1ST FIVE-YEAR REVIEW

SOL LYNN / INDUSTRIAL TRANSFORMER SUPERFUND SITE

HOUSTON, HARRIS COUNTY, TEXAS

October 1990

Prepared by:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733
1st FIVE-YEAR REVIEW
SOL LYNN/ INDUSTRIAL TRANSFORMER SUPERFUND SITE
Houston, Texas

I. INTRODUCTION

AUTHORITY STATEMENT. Purpose. The U.S. Environmental Protection Agency (EPA) Region 6 conducted this Five-Year Review pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9621(c), as well as Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR 300.430(f)(4)(ii), and EPA Office of Solid Waste and Emergency Response (OSWER) Directives 9355.7-02 (May 23, 1991), 9355.7-02A, and 9355.7-03A. The purpose of a five-year review is to ensure that the remedial action groundwater pump and treatment system remains protective of public health and the environment and is functional as designed. This document will become a part of the site file and is a statutory review applicable to a site at which the response is ongoing.

SITE CHARACTERISTICS. The Sol Lynn/Industrial Transformer site (Site) is located within the city limits of Houston, Texas. The Site is located just south of I-610 and west of State Highway Number 288. The Site encompasses approximately three quarters of an acre. Bounded on the north by South Loop Feeder Street of I-610, west by Knight Street, and south by Mansard Street, and East by South David Street. See attached Figure # 1 for the Site Location.

The one-mile Site radius encompasses an area which is a mix of residential, commercial, and light industrial. The light industrial, commercial business area is located directly to the east and south of the Site, the Astroworld and Astrodome are approximately 4,000 feet to the northwest, and finally a mix of private, single and multi-family dwellings are approximately 3,000 feet to the west. The residential population is about 2,000 and a maximum daily traffic of 100,000 persons is estimated to move within this one-mile radius due to major daily highway traffic on I-610 and the recreational activities associated with the Astrodome and Astroworld.

A Remedial Investigation was conducted in 1987 and 1988, comprised of a “Sol Lynn” Phase I soils or source control investigation, and an “Industrial Transformer,” of “ITS” Phase II groundwater investigation. A Feasibility Study for both soil and groundwater contamination at this site was completed in 1988. The results of the investigation identified the presence of poly chlorinated biphenyls (PCBs) in the soils and trichloroethylene (TCE) in the shallow aquifer (approximately 30 - 40 feet below the ground surface, referred to as “the 40-foot aquifer”) and the intermediate aquifer (approximately 80 - 90 feet below the ground surface, referred to as “the 80-foot aquifer”).
II. DISCUSSION OF REMEDIAL OBJECTIVES: SOURCE/GROUND WATER

A Record of Decision (ROD) was issued on March 25, 1988, for the Sol Lynn source (soils) in which approximately 2400 cubic yards of PCB contaminated soils were to be chemically dechlorinated with a soil washing pre-treatment technology. The Industrial Transformer ROD was signed on September 23, 1988, for the ground water specifying that a remediation system be installed and that the groundwater be treated using air stripping in combination with liquid phase carbon absorption. The objectives of these RODs were to remove the contaminated soils source, and to remediate the contaminated ground water to a level of no more than 5 ppb of TCE within 10 years.

The Sol Lynn source control action was carried out with EPA oversight by Gulf Coast Utilities Company (GSU), now Entergy Services, Inc. (Entergy), under a consent decree, which was modified twice to reflect changes in the site source control remedy. The original consent decree was entered by the Court between EPA and GSU on January 8, 1990, in the United States District Court for the Southern District of Texas, United States v. Gulf States Utilities Company, C.A. No. H-89-2584 (S.D.Tex.). It was modified first on May 15, 1991, following a determination by EPA to permit the defendant to implement the APEG™ chemical dechlorination process, which is a proprietary trademark of GRC Environmental, Inc. (determined by EPA to be an alternative and innovative treatment technology). Following problems with application of the technology during the treatment by GSU of some 140 tons of contaminated soil, EPA issued an amended ROD on September 16, 1992, permitting the excavation and removal of the remaining PCB contaminated soils above 25 ppm to an off-site approved Toxic Substances Control Act (TSCA) landfill. On January 12, 1993, the consent decree with GSU was modified a second time to provide for GSU implementation of the amended remedy. See 57 Fed. Reg. 55570, Nov. 25, 1992, for the consent decree lodging notice. The source control remedial action was completed in April 1993.

In connection with the ITS ground water contamination problem, in 1990 an environmental firm contracted by First Gibraltar Bank conducted an environmental assessment of a small tract of property located next to the ITS site. The result of the investigation indicated high concentrations of TCE in the Silty Zone (approximately 20 - 30 feet below the ground surface, referred to as “the 20-foot aquifer”). Under a cooperative agreement, the EPA and the Texas Water Commission [now the Texas Natural Resource Conservation Commission (TNRCC)] had decided that a thorough investigation of the 20-foot aquifer would be deferred to the Remedial Design/ Remedial Action Phase. In 1992, the 20-foot aquifer investigation was conducted. TCE was detected in the ground water from the 20-foot aquifer up to 1,100,000 ppb which was considerably higher than the 790,000 ppb maximum concentration stated on page seven of the ROD. The 20-foot and 40-foot aquifers were found to be interconnected. These high dissolved concentrations suggest that residual TCE still exists in the soil and aquifer material. However, there was not sufficient soil analytical data to calculate the amount of TCE absorbed in the soil.
To avoid delaying the remedial action, the Ground Water Treatment System designed for the 40 and 80 foot aquifers was modified to include the pumping and treatment of groundwater from the 20-foot aquifer. Using the best engineering judgement, it was determined that by increasing the volume of groundwater through the pump-and-treat system as well as reinjecting the treated groundwater, the initial contamination level and quantities gave evidence that the cleanup goal set by the ROD was achievable. On October 27, 1992, the EPA issued an Explanation of Significant Difference (ESD) to the ROD, changing the volume of groundwater required to be treated.

In October 1993, the groundwater treatment system began pumping and treating contaminated groundwater. As part of the remediation, an evaluation of the groundwater remediation, including ground water modeling, is performed annually to assess the status of the treatment system. The evaluation includes recommendations for minor and/or major modification to the system, as necessary, to achieve the remediation goal.

On April 8, 1996, the TNRCC executed contract amendment No. 4 with Radian International LLC. (Radian) to perform additional out-of-scope services for monitoring one year of Treatment Phase activities, evaluating alternative technologies to accelerate Site groundwater remediation, and conducting a system modification evaluation for the off-site migration of the shallow aquifer plume.

The ground water treatment system was shut down in October 1996 after various leaks were detected in the extraction system. An analysis of a segment of extraction piping suggested that the extraction-pipe system had failed due to corrosion. The corrosion on the interior is consistent with pitting of carbon steel by aerated waters. The corrosion on the exterior of the pipe is consistent with corrosion by condensation and moisture films. It was recommended that to prevent further leaks all existing extraction pipes, all valves, fittings, manholes, and controls be redesigned and reinstalled. Due to the very significant nature and extent of these recommended changes, the TNRCC recommended with EPA concurrence that the Remedial Contract be terminated in 1997.

III. AREAS OF DISCHARGE NONCOMPLIANCE, BASED ON TEST RESULTS:

The EPA and TNRCC met on April 15, 1997, to develop the following project strategies:

1. Additional monitoring wells were needed to define the current contaminant boundaries.

2. Retrofit the ground water treatment systems, including the redesign of pipe and electrical distribution systems, in order to get the treatment system back on line.
3. After the system modification is completed, alternative technologies enhancing the pump and treat system will be evaluated.

4. TNRCC will execute a contract amendment with Radian to perform additional out-of-scope services.

Following that meeting, TNRCC executed contract amendments Nos. 6 & 7 with Radian to perform system modification design and field exploration. Additional field explorations were conducted in March 1998 to delineate the contaminated plume in the 40-foot aquifer on the north side of Interstate Highway (IH) 610. This investigation revealed the existence of the Deep Shallow aquifer (approximately 60-70 feet below the ground surface, referred to as “the 60-foot aquifer”) on the north side of IH 610. The 40-foot and 60-foot aquifers were found to be interconnected. Additional extraction and monitoring wells and new distribution pipes were installed in 1998. The groundwater treatment system was back in operation in December 1998. Due to corrosion, the treatment plant metal duct work from the stripper to the carbon unit, required replacement. Concrete pad patching was conducted, and the plant base metal was cleaned of corrosion and painted. Final inspection of this work was conducted by TNRCC and EPA on September 22, 1999.

TCE Monitoring Results:

Base line sampling was conducted in November 1998. High concentrations of TCE were detected at 490,000 ppb, 550,000 ppb, 34,000 ppb, and 3,600 ppb in the 20, 40, 60 and 80-foot aquifers, respectively. The consistent presence of high level dissolved TCE suggest that the Dense Non-Aqueous Phase Liquid (DNAPL) retained in the soil capillaries is continuously leaching from the soil into groundwater. These sampling results indicated that the current treatment system was failing to contain the contaminated groundwater plume.

IV. RECOMMENDATIONS:

During the February 18, 1999, meeting and subsequent discussions, the TNRCC and EPA tentatively agreed to the following project strategies:

• Installation of additional extraction and monitoring wells as necessary.

• The current ROD does not address the TCE location nor does it provide options for secondary treatment. The EPA would consider preparation of an Explanation of Significant Differences (ESD) which would describe the revised remedial action plan agreed to by TNRCC and EPA.

• The proposed ESD would not change the action level for the groundwater, and no change would be permitted. The TNRCC would reevaluate the remedial goal for the groundwater after the completion of the TCE removal.
• Additional funding/time would be needed to perform proposed revised action plans.

• Due to the uncertainty of the treatment system operation, the TNRCC would incorporate the proposed revised action plan into the bid package for the treatment system maintenance contract.

A. REMEDIAL INVESTIGATION / FEASIBILITY STUDY

For the reasons set forth below, the EPA and the TNRCC have subsequently agreed that EPA will require and conduct an additional Remedial Investigation (RI) and Feasibility Study (FS). This work is necessitated by the significant amount of investigation of the nature, area, and extent of contamination in the groundwater, as well as analysis of an expanded list of Site remedial alternatives. This work would be conducted supplemental to, and in addition to, the existing RI/FS, as well as preparatory to promulgation of an Amended Proposed Remedial Action Plan and Amended Record of Decision. It would include an investigation of the sloping, pervious subsurface layers currently deemed to be aquifer zones, in order to determine the extent and degree of the TCE contamination and to gather necessary data to remediate the TCE contaminated plume(s). Field activities will use cone-penetrometry to establish the location(s) for installation of any additional monitoring wells through a CERCLA Federal lead, Response Action Contract (RAC). In addition, monitoring wells will be installed to assess the extent to which the groundwater plume migrates. A work plan and a sampling and analysis plan will be developed and approved prior to beginning field work to collect samples for analysis.

Elements of the RI and FS are expected to include, but may not be limited to:

• Collection of groundwater samples and evaluation of the nature, area, and extent of the contaminant plume(s) in order to better characterize and define the environmental threat to groundwater posed at the Site, as well as to analyze and determine the effectiveness of the existing treatment system and feasible alternatives.

• Evaluation of potential enhancement of the current pump and treat system through other remedial alternatives including, but not limited to, surfactant injection, in-situ oxidization, barrier walls, or other proven treatment methodology.

• Evaluation of potential remedial alternatives for the groundwater treatment plant to treat the contaminants in the gaseous phase.

• Define existing or potential receptors along with the areal and vertical extent of the contamination.

The EPA arrived at the determination of the necessity for the additional remedial studies discussed above after extensive review and analysis of continued problems with implementation of the existing groundwater remedy at the ITS site. Because of the extensive
nature and the quality of additional information and studies that were deemed necessary, it was acknowledged by EPA staff technical experts that more would be required than operational remedial modifications and analysis, or even the requirements of an ESD. Some of the rationale for moving the Sol Lynn/TTS site toward these additional investigations, studies, and potential amended remedial action is set forth below, as well as potential elements for incorporation into further remedial characterization and delineation studies.

B. REMEDIAL ALTERNATIVES FOR SYSTEM MODIFICATION

Through EPA’s Robert S. Kerr Laboratory, Technical Assistance and Technology Transfer Branch, two hydrologists with ManTech Environmental Research Services Corporation (MERSC), Dr. Bruce Pivetz and Mr. Rick Stansky, were selected to conduct a Site evaluation. The nine pages of the MERSC report comments and recommendations are being reviewed by all parties in conjunction with the following Natural Attenuation Evaluation considerations, in order to utilize field and sampling activities results to best achieve Site remediation goals. An EPA meeting was held on July 15, 1999, in which both existing and needed field sampling and analysis were discussed, as well as those actions and contract modifications/activities that would enhance the Remedial Action toward the achievement of a higher level of performance and contamination removal. A total of eleven professionals, consisting of geologists, environmental scientists, hydrologists, and professional engineers, were present at the meeting. This included two personnel from TNRCC, three from Dynamac Corporation (Robert S. Kerr Laboratory), two from MERSC, three from the U.S. Geological Survey (USGS), and one from EPA.

C. NATURAL ATTENUATION EVALUATION

The EPA and TNRCC acknowledge the need to evaluate the degree of natural attenuation in the respective Site pervious material layers and the level of usage of natural degradation processes in achieving long-range remediation goals. This required data is currently being sampled concurrent with the new RI/FS investigation. The new RI/FS Site work is to evaluate existing Site data of record, delineate the plume, identify the existing or potential receptors, and gather critical data to determine if natural attenuation is occurring in the aquifers and, if so, to what degree. The EPA Response Action Contractor (RAC) will be engaged to conduct the RI/FS analysis and the natural attenuation evaluations, as well as evaluation and incorporation of a report of findings into the RI/FS.

The following activities are currently included in the statement of work for the RI/FS and natural attenuation evaluations:

- A surface geophysical survey and analysis will be conducted prior to the field cone penetrometry to determine the presence and spiral distribution of shallow water-bearing zones in and near areas of contamination. The USGS, TNRCC, and EPA have proposed the six line locations for the cone petrometer (CPT).
• Surface and borehole geophysics to provide preliminary information on hydrogeologic framework.

• Well borings to sample for VOCs, conduct hydrologic testing, and collect core samples for analyses and microbiological testing.

• Preparation of Data Report.

• Preparation of Hydrogeological, Geochemical, and Microbiological Report.

• Design and implementation of monitoring well clusters transverse to the direction of the contaminant plume movement.

• Synoptic sampling and water-level measurements of existing and new monitoring wells for natural attenuation parameters.

• Development of 2-D resistivity surveys and transects over the area of the plume and the fate and transport model of solute TCE and associated contaminants.

• Final RI/FS Report (Including Natural Attenuation Evaluation).

• The approximate time frame for achieving RI/FS activities is April 1, 2001.

Execute a well-supported Amendment to the existing ROD within eighteen months after approval of the Project Management and Work Plan of EPA Response Action Contractor.

V. STATEMENT ON PROTECTIVENESS

I certify that the source control remedy selected for this site remains protective of human health and the environment, and is likely to remain so, based upon all records and findings to date. However, I have determined that the existing long-term groundwater remedial action, as currently implemented for this Site, may not be protective of the public health and the environment for the preceding reasons.

In accordance with sub-sections 300.430(d) and (e) of the NCP, 40 CFR 300.430(d) and (e), I have directed my staff to initiate and undertake an additional new Remedial Investigation and Feasibility Study of groundwater contamination at the Site and potential remedial alternatives for addressing it, under Federal lead RAC Contract. Nevertheless, I have determined that continued operation of the existing groundwater remedy is necessary to reduce risks to public health and the environment in the interim until the new RI/FS is completed and until the EPA can reach a determination as to whether the Record of Decision will require amendment and, if so, whether any additional remedial action should be implemented at the Site. Therefore, consistent with sections 300.515 and 300.435(c), (e), and (f) of the NCP, 40 CFR 300.515, 300.435(c), (e), and (f), I am directing that EPA Region 6 Superfund staff ensure through
appropriate means under our cooperative agreement, including any necessary amendment thereof, that the TNRCC continues operation of the existing long-term groundwater remedial action at the Site during the interim period.

VI. THE NEXT FIVE-YEAR REVIEW

The next five-year review of the source control remedy for Sol Lynn/ITS will be conducted in October 2004. The next five-year review of the groundwater remedy for Sol Lynn/ITS will be conducted at such appropriate time as warranted, consistent with the NCP and section 121 of CERCLA, following any amended ROD, or otherwise.

Myron O. Knudson, P.E.  
Director  
Superfund Division  

Pamela Phillips, Acting  
Date  
1/23/99