGINALLY SELECTED REMEDIES

Crystal Chemical Company produced arsenical, phenolic, and amine-based herbicides from 1968 to 1981. Operation and maintenance problems at the Crystal Chemical facility during the late 1970s resulted in several violations of the State of Texas' environmental standards, and in September 1981, Crystal Chemical Company filed for bankruptcy and abandoned the site. In 1983, the Crystal Chemical property was added to the National Priorities List, qualifying the site for Investigation and Remediation under CERCLA, more commonly known as Superfund.

In September 1990, EPA issued the ROD that addressed soil and ground water contamination. The selected remedy for soil called for the excavation of offsite soils contaminated with arsenic greater than 30 parts per million (ppm), treating all the soils contaminated with arsenic greater than 300 ppm with a process called in-situ vitrification, and capping the entire site after the soils treatment had been completed. Due to the unavailability of the in-situ vitrification technology, EPA selected a new soil remedy in a ROD amendment issued in June 1992. The soil consolidation and capping remedy was completed in September 1995.

The remedy selected in the 1990 ROD for ground water called for the extraction and treatment of arsenic-contaminated ground water. The remediation goal specified in the 1990 ROD for the affected ground water zones is 50 Ig/l, the MCL for arsenic. The 1990 ROD also included several contingency measures that could be implemented if an extraction and treatment system would not produce the remediation goals set for the Crystal Chemical site.

IV. DESCRIPTION OF AND BASIS FOR THE SIGNIFICANT DIFFERENCE

The 1990 ROD states that the goal of the ground water remedy is to restore the ground water to a useable state, i.e., removing the arsenic to the MCL of 50 Ig/l. However, the 1990 ROD indicates that due to the uncertainty as to whether the remedy will be able to meet the remediation goal of the MCL for arsenic, contingency measures and goals may replace the selected remedy and goals. The contingency measures specified in the 1990 ROD were:

- 1) discontinuing operation of extraction wells in areas where remediation goals have been attained;
- 2) alternating pumping at wells to eliminate stagnation points; and/or,
- 3) establishing an Alternative Concentration Limit for arsenic provided compliance with CERCLA Section 121 (d)(2)(B)(ii) can be demonstrated;
- 4) waiving the ground water ARAR for those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;
- 5) implementing low level pumping as a long-term gradient control or construction of a containment measure such as a slurry wall; and/or,

- 6) implementing additional source control treatment to further reduce arsenic migration to ground water.

At the time of the 1990 ROD, EPA called for investigations and evaluations necessary to design the extraction and treatment system for the ground water remedy. Through an Administrative Order on Consent, EPA authorized Southern Pacific Transportation Company to undertake, with EPA oversight, the investigations and evaluations necessary to design an efficient and effective ground water extraction and treatment system.

During the course of the design investigations and evaluations, data indicated that portions of the site's contaminated ground water zones could not be restored. The portions of the site that cannot be remediated (the technical impracticability (TI) zone) consists of splay deposits, or off-channel deposits. These splay or off-channel deposits consist of sandy material with an abundance of fine-grained material (clay and/or silt). The other portion of the site, which is not part of the TI zone and is therefore not affected by this ESD, consists of a subsurface stream channel. The subsurface stream channel contains more sand and less fine-grained material, and this portion of the site can likely be restored through the extraction and treatment remedy based on the information collected and evaluated (Figures 2 and 3).

The findings of the investigations and evaluations are presented in the TI Assessment for the Crystal Chemical site. Factors providing the basis for the TI waiver include the following:

- 1) The complexity of the site geology;
- 2) the majority of the arsenic is in the fine-grained splay or off-channel deposits;
- 3) lab and field testing indicates that the arsenic has adsorbed on to the fine-grained sediments of the splay or off-channel deposits;
- 4) over 700 million gallons of water would have to be extracted to try to achieve the remediation goal;
- 5) the slow release of arsenic from the fine-grained sediments will limit the rate and quantity of arsenic that can be removed by extracting the ground water; therefore,
- 6) a range from 200 to 650 years is the minimum time estimated to restore the ground water zones, if they could be restored at all.

The timing of this TI decision is consistent with EPA's current program guidance on such waivers, "Guidance for Evaluating the Technical Impracticability of Ground Water Restoration (OSWER Directive 9234.2-25, September, 1993). The guidance states that a TI decision may be made prior to implementing the remedy provided such a TI decision is adequately supported by detailed site-specific data and analyses.

The detailed technical demonstration that serves as the basis for the TI decision at the Crystal Chemical site is provided in the TI Assessment, prepared by Southern Pacific Transportation Company. The TI Assessment presents a detailed analysis of information collected prior to the issuance of the ROD, as well as information collected during the design investigations.

During the course of the implementation of the soil remedy (completed in September 1995), contaminated soils associated with two of the three onsite wastewater storage/treatment ponds were excavated and placed under the engineered, low permeability cap that was constructed over the entire Crystal Chemical site. Based on the depth of contamination, excavation from the third pond was not necessary. All source control measures that could reduce the migration of arsenic to the ground water have been implemented at the Crystal Chemical site. Therefore, according to the ROD, the ground water contingency measure calling for the implementation of additional source control (ROD ground water contingency measure #6) has been carried out.

As a result of EPA's conclusion that restoration of the ground water is technically impracticable for portions of the Crystal Chemical site, EPA has determined that the ARAR for ground water restoration will be waived (ROD groundwater contingency measure # 4) and a slurry wall will be constructed around the portions of the site where ground water cannot be restored (ROD ground water contingency measure #5). See Figure 3 for the illustration of the TI zone and

location of the slurry wall. The extraction and treatment of arsenic-contaminated ground water remedy will be implemented on the remainder of the site.

Although the 1990 ROD indicates that there will be operation and monitoring of the extraction and treatment system for 10 years prior to consideration of the contingency measures, implementation of the extraction and treatment remedy and monitoring for a 10-year period is not necessary to determine that the remedy is incapable of achieving the remediation goal in the TI zone. EPA already has adequate information to support its determination that a TI waiver is appropriate.

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the TI Assessment and agrees that the data support the findings that ground water restoration on portions of the Crystal Chemical site is technically impracticable. TNRCC has also concurred with EPA regarding the construction of the slurry wall around the TI zone.

V. PUBLIC PARTICIPATION ACTIVITIES

During the preparation of the ROD, EPA held a public comment period from June 11, 1990 through July 11, 1990. Informal open houses were held in the Houston area on two separate occasions: April 10 and June 5, 1990. Additionally, a public meeting was held on June 21, 1990. EPA responded to comments received during the public meeting as well as the public comment period in the Responsiveness Summary, which is an attachment to the ROD.

During the preparation of the ROD amendment for the soil remedy, EPA held a public comment period from February 24, 1992 through March 24, 1992. An informal open house was held on February 20, 1992, with the public meeting being held on March 19, 1992. EPA responded to comments received during the public meeting as well as the public comment period in the Responsiveness Summary, which is an attachment to the June 1992 ROD amendment for the soil remedy.

An open house was held on October 13, 1994 to update the community on the remedial designs for the soil and ground water remedies for the Crystal Chemical site.

A notice of this Explanation of Significant Differences and a summary of the differences between the ground water remedy being proposed and the ground water remedy identified in the 1990 ROD was published in the Houston Chronicle on July 12, 1996. Approximately 1300 fact sheets summarizing the proposed changes and requesting public participation were mailed, and EPA invited public comment from July 15, 1996 until August 15, 1996. All Written comments submitted have been responded to in the attached Responsiveness Summary.

VI. STATE COMMENTS

The State's letter expressing its concurrence with this ESD is attached.

VII. STATUTORY DETERMINATION

Considering the new information developed during the remedial design for the ground water remedy described in the ROD, specifically the technical impracticability of restoring the ground water on portions of the site, EPA believes that the remedy remains protective of human health and the environment. Furthermore, the 1990 ROD remains protective and continues to meet ARARs identified in the 1990 ROD that are not being waived. The revised remedy utilizes permanent solutions to the maximum extent practicable for this site and is cost-effective. It complies with the National Oil and Hazardous Substances Pollution Contingency Plan and other federal and state requirements that are applicable or relevant and appropriate to this remedial action.

APPENDIX A

RESPONSIVENESS SUMMARY FOR EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE SEPTEMBER 1990 RECORD OF DECISION CRYSTAL CHEMICAL COMPANY SUPERFUND SITE HOUSTON, TEXAS

The public comment period for the Explanation of Significant Differences to the Crystal Chemical Company Superfund site September 1990 Record of Decision was held from July 15, 1996 to August 15, 1996. The EPA received no requests for a public meeting during the public comment period. The only comments received during the public comment period were submitted by Vinson & Elkins, Attorneys at Law, on behalf of their client Mr. Theodore Levy. Mr. Levy, now deceased, owned property north of the site. These comments are being addressed in this Responsiveness Summary.

Comment 1: EPA must use the [Record of Decision] Amendment process to grant the [technical impracticability] waiver.

The "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (OSWER Directive 9234.2-25, September 1993) identifies an Explanation of Significant Differences (ESD) as a mechanism by which a technical impracticability (TI) waiver can be invoked. The directive does state that public notice and opportunity for comment should be provided if an ESD is used to grant the TI waiver. Pursuant to the directive, the EPA has provided public notice and opportunity for comment since an ESD is being used to invoke the TI waiver.

The requirements for issuing an ESD and issuing a Record of Decision (ROD) Amendment pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) differ essentially in that a ROD Amendment is subject to public comment. The ROD issued in September 1990 for the Crystal Chemical Company Superfund site identified several ground water contingency measures that could be implemented if an extraction and treatment system would not attain the remediation goals set for the Crystal Chemical Company site, and opportunity for public comment was provided for the ground water contingency measures identified in that 1990 ROD. The contingency measures in the 1990 ROD included containment through use of a slurry wall. The EPA also issued a notice of availability and brief description of the proposed ESD for the Crystal Chemical Company site ground water remedy in the Houston Chronicle, a major local newspaper of general circulation. Approximately 1300 fact sheets summarizing the changes and requesting public participation were mailed. The proposed ESD and supporting information were available to the public in the administrative record.

Unfortunately, property adjacent to the site has been affected by the ground water contamination associated with the Crystal Chemical Company site. Regardless of whether the TI waiver was invoked or the 1990 ROD extraction and treatment remedy was implemented on all portions of the site, the adjacent property would be affected by the remedial action for the ground water contamination. Under the design plan for the extraction and treatment remedy, installation of two or three extraction wells were planned on the adjacent property for long-term operation. During the development of this design, however, it was determined that the extraction and treatment remedy would be unable to attain EPA's goal of restoring contaminated ground water at the Crystal Chemical Company site within a reasonable time frame. Therefore, after careful consideration, the EPA has selected an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies the statutory and regulatory requirements of the Superfund program. This alternative remedial strategy includes the construction of a slurry wall across Westpark Drive and onto the adjacent property. The slurry wall will contribute to the long-term management of contaminant migration by limiting the further contamination of ground water. Effective source containment will permit restoration of the portion of the aqueous plume that lies outside the containment area.

Comment 2: The TI waiver cannot be granted because EPA has not demonstrated that an enhancement or augmentation of the selected remedy could not attain the groundwater cleanup standard.

With the issuance of this ESD, the EPA concludes the culmination of approximately thirteen years of investigations and studies in connection with the Crystal Chemical Company site.

Pursuant to the "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (OSWER Directive 9234.2-25, September 1993), the Assessment of the Technical Impracticability of Ground-Water Remediation for the Crystal Chemical Superfund Site, February 1996 (TI Assessment) was drafted by Southern Pacific Transportation Company in consultation with EPA, and was ultimately approved by the EPA. EPA representatives from this regional office as well as from EPA's headquarters in Washington, D.C., participated in the evaluation and review of the Crystal Chemical Company site and of this document.

Representatives from EPA's Office of Research and Development, Technical Support Project at the Robert S. Kerr Environmental Research Laboratory also fully participated in the evaluation and review of the site, the ground water remedy, the ground water contingency measures, and the TI waiver request.

In pursuit of the statutory preference for treatment and a permanent solution to the Crystal Chemical Company site, EPA has been receptive to new technologies as well as innovative approaches to addressing the contamination at the Crystal Chemical Company site during the past thirteen years. In portions of the site where it has been determined that restoration of the ground water is technically practicable, a contaminated ground water extraction and treatment system has been constructed and is operational. It is estimated that to reach the ground water remediation goals for areas outside the proposed slurry wall, the water treatment plant will be treating the extracted ground water (at approximately 5 - 10 gallons per minute) for the next 15 years.

During the development of the TI Assessment for areas of the site where groundwater restoration is not technically practicable, initial bench tests (e.g., soil column leaching tests) to assess the viability of aquifer extraction enhancement were conducted. In fact three methods for the in-situ treatment of arsenic-bearing ground water were postulated: 1) a soluble ferric iron complex would be injected into the contaminated aquifer; breakdown of the complex would allow precipitation of ferric hydroxide at near-neutral pH, and arsenic would be coprecipitated, 2) ground water pumped from the aquifer would be treated on the surface to produce a ferric hydroxide precipitate containing arsenic, the ferric hydroxide, if present as a colloidal suspension (a hydrosol), could be injected into the contaminated aquifer; and 3) aqueous ferric sulphate would be injected into the aquifer in a geometric pattern with compressed air to oxidize resident arsenate to arsenite while reacting with both inorganic and organic arsenic species. The testing and studies concluded that arsenic could not be recovered from saturated soils to any significant degree. A multi-year testing program (from further lab and bench scale tests to actual field pilot tests) would be needed in order to design a full-scale aquifer remediation program using chemically enhanced desorption or dissolution and mobilization of the arsenic at the Crystal Chemical Company site. Even after designing a full scale system, uncertainties regarding the ability of this remedial strategy to achieve the ground water remedial goals in the field would remain due to hydrogeologic factors (i.e., subsurface heterogeneities and abundance of fine grain materials [clay and/or silt]) and contaminant-related factors.

As an attachment to the comments, a contractor provided a document which discussed the possibility of similar enhancements to the extraction and treatment remedy for the Crystal Chemical Company site. The contractor indicated that its "analysis and groundwater-flow modeling of the Crystal Chemical situation clearly showed that hydraulic control of ground water flow and transport could be achieved at the Crystal Chemical site through proper design, number, and placement of wells." Previous modeling done for the Crystal Chemical Company site in relation to the TI evaluation showed that a range from 200 to 650 years is the minimum time estimated to restore the ground water zones, if they could be restored at all. Although the modeling done in relation to the TI evaluation did not include the addition of a chemical agent to aid in the extraction of contamination, the fact that it predicted very long restoration time frames (e.g., longer than 250 years) seems to indicate the presence of hydrogeologic, and/or contaminant-related constraints to remediation. In addition, nowhere in the contractor's document is a single example cited where arsenic of any form has been successfully removed from an aquifer to the Crystal Chemical Company site remediation goal or to any other goal. Therefore, until the conclusion and evaluation of a multi-year testing program as discussed above, the ability of the contractor's proposed insitu extraction enhancements to attain the ground water remediation goals would not be known. The EPA has determined that it is more appropriate to go forward with a remedy which has been demonstrated to be effective.

Comment 3: The administrative record does not support the action EPA proposed because it does not include any evidence indicating an enhanced desorption remedy is impracticable.

The administrative record does contain [as required in CERCLA § 113(k)(1)] the documents that form the basis for the selection of the response action. As discussed in the Office of Solid Waste and Emergency Response Directive # 9833.3A-1 (Final Guidance on Administrative Records for Selecting CERCLA Response Actions), the administrative record file has been amended to include all of the comments submitted during the formal public comment period. The information submitted during the formal public comment period does not support the proposition that enhanced desorption is practicable for the Crystal Chemical Company site. The speculative nature of the technology and the lack of specific and/or demonstrated application to the Crystal Chemical Company site does not justify the additional time and resources needed to pursue enhanced desorption, especially given the thirteen years already expended in studying the Crystal Chemical Company site in pursuit of a remedy. The EPA has selected an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies the statutory and regulatory requirements of the Superfund program.

APPENDIX B

STATE OF TEXAS CONCURRENCE LETTER

Barry R. McBee, Chairman
R. B. "Ralph" Marquez, Commissioner
John M. Baker, Commissioner
Dan Pearson, Executive Director

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Protecting Texas by Reducing and Preventing Pollution

June 27, 1996

SENT VIA FACSIMILE & CERTIFIED MAIL

Mr. Chris Villarreal
Remedial Project Manager
Crystal Chemical Superfund Site
U.S. Environmental Protection Agency
Region 6, 6H-ET
Allied Bank Tower
1445 Ross Avenue
Dallas, TX 75202-2733

RE: Explanation of Significant Differences,
Crystal Chemical Site, Houston, Texas

Dear Mr. Villarreal:

This letter serves to communicate Texas Natural Resource Conservation Commission (TNRCC) concurrence with the Explanation of Significant Differences (ESD) for the Crystal Chemical Superfund Site in Houston, Texas. The TNRCC believes that the remedial strategy for the ground water presented in the ESD is supported by the contingency measures outlined in the 1990 Record of Decision. Furthermore, the TNRCC agrees with the U. S. Environmental Protection Agency's belief that the remedy utilizes permanent solutions to the maximum extent practicable, is cost-effective, and remains protective of human health and the environment.

Please contact me with any questions concerning these comments or any other issues at the Crystal Chemical site at (512) 239-2030.

APPENDIX C
ADMINISTRATIVE RECORD INDEX

April 4, 1996

Mr. James Wittwer
Work Assignment Manager
TechLaw, Inc.
750 N. St. Paul Street, Suite 600
Dallas, Texas 75201

RE: Crystal Chemical Site Explanation of Significant Differences
Administrative Record Addendum Index
ESS VI Work Assignment No. ESS06014

Dear Mr Wittwer:

Please find, enclosed, a copy of the index for the Crystal Chemical Site Explanation of Significant Differences Administrative Record Addendum. The index will be delivered to Mr. Chris Villarreal, Remedial Project Manager, for placement in the site files. The AR addendum index and addendum documents were mailed to the repository on April 2, 1997.

This document has been reviewed according to DPRA's Quality Assurance Program Plan and Quality Assurance/Quality Control procedures. If you have any questions or comments about the index, feel free to contact me at (214) 969-6977.

Prepared for
United States Environmental Protection Agency

Region 6

FINAL

Administrative Record Addendum Index

CRYSTAL CHEMICAL COMPANY SUPERFUND SITE
EPA ID No. TXD990707010

Explanation of Significant Differences
For Record of Decision

ESS VI
Work Assignment No. ESS06014

Chris Villarreal
Remedial Project Manager
U.S. EPA Region 6

Prepared by

DPRA Incorporated
717 North Harwood Street
Suite 1300
Dallas, Texas 75201

P. 6214.0617
March 19, 1997

ADMINISTRATIVE RECORD INDEX
ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010

DOCUMENT NUMBER: 007369 - 007398
DOCUMENT DATE: 03/31/92
NUMBER OF PAGES: 030
AUTHOR: Michael C. Barra, Assistant Regional Counsel
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Charlotte L. Neitzel, Attorney for Southern Pacific
Transportation Company (Southern Pacific Lines), Law Firm of
Holme Roberts & Owen

DOCUMENT TYPE: Cover Letter w/Enclosure
DOCUMENT TITLE: Signed Administrative Order on Consent, Remedial Design for
groundwater remedy (Docket No. VI-11-92)

DOCUMENT NUMBER: 007399 - 007470
DOCUMENT DATE: 9/03/92
NUMBER OF PAGES: 072
AUTHOR: Allyn M. Davis, Director, Hazardous Waste Management Division
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: David W. Long, Assistant General Counsel, Law Department
Southern Pacific Lines

DOCUMENT TYPE: Cover Letter w/Enclosure
DOCUMENT TITLE: Administrative Order, Docket No. VI-15-92, Remedial
Design/Remedial Action

DOCUMENT NUMBER: 007471 - 007683
DOCUMENT DATE: 7/22/94
NUMBER OF PAGES: 213
AUTHOR: Industrial Compliance
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 1
DOCUMENT TITLE: "Geochemical/Geohydrologic Report - Groundwater Remedial
Design."

DOCUMENT NUMBER: 007684 - 008350
DOCUMENT DATE: 07/22/94
NUMBER OF PAGES: 667
AUTHOR: Industrial Compliance
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 2, Appendices 1-9
DOCUMENT TITLE: "Geochemical/Geohydrologic Report - Groundwater Remedial
Design, Volume 2"

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010

DOCUMENT NUMBER: 008705 - 009268
DOCUMENT DATE: 07/22/94
NUMBER OF PAGES: 564
AUTHOR: Industrial Compliance
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 3, Appendices 10-15
DOCUMENT TITLE: Geochemical/Geohydrologic Report - Groundwater Remedial Design Volume 3"

DOCUMENT NUMBER: 008351 - 008704
DOCUMENT DATE: 08/17/94
NUMBER OF PAGES: 354
AUTHOR: Paul Kuhlmeier, Director of Remedial Technology, Environmental Affairs Group
COMPANY/AGENCY: Southern Pacific Lines
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Cover Letter w/Report
DOCUMENT TITLE: "Treatment of Arsenic-Contaminated Groundwater from the Crystal Chemical Superfund Site"

DOCUMENT NUMBER: 009269 - 009281
DOCUMENT DATE: 09/28/94
NUMBER OF PAGES: 013
AUTHOR: John G. Bins, Project Manager
COMPANY/AGENCY: Industrial Compliance (Consultant for Southern Pacific Transportation Company)
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Cover Letter w/Enclosure
DOCUMENT TITLE: Revised Work Plan for Technical Evaluation of Arsenic Extraction

DOCUMENT NUMBER: 009282 - 009319
DOCUMENT DATE: 03/20/95
NUMBER OF PAGES: 038
AUTHOR: Hydrologic Consultants, Inc.
COMPANY/AGENCY: Consultant for Southern Pacific Lines
RECIPIENT: Southern Pacific Lines and U.S. EPA Region 6
DOCUMENT TYPE: Report
DOCUMENT TITLE: "Treated Groundwater ReInjection Option Report"

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 009320 - 009510
DOCUMENT DATE: 03/20/95
NUMBER OF PAGES: 191
AUTHOR: Hydrologic Consultants, Inc.
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 1
DOCUMENT TITLE: "Soil and Groundwater Model Report"
DOCUMENT NUMBER: 009511 - 009843
DOCUMENT DATE: 03/20/95
NUMBER OF PAGES: 333
AUTHOR: Hydrologic Consultants, Inc.
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 2, Appendices A-H
DOCUMENT TITLE: "Soil and Groundwater Model Report"
DOCUMENT NUMBER: 009844 - 009845
DOCUMENT DATE: 04/20/95
NUMBER OF PAGES: 002
AUTHOR: E.R. (Trey) Collins III, Project Manager
COMPANY/AGENCY: Texas Natural Resource Conservation Commission (TNRCC)
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: TNRCC comments about Southern Pacific Transportation Company's groundwater technical impracticability (TI) waiver for portion of remedy presented in "Assessment of the TI Groundwater Remediation Report"
DOCUMENT NUMBER: 009846 - 009850
DOCUMENT DATE: 04/28/95
NUMBER OF PAGES: 005
AUTHOR: Lisa Price, RPM, Superfund Enforcement Branch
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: David W. Long, Assistant General Counsel, Law Department, Southern Pacific Transportation Company
DOCUMENT TYPE: Cover Letter w/Enclosed Comments
DOCUMENT TITLE: EPA's comments on the "TI Groundwater Remediation Report"

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 009851 - 009852
DOCUMENT DATE: 05/18/95
NUMBER OF PAGES: 002
AUTHOR: Christopher B. Amandes, Attorney for Theodore R. Levy,
COMPANY/AGENCY: Vinson & Elkins
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: TI waiver and public notice requirements
DOCUMENT NUMBER: 009853 - 009856
DOCUMENT DATE: 05/30/95
NUMBER OF PAGES: 004
AUTHOR: Lisa Price, RPM, Superfund Enforcement Branch
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Christopher B. Amandes, Attorney for Theodore R. Levy, Vinson
& Elkins
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Response to Mr. Amandes' 05/18/95 letter
DOCUMENT NUMBER: 009857 - 009860
DOCUMENT DATE: 06/19/95
NUMBER OF PAGES: 004
AUTHOR: Christopher B. Amandes, Attorney for Theodore R. Levy
COMPANY/AGENCY: Vinson & Elkins
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Requests EPA reconsider submitting decision granting Southern
Pacific Lines a TI waiver for groundwater remedy
DOCUMENT NUMBER: 009861 - 009868
DOCUMENT DATE: 08/30/95
NUMBER OF PAGES: 008
AUTHOR: Lisa Price, RPM, Superfund Enforcement Branch
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Christopher B. Amandes, Attorney for Theodore R. Levy, Vinson
& Elkins
DOCUMENT TYPE: Letter w/Enclosures
DOCUMENT TITLE: Re: 1) EPA grants TI waiver for groundwater remedy and 2) EPA requests
access to property to perform response action for contaminated
groundwater

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 009869 - 009871
DOCUMENT DATE: 09/11/95
NUMBER OF PAGES: 003
AUTHOR: Christopher B. Amandes, Attorney for Theodore R. Levy
COMPANY/AGENCY: Vinson & Elkins
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Requests EPA defer request for access to Mr. Levy's property until the agency has granted TI waiver to Southern Pacific Transportation Company

DOCUMENT NUMBER: 009872 - 009874
DOCUMENT DATE: 09/19/95
NUMBER OF PAGES: 003
AUTHOR: Lisa Price, RPM, Superfund Enforcement Branch
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Christopher B. Amandes, Attorney for Theodore R. Levy, Vinson & Elkins
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Clarification of issues addressed in 09/11/95 letter about EPA's request for access to easement portion of Mr. Theodore Levy's property

DOCUMENT NUMBER: 009875 - 009876
DOCUMENT DATE: 09/28/95
NUMBER OF PAGES: 002
AUTHOR: E.R. (Trey) Collins III, Project Manager
COMPANY/AGENCY: TNRCC
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: TNRCC's agreement with TI waiver and with the slurry wall

DOCUMENT NUMBER: 009877 - 009888
DOCUMENT DATE: 10/02/95
NUMBER OF PAGES: 012
AUTHOR: Scott G. Huling, Environmental Engineer, Office of Research and Development
COMPANY/AGENCY: U. S. EPA, Ada, Oklahoma
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Review comments on "Geochemical/Geohydrologic Report, Volume 1", (7/22/94) and "Assessment of the TI of Groundwater Remediation, Volume 1" (95-RO6-001)

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 009889 - 009891
DOCUMENT DATE: 10/26/95
NUMBER OF PAGES: 003
AUTHOR: Cal James and Peter Feldman, Office of Emergency and Remedial Response
COMPANY AGENCY: U.S. EPA Headquarters
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch. U.S. EPA Region 6
DOCUMENT TYPE: Memorandum
DOCUMENT TITLE: Review of the "TI of Groundwater Remediation Report"
DOCUMENT NUMBER: 009892 - 009901
DOCUMENT DATE: 11/11/95
NUMBER OF PAGES: 010
AUTHOR: Aniko Molnar, Environmental Project Manager
COMPANY/AGENCY: Southern Pacific Lines
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Cover Letter w/Letter Report
DOCUMENT TITLE: "Former Evaporation Pond - Source Removal Excavations"
DOCUMENT NUMBER: 009902 - 009903
DOCUMENT DATE: 02/02/96
NUMBER OF PAGES: 002
AUTHOR: David W. Long, Assistant General Counsel, Law Department
COMPANY/AGENCY: Southern Pacific Lines
RECIPIENT: Lisa Price, RPM, Superfund Enforcement Branch, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Submittal of "Assessment of the TI of Groundwater Remediation Report"
DOCUMENT NUMBER: 009904 - 010146
DOCUMENT DATE: 02/02/96
NUMBER OF PAGES: 243
AUTHOR: Hydrologic Consultants, Inc.
COMPANY/AGENCY: Consultants for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 1
DOCUMENT TITLE: "Assessment of the TI of Groundwater Remediation"

ADMINISTRATIVE RECORD INDEX

ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 010147 - 010503
DOCUMENT DATE: 02/02/96
NUMBER OF PAGES: 357
AUTHOR: Hydrologic Consultants, Inc.
COMPANY/AGENCY: Consultant for Southern Pacific Transportation Company
RECIPIENT: Southern Pacific Transportation Company and U.S. EPA Region 6
DOCUMENT TYPE: Report - Volume 2, Appendices A-K
DOCUMENT TITLE: "Assessment of the TI of Groundwater Remediation"
DOCUMENT NUMBER: 010504 -010504
DOCUMENT DATE: 06/27/96
NUMBER OF PAGES: 001
AUTHOR: E.R. (Trey) Collins III, Project Manager, Superfund
Engineering Section, Pollution Cleanup Division
COMPANY/AGENCY: TNRCC
RECIPIENT: Chris Villarreal, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: State concurs with Explanation of Significant Differences
(ESD)
DOCUMENT NUMBER: 010505 - 010515
DOCUMENT DATE: 06/27/96
NUMBER OF PAGES: 011
AUTHOR: EPA Staff
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: Proposed ESD
DOCUMENT TITLE: Proposed ESD to the September 1990 Record of Decision
DOCUMENT NUMBER: 010516 - 010519
DOCUMENT DATE: 07/08/96
NUMBER OF PAGES: 004
AUTHOR: Unspecified
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: EPA Update on Activities at Crystal Chemical Superfund Site
DOCUMENT TITLE: Site Update

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ADDENDUM

SITE NAME: CRYSTAL CHEMICAL COMPANY SITE
SITE NUMBER: TXD990707010
DOCUMENT NUMBER: 010520 - 010549
DOCUMENT DATE: 08/14/96
NUMBER OF PAGES: 030
AUTHOR: Christopher S. Amandes, Attorney for Theodore R. Levy
COMPANY/AGENCY: Vinson & Elkins
RECIPIENT: Chris Villarreal, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Letter w/Enclosures
DOCUMENT TITLE: Comments on behalf of Mr. Theodore R. Levy about proposed ESD
DOCUMENT NUMBER: 010550 - 010552
DOCUMENT DATE: 08/19/96
NUMBER OF PAGES: 003
AUTHOR: Bruce Daniel
COMPANY/AGENCY: TerraNext
RECIPIENT: Chris Villarreal, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Facsimile Transmittal Cover Sheet w/Enclosures
DOCUMENT TITLE: Sworn affidavit from the Houston Chronicle that ESD notice was published on 07/12/96.
DOCUMENT NUMBER: 010553 - 010555
DOCUMENT DATE: 08/29/96
NUMBER OF PAGES: 003
AUTHOR: G. F. Shepherd, Director Environmental Projects
COMPANY/AGENCY: Southern Pacific Lines, Environmental Affairs Group
RECIPIENT: Lisa Price, RPM, U.S. EPA Region 6
DOCUMENT TYPE: Letter
DOCUMENT TITLE: Rebuttal to 08/14/96 Vinson & Elkins letter
DOCUMENT NUMBER: 010556 - 010583
DOCUMENT DATE: 03/19/97
NUMBER OF PAGES: 028
AUTHOR: Jane N. Saginaw, Regional Administrator
COMPANY/AGENCY: U.S. EPA Region 6
RECIPIENT: Public
DOCUMENT TYPE: Decision Document
DOCUMENT TITLE: "Superfund ESD for Record of Decision: Crystal Chemical Superfund Site, Houston, Texas"