

SECOND FIVE-YEAR REVIEW

Reich Farm Superfund Site

Toms River, Ocean County, New Jersey



Prepared By:  
U.S. Environmental Protection Agency  
Emergency and Remedial Response Division  
Region II  
New York, New York

September 2008

## **Executive Summary**

This is the second five-year review for the Reich Farm Superfund Site. The Site is located in Toms River, Ocean County, New Jersey. The Site Record of Decision called for thermal desorption of contaminated soils and the extraction and treatment of contaminated groundwater. The soil treatment was completed in 1995; the treatment of the contaminated groundwater continues.

The results of this five-year review found that the remedy is operating in accordance with the Record of Decision and subsequent Explanations of Significant Differences. The immediate threats have been addressed, the remedy is protective, and the groundwater cleanup goals are expected to be achieved through continued treatment of contaminated groundwater.

Five Year Review Summary Form

SITE IDENTIFICATION		
Site Name (from WasteLAN): REICH FARM		
EPA ID (from WasteLAN): NJD980529713		
Region: 2	State: NJ	City/County: Ocean
SITE STATUS		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation Status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Constructed <input checked="" type="checkbox"/> Operating		
Multiple OUs? No	Construction completion date: 9/30/98	
Has site been put into reuse? The site is currently being leased by the owner to a local cement dealer to store equipment and stones/sand..		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Jon Gorin		
Author title: Remedial Project Manager	Author affiliation: EPA	
Review period: 9/22/03 to 7/15/08		
Date(s) of site inspection: April 24, 2008		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion <input type="checkbox"/> Statutory		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction at OU <input type="checkbox"/> Actual RA Start at OU# <u>  1  </u> <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 9/22/03		
Due date (five years after triggering action date): 9/22/08		

**Five-Year Review Summary Form (continued)**

**Issues, Recommendations, and Follow-Up Actions**

There are no recommendations or follow-up actions stemming from this five-year review. Union Carbide Corporation and United Water of Toms River will continue to conduct routine operation and maintenance activities.

**Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls**

None.

**Protectiveness Statement**

The remedy at the Reich Farm Superfund Site is expected to be protective upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled.

**U.S. Environmental Protection Agency**  
**Region II**  
**Emergency and Remedial Response Division**  
**Five - Year Review**  
**Reich Farm Superfund Site**  
**Toms River, Ocean County, New Jersey**

I. INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 2, conducted this five-year review in accordance with OSWER Directive 9355.7-03B-P (June 2001). The purpose of a five-year review is to assure that implemented remedies protect public health and the environment and that they function as intended by the decision document. This report will become part of the site file.

This is the second five-year review for the Site. In accordance with Section 1.3.2 of the five-year review guidance, a policy five-year review is triggered by the construction completion of the site. The trigger for the first five-year review is the date of the Preliminary Close-out Report, which was September 1998. The trigger of the second five-year review is five years after the first five-year review, which was September 2003

II. SITE CHRONOLOGY

Table 1 - Chronology of Events

Event	Date
An Independent waste hauler deposited drums of semi-volatile and volatile chemicals on property owned by Samuel Reich.	1971
The wastes were found to be from Union Carbide Corporation (UCC) - UCC removed all visible drums and the top layers of soil.	1972
Well restriction area enacted and residents hooked into public water supply.	1974
EPA added Site to the National Priorities List (Superfund)	1983
The Remedial Investigation completed by EPA.	1988
EPA issues a Record of Decision (ROD) for the Site.	1988
United Water of Toms River (UWTR) detected contamination in 2 Parkway Well Field Wells and installed air stripper.	1988



Additional groundwater studies indicated that the contaminated groundwater being treated at the Parkway Well Field was from the Reich Farm Site.	1991-93
Contaminated soil is treated using on-site thermal desorption technology.	1994-95
An Explanation of Significant Differences (ESD) was issued which modified the ROD to include continued treatment by air stripping at Parkway Well Field, rather than construction of a separate system.	1995
A group of unregulated semi-volatile compounds were found in the contaminated Parkway Wells. The compounds were identified as Styrene Acrylonitrile (SAN) Trimer.	1997
A carbon treatment system was installed by UCC to further treat the contaminated water. The carbon system removes SAN Trimer to below detectable levels before water is discharged to waste.	1997
EPA issued a second ESD authorizing use of carbon treatment on the contaminated wells.	1998
Preliminary Close-Out Report (PCOR) issued.	1998
NJ added carbon treatment to two additional wells at the Parkway Well field.	1999
SAN Trimer Workgroup is formed to oversee toxicity testing of SAN Trimer.	1999
EPA analyzed treated site soil for SAN Trimer. Low levels of SAN Trimer are detected.	2003
EPA completed first Five-Year Review which determined that the remedy was protective of public health and the environment.	2003
EPA collects and analyzes additional treated soil at depth on the Reich Farm property.	2005
Operation and Maintenance	Ongoing
SAN Trimer toxicity study being conducted by National Toxicology Program	Ongoing

### III. Background

#### *Characteristics:*

The Reich Farm property, which comprises part of the overall Site, is located on Lakewood Road in the Pleasant Plains section of Dover Township, New Jersey. The property encompasses three acres and is surrounded by commercial and residential areas.

The Kirkwood-Cohansey aquifer system underlies the Site. The

upper portion of the system is generally referred to as the Cohansey aquifer, and is the principal source of drinking water for the area. The lower portion of the aquifer is known as the Kirkwood aquifer. The average depth to ground water beneath the Site is approximately thirty feet. The direction of groundwater flow in this system is generally to the south-southwest; however, pumping at the United Water of Toms River (UWTR) Parkway Well Field (Well Field), which is one mile south of the Site, has a strong effect on the local, shallow groundwater flow.

*History:*

In December 1971, approximately 4,500 drums containing wastes and 450 empty drums from Union Carbide Chemicals' (UCC's) Bound Brook chemical manufacturing facility were discovered at the Site. In 1972 and 1974, UCC removed the drums and some contaminated soil from the Site.

In 1974, the Dover Township Health Department (now the Ocean County Health Department) issued a zoning ordinance restricting private well use around the Site due to contamination found in the ground water. Currently, all residences and businesses within the area, affected by groundwater contamination associated with the Site, are connected to the public water supply. The public water supply has continuously met the federal and state safe drinking water standards.

In September 1983, EPA included the Reich Farm Site on its National Priorities List of Superfund Sites. In 1986, EPA commenced a Remedial Investigation and Feasibility Study (RI/FS) at the Site pursuant to CERCLA, in order to identify the nature and extent of contamination, and to develop cleanup alternatives.

The RI confirmed the presence of groundwater and soil contamination. Contaminants identified in the ground water and soil included 1,1,1,-trichloroethane, trichloroethene, and tetrachloroethylene.

Following issuance of the September 1988 ROD, EPA entered into a Judicial Consent Decree with UCC for performance of a remedial design and construction of the selected remedy. The decree was entered by the federal district court of New Jersey on March 28, 1990.

In 1996, a statistically significant elevation in the rates of certain childhood cancers was found to exist in the Toms River area. In response to this finding, New Jersey's Department of Health and Senior Services, in cooperation with the U.S. Agency for Toxic Substances and Disease Registry, undertook a



massive analysis of various potential causes of the elevated cancer rates. During that effort, the presence of a group of unregulated, previously unknown semi-volatile contaminants was noted in the Site's groundwater plume. These contaminants, which are site related, were later identified and are now referred to as the SAN Trimer.

#### IV. REMEDIAL ACTIONS

##### *Remedy Selection*

On September 30, 1988, EPA issued a ROD that described the selected remedy for contaminated ground water and soil at the Reich Farm Site. The remedy called for the following:

- (1) additional groundwater and soil sampling to further delineate contamination related to the Site;
- (2) the excavation and treatment of contaminated soil by enhanced volatilization (thermal desorption) to remove volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs); and
- (3) the installation and operation of a groundwater pumping, treatment and reinjection system to remove VOCs from ground water at the Site.

Subsequent to the ROD and under EPA oversight, UCC conducted two phases of pre-design activities. Phase I, which was conducted during 1990-1992 and summarized in the May 1992 Remedial Design/Remedial Action Report, included additional soil and groundwater sampling to further delineate the extent of contamination.

Based on the sampling results, EPA concluded that: (1) groundwater contamination from the Site extends approximately one-mile south to the UWTR Parkway Well Field; and (2) the volume of contaminated soils at the Site was approximately 15,000 cubic yards (which significantly exceeded the initial estimated volume of 2,000 cubic yards).

The groundwater data collected and the modeling done during the pre-design work increased EPA's understanding of the movement and configuration of the groundwater contaminant plume. Based on this information, EPA issued the 1995 Explanation of Significant Differences (ESD) which allowed the UWTR Parkway Well Field's existing treatment system (i.e., an air stripper) to be used as the Site's groundwater remedy.



In 1997, the SAN Trimer was found in the same two wells impacted by the other site contaminants within the UWTR Parkway Well Field (Wells #26 and #28). The existing air-stripper treatment system did not effectively remove the SAN Trimer. The toxicity of these compounds remains unknown. Toxicity testing of the SAN Trimer by the National Toxicology Program (NTP) is expected to be completed and the results are expected to be available by the end of 2010.

The 1998 ESD called for the installation of additional treatment, in the form of activated carbon units, at the Parkway Well Field to remove the SAN Trimer down to below the laboratory detection limit until toxicity studies could provide more information. This treatment was installed by UCC.

#### *Remedy Implementation*

The remedy was implemented by the Potentially Responsible Parties (PRPs) pursuant to a Judicial Consent Decree. By June 1998, the PRPs had:

- Treated 15,000 cubic yards of contaminated soil using thermal desorption technologies;
- Backfilled and restored the Reich Farm property;
- Added activated carbon to the treatment system at the Well Field (as per the 1998 ESD);
- Diverted treated water to a re-charge area;
- Installed an additional containment well (Well 26b) at the Parkway Well Field;
- Performed continual groundwater monitoring.

The soil remedy was completed in 1995 and documented in a 1995 Remedial Action Report. The groundwater remedy's construction was completed in 1998 and documented in a 1998 Remedial Action Report.

In May 1997, UCC added activated carbon treatment following the air stripper treatment system at the Well Field. Effluent sampling has shown that activated carbon effectively treats the SAN Trimer to non-detectable levels, at an analytical detection limit of 150 parts per trillion.

The treated water from Wells #26 and #28 is currently discharged to the ground on an area close to the intersection of Route 9 and the Garden State Parkway (discharge area). To date, inspection of the discharge area indicates that the treated water is being adequately recharged to the aquifer. At NJDEP's discretion, the treated water may also be used as a source of potable water.

In 1998, low levels of San Trimer were detected in a previously uncontaminated Well Field well (Well #29). Apparently, this was caused by over-pumping of that specific well. In response, EPA directed UCC to place a pumping control device on Well #29, and to install an additional containment/recovery well at the Well Field (Well #26b). UCC later installed pumping control devices on four other Parkway Well Field wells. The maximum pumping rates allowed at each well in the Well Field are specified in a 1999 legal agreement between UCC and UWTR.

As an additional protective measure, in 1999, NJDEP directed UWTR to install activated carbon treatment systems on production Wells #29 and #22. Those were installed in 1999.

The most recent NJDEP/UWTR data collected from the production wells at the Well Field indicate that the SAN Trimer is not impacting these wells. The water from these wells meets federal and NJ Maximum Contaminant Levels (MCLs) for drinking water; therefore, these wells are being used as public potable water supply. In addition, it appears the mandated maximum pumping rates at the Parkway Well Field are effectively preventing wells from drawing in contaminants from the Site's plume.

As a protective measure, NJDEP recommends that water from the recovery wells (Wells #26, #26b and #28) not be used as a public water supply unless needed to meet the public's demand for potable water. However, those wells must continue to operate to ensure the protection of the production wells at the Well Field (Wells #22, #24, #29 and #44). In addition, the recovery wells must operate to facilitate the ultimate cleanup of the ground water plume.

#### *Operation and Maintenance*

The PRPs have instituted a comprehensive monitoring program for the ground water at the Site. The PRPs collect and analyze



samples of the treated water on a monthly basis, and water from respective monitoring wells on a bi-monthly, quarterly, semi-annual, annual and bi-annual basis. In addition, water level measurements are collected semi-annually from twenty-eight monitoring wells. Table 1 provides a summary of the groundwater sampling program.

#### **V. PROGRESS SINCE THE LAST REVIEW**

The First Five-Year review for the Site noted that EPA collected a limited number of shallow samples of the treated soils that had been backfilled on the Site in 1995. The samples were analyzed to determine if thermal desorption treatment had effectively removed the SAN Trimer. Results showed the SAN Trimer was still present at low parts per million levels. The review went on to state that additional soils samples should be collected and analyzed for the SAN Trimer.

Field work for that task, which was completed in 2004, included collecting soil samples from four depths at each of 19 soil borings in the three excavation areas on the Site. The majority of the samples showed no detectable levels of the SAN Trimer. However, the SAN Trimer was detected in approximately 40 percent of the samples, with concentrations ranging from 0.023 parts per million (ppm) to 14 ppm. The 14 ppm detection was at a depth of twenty-nine feet, and was the only detection that exceeded the 10 ppm cleanup level for semi-volatile contaminants (SVOCs) as set in the ROD. The results are presented in the 2005 document titled "Draft Final Technical Memorandum for Soil Sampling Activities at the Reich Farm Superfund Site."

The First Five-Year review indicated that a vapor intrusion screening analysis would be performed for the Site. This screening analysis has been performed and the results are discussed in Section V, Question B of this document.

#### **V. FIVE-YEAR REVIEW PROCESS**

##### *Administrative Component*

This review has been performed by the EPA Remedial Project Team for the Site, consisting of the Remedial Project Manager (Jon Gorin), Human Health Risk Assessor (Marian Olsen), Ecological Risk Assessor (Mindy Pensak) Hydro-Geologist (Ed Modica) and Community Involvement Coordinator (Natalie Loney).

##### *Community Involvement*



The EPA Remedial Project Manager, Risk Assessor and Community Involvement Coordinator attend frequent citizen's meetings regarding concerns on the elevated rates of local childhood cancer and also the ongoing toxicity testing of the SAN Trimer. The meetings are held by the Citizens Action Committee on Childhood Cancer (CACCCC). From 1997-2001, the meetings were held on a monthly basis. Since 2001, the meetings occur on a roughly semi-annual to quarterly basis. Since 2004, EPA's Reich Farm Remedial Project Team has attended the meetings when EPA's input on issues specific to the Reich Farm Site are required by the CACCCC.

EPA has established two information repositories for the Site, where information is available for review during business hours. One repository is at the Ocean County Public Library, 101 Washington Street, Toms River, New Jersey 08753, and the second one is at EPA Region II offices, 290 Broadway, New York, New York 10007-1866.

#### *Document Review*

The documents, data, and information reviewed in completing this five-year review include the ROD, ESDs, Remedial Action Reports, and Annual Maintenance and Groundwater Monitoring Reports (dated August 2005, May 2006 and June 2007).

#### *Data Review*

As described in Section V of this Review, EPA collected two rounds of samples from the soil treated during the source area remediation. When the samples were tested for the presence of SAN Trimer, concentrations were found as high as 14 ppm. The ROD established a soil cleanup level for total SVOCs as 10 ppm. Except for the 14 ppm concentration, all other samples had concentrations below the SVOC cleanup level.

The PRPs collect and analyze samples from monitoring wells, containment wells and from the treated groundwater (see Table 1). EPA occasionally collects split samples with the PRPs to ensure analytical results are accurate. In addition, the PRPs compile data on pumping rates of the UWTR Parkway Well Field wells to ensure compliance with the 1999 agreement on pumping rates.

A comparison of the January 1999, December 2004 and December 2006 groundwater data show that a general decrease in groundwater contamination for both SAN Trimer and the VOCs is continuing.

In 1999, seven of the twenty-five monitoring wells sampled showed VOC contamination greater than New Jersey Groundwater Quality Standards (NJGWQS). Of the seven wells, two were on the Reich

Property, two were mid-gradient between the Reich Property and the recovery wells, and three (MW-Swain, CHMW-4 and MP-8) were relatively close to the recovery wells. The highest concentrations of TCE were in MW-Swain (26.0 parts per billion (ppb)) and CHMW-4 (22.0 ppb). In 1999, both those wells also had PCE concentrations greater than the NJGWQS level of 1 ppb.

By 2004, only three wells (MW-Swain, CHMW-4 and MW-4S) continued to show elevated levels of VOCs. Concentrations of TCE in MW-Swain and CHMW-4 had fallen to 1.3 ppb and 4.3 ppb, respectively, and PCE was below the NJGWQS level of 1.0 ppb in those two wells.

The 2007 results showed VOC exceedences in three wells; MW-Swain which showed an increase in TCE (4.3 ppm) and PCE (1.4 ppb) levels; CHMW-4 which showed a decrease in TCE (1.4 ppb); and MP-2R which had a concentration of TCE at 1.7 ppb. None of the Reich Farm Property wells showed VOC concentrations above the applicable NJGWQS.

A similar decreasing trend was seen for SAN Trimer. In 1999, there were four monitoring wells (MP-1R, MP-8, MW-Swain and CHMW-4) with SAN Trimer greater than 1.0 ppb (there is no set cleanup level for SAN Trimer). The greatest concentrations were 3.0 ppb at MP-1R (a well just downgradient of the Reich Farm property) and 3.0 ppb in MP-8. By 2007, there was one well (MP-2R) with a concentration of SAN Trimer greater than 1.0 ppb (1.1 ppb). Other wells with detectable concentrations of SAN Trimer in 2007 were 0.21 ppb in MP-1R, 0.20 ppb in CHMW-4, and 0.16 ppb in MW-Swain.

A review of all the data shows a general decrease in groundwater concentrations of VOCs and SAN Trimer over the last five years. VOC concentrations are now either meeting or are very near meeting NJGWQS in the monitoring wells and also the recovery wells (see Figure 1). Except for well MP-2R, SAN Trimer levels are below or approaching the limits of detection in all monitoring and recovery wells (see Figure 2).

#### *Site Inspection*

The EPA Remedial Project Manager, Hydro-Geologist, and Risk Assessor performed a Site inspection on April 24, 2008. Atiya Wahab and Steve Spayd of NJDEP were also present for the Site inspection.

The discharge area for the treated water was inspected. The treated water is recharging into the ground and does not connect with any surface water-body. The Reich Farm property continues



to be used by a local contractor to stage gravel and sand piles. The areas where the soils were excavated, treated and backfilled are currently located below large piles of sand.

#### *Interviews*

As part of this five-year review, several key people involved with the remedy have been contacted:

Rob Rouse - Dow/Union Carbide Corporation (UCC). In April 2008, Rob Rouse indicated that SAN Trimer was detected after the second carbon unit on the treatment system. This indicates that water with low levels of SAN Trimer was being discharged to waste. The concentrations were below levels where accurate measurements could be made, but it was estimated to be around 20 parts per trillion. This also happened in 2004, when modifications of carbon change-out and backwashing schedules seemed to have rectified the issue. Due to the breakthrough, the unit's carbon was changed on April 28, 2008. UCC has once again modified its schedule so the carbon will be changed on a more frequent basis. In addition, UCC replaced water nozzles and replaced or cleaned internal screens on each filter unit.

Ed Nemeth of UWTR. Mr. Nemeth indicated that the filtration systems generally function well and any issues are resolved within 24 hours.

## **VI. TECHNICAL ASSESSMENT**

### **Question A: Is the remedy functioning as intended by the decision documents?**

Yes, the remedy is functioning as intended by the ROD signed on September 30, 1988 and the ESDs issued in 1995 and 1998.

Analysis of data over the past five years indicates that NJGWQSs continue to be met after treatment. Before being discharged to waste, the ground water is treated to meet applicable standards and the SAN Trimer levels are below the laboratory detection limits. During short periods in 2004 and again in 2008, water with low but detectable levels of SAN Trimer was discharged to waste. The controls in place, since 1999, on the various production wells at the UWTR Parkway Well Field have effectively prevented the plume from impacting uncontaminated wells. Monitoring data collected over the last five years has shown a general decrease in the concentrations of groundwater contaminants, including TCE, SAN Trimer and PCE. Additionally, the soil treatment, which was undertaken to protect the underlying groundwater, appears to have addressed the source area



of groundwater contamination, meeting the goals of the ROD.

These actions have reduced the amount of contamination in the environment (both soils and groundwater) and are functioning as intended to prevent direct exposure to Site contaminants.

**Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy still valid?**

ROD Contaminants of Concern: The exposure assumptions that were used to estimate the potential cancer risks and non-cancer hazards in the risk assessment supporting the 1988 ROD for human health followed the Risk Assessment Guidance. The process that was used at that time is still valid.

While the chemical-specific toxicity values have changed since the Site was originally assessed, as described below, the cleanup levels and the remedial action objectives selected in the ROD and subsequent ESDs for both ground water and soil are valid.

For ground water, the ROD-established cleanup goals are the State and Federal Maximum Contamination Levels (MCLs). A comparison of the 1988 MCLs to present MCLs and NJGWQS (for the contaminants of concern remaining at detectable levels in the ground water) shows no changes in values (Table 2). So, while this remedial action objective (i.e., groundwater meeting MCL levels) has not yet been achieved for all contaminants of concern, the objective remains valid.

For soils, the risk assessment determined that contaminated soil posed no unacceptable risk to human health from direct soil contact, but posed a risk to further contamination of the ground water. The ROD selected cleanup standards of a total of 1 ppm for all VOCs and a total of 10 ppm for all SVOCs to assure protection of groundwater. Post-cleanup sampling showed that these standards were met. These standards are no longer used, however, post cleanup soil concentrations for total VOCs and SVOCs confirmed that no concentrations of the contaminants of concern remain in the soil above current soil cleanup criteria (i.e., Region VI PRGs and NJDEP Soil Cleanup Criteria) for either residential direct soil contact or impact to groundwater (Table 3). Therefore, the remedial action objective for soil cleanup of the COCs has been met and remains protective.

SAN Trimer: At the time of the ROD, EPA had no information or knowledge of the SAN Trimer, a semi-volatile contaminant, nor does EPA currently have information on the toxicity of the SAN

Trimer. The National Toxicology Program (NTP) of the National Institute of Environmental Health Sciences (NIEHS) is performing toxicity testing for the SAN Trimer.

In the meantime, EPA, through an ESD, has set the groundwater cleanup level for SAN Trimer as "non-detect." No soil cleanup level specific to SAN Trimer has been developed by EPA. In 2003 and 2004, eighty-three samples of soil were collected and analyzed for SAN Trimer and one sample, collected at a depth of 29 feet, had a concentration (14 ppm) greater than the ROD level for semi-volatile contaminants (10 ppm). Groundwater samples collected since the soil remedy was completed indicate that the soil is no longer acting as a source of SAN Trimer contamination to the ground water. Based on these data, EPA determined that no additional soil remediation is necessary to protect ground water from the SAN Trimer remaining in the Site soil.

EPA will consider additional actions if the SAN Trimer toxicity testing shows potentially unacceptable human health risk if someone were to come into direct contact with the treated soils found at depth on the property.

Vapor Intrusion: Soil Vapor Intrusion was not evaluated by EPA for the 1988 ROD. For this Five-Year Review, EPA compared the maximum concentrations of VOCs from the most current available groundwater data to the values listed in the 2001 OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils Guidance ([www.epa.gov/correctiveaction/eis/vapor.htm](http://www.epa.gov/correctiveaction/eis/vapor.htm)). The maximum contaminant concentrations were below the Guidance screening criteria for TCE, PERC, and 1,1,1-TCA.

Further, EPA compared the Henry's Law Constant for the SAN Trimer to the screening criteria identified in the Guidance and found it to be below the screening value. This means that it is not volatile enough to pose a vapor intrusion risk to structures overlying the groundwater plume.

Based on these analyses, EPA concluded further investigation of potential soil vapor intrusion is not necessary.

**Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

No. No new information has called into question the protectiveness of the remedy.



In 2004, EPA collected samples of the treated soils and analyzed them for SAN Trimer. As described above, the samples showed SAN Trimer to be present in the soil and, in one case, to be above the ROD cleanup level for SVOCs. However, based on the evaluation of the potential human exposures at the Site as well as ten years of groundwater data, this new information does not call into question the protectiveness of this remedy.

#### *Assessment Summary*

- Contaminated Site soils have been remediated and the current site use is appropriate.
- There are no private drinking water wells within the plume of contamination and no new wells will be installed because local requirements are in place to prevent this. Public drinking water wells are regulated by NJDEP.
- Groundwater monitoring wells are functional and show a continued measurable and significant reduction in contaminant concentrations throughout the groundwater plume as well as an overall decrease in the size of the plume.
- Groundwater extraction and treatment is operating as intended by the Site's decision documents.

#### **VII. ISSUES, RECOMMENDATIONS AND FOLLOW-UP ACTIONS**

The Site has a long-term response action ongoing, including extensive monitoring activities. As expected by the decision documents, these ongoing activities are subject to routine modifications and adjustment. EPA will continue to coordinate the workgroup overseeing the toxicity testing of the SAN Trimer. There are no recommendations or follow-up actions necessary to protect the public health or the environment at this time.

#### **IX. STATEMENT OF PROTECTIVENESS**

The remedy at the Reich Farm Superfund Site is expected to be protective upon completion and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.



X. NEXT FIVE-YEAR REVIEW

The next five year review for the Reich Site should be completed before September 2013, five years from the date of this report.

John S. Frisco

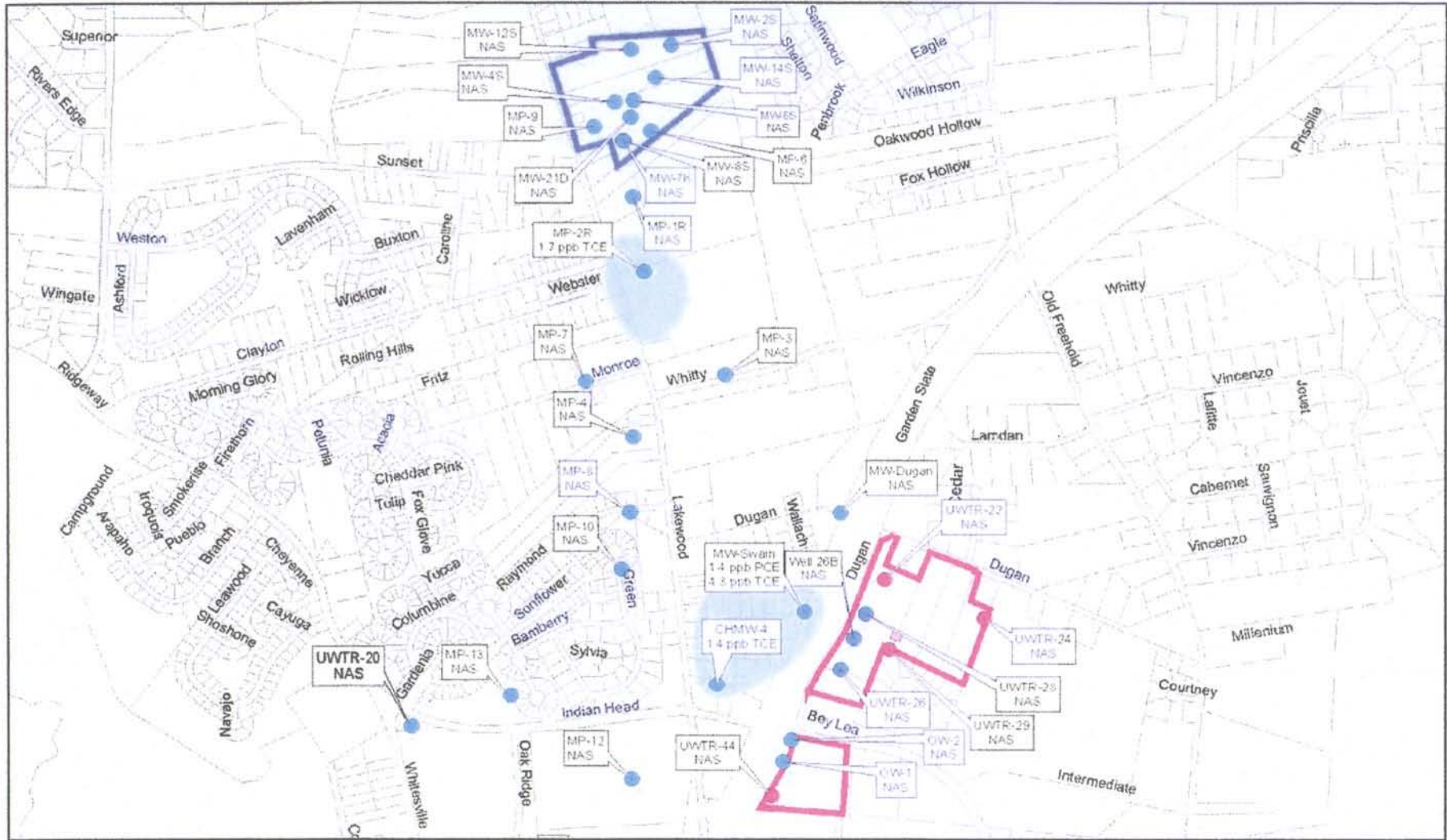
9/3/08

for George Pavlou, Acting Director  
Emergency and Remedial Response Division

Date

# Figure 1

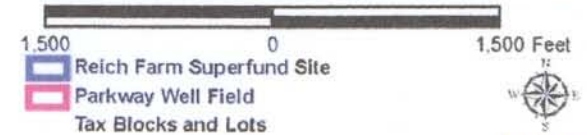
## VOC GROUNDWATER PLUME - DECEMBER 2007 REICH FARM SUPERFUND SITE



**Abbreviations:**

NAS - VOC not detected (below laboratory detection limits)  
 ppb PCE - Tetrachloroethylene detected at parts per billion  
 ppb TCE - Trichloroethylene detected at parts per billion  
 MW - Monitoring Well  
 UWTR - United Water Toms River

- Public Supply Well
- Groundwater Recovery Well
- O & M Phase Monitoring Wells
- Granular Activated Carbon (GAC) Treatment System
- VOC Plume (Above Regulatory Cleanup Standard of 1 ppb)

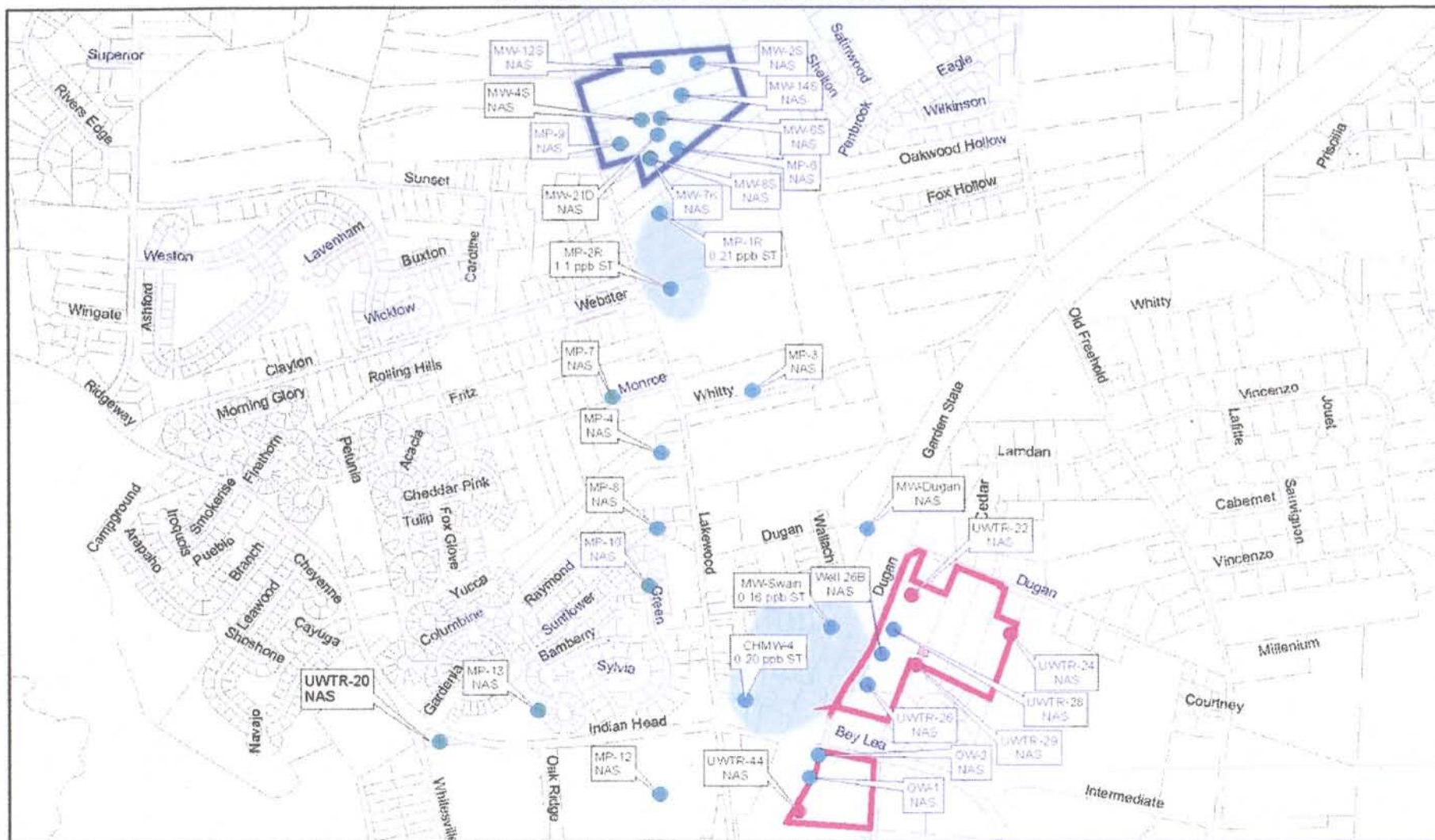


**URS**



Figure 2

**SAN TRIMER GROUNDWATER PLUME - DECEMBER 2007  
REICH FARM SUPERFUND SITE**



Abbreviations:

NAS - SAN TRIMER not detected (below laboratory detection limits)  
 ppb ST - SAN TRIMER detected at parts per billion  
 MW - Monitoring Well  
 UWTR - United Water Toms River

- O & M Phase Monitoring Wells
- Public Supply Well
- Groundwater Recovery Well
- Granular Activated Carbon (GAC) Treatment System
- SAN TRIMER Plume (Above Interim Aquifer Restoration Criteria of 0.15 ppb)



- Reich Farm Superfund Site
- Parkway Well Field
- Tax Blocks and Lots



## List of Acronyms

CACCCC	Citizens Action Committee on Childhood Cancer Clusters
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
MCL	Maximum Contaminant Levels
MCLG	Maximum Contaminant Level Goals
MW	Monitoring Well
NIEHS	National Institutes of Environmental Health Sciences
NJDEP	New Jersey Department of Environmental Protection
NJMCL	New Jersey Maximum Contaminant Level
NTP	National Toxicology Program
PCOR	Preliminary Closeout Report
Perc	tetrachloroethylene
ppb	Parts per billion
ppm	Parts per million
PRPs	Potentially Responsible Party
RI/FS	Remedial Investigation/Feasibility Study
SAN	Styrene Acrylonitrile trimer
SVOCS	Semivolatle organic compounds
TCE	Trichloroethylene
UCC	Union Carbide Corporation
UWTR	United Water of Toms River
VOCs	Volatile Organic Compounds



**Table 1 Groundwater Sampling for the Reich Farm Site**

Frequency	Parameters	Type of sample/Wells	# of Samples
Monthly	VOC and SAN Trimer	Combined treated water from Parkway Well Field Wells 26, 26b, and 28. And sample from lead carbon unit (to determine when carbon in lead unit needs to be changed).	2
Alternate months	VOC and SAN Trimer	Samples from 3 key monitoring wells and one United Water production well (UWTR #44)	4
Quarterly	VOC and SAN Trimer	Parkway Wells 26, 26b and 28 (untreated, uncombined).	3
semi-annual	water level measurements	Data collected from 26 monitoring wells and two UWTR production wells: #20 (which is not part of the parkway wellfield, and lies outside western edge of plume) and well #44. MP9 is no longer sample as it has been destroyed	28
semi-annual	VOC and SAN Trimer	Samples from 4 monitoring wells and one UWTR production wells (UWTR #20 )	5
Annual	VOC and SAN Trimer	Samples collected from 12 monitoring wells.	12
Bi-Annual	VOC and SAN Trimer	Samples from an additional four monitoring wells	4
Every third year	Video inspection	Discharge flow under Garden State Parkway for submittal to NJ Highway Authority.	1

Table 2 Comparison of 1988 State and Federal MCLs to Current Values.

Contaminant of Concern	1988 State MCL (ppb)	1988 Federal MCL (ppb)	2008 State MCL (ppb)	2008 Federal MCL (ppb)	2008 NJ GWQS (ppb)
					NJAC7:9-6
Methylene chloride	2	NG	3 (NJ MCL (A-280))	NG	3
Toluene	Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	2,000	1000	1000	600
Acetone	NG	NG	NG	NG	6,000
Trichloroethene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280))	5	1
2-Butanone	NG	NG	NG	NG	NG
Carbon Tetrachloride	2, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	2 (NJ MCL (A-280))	5	1.0
Tetrachloroethene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280))	5	1.0
1,1,1-Trichloroethane	26	200	30 (NJ MCL (A-280))	200	30
4-Methyl-2-Pentanone	NG	NG	NG	NG	NG
Chloroform	5, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	NG	NG	NG	70
Benzene	1, Total Concentration limit for all contaminants with this indicator is 50 ppb in groundwater	5	1 (NJ MCL (A-280))	5	1.0
Bis-2-(ethylhexyl) phthalate	NG	21,000 (Clean Water Act Water Quality Criteria for Human Health Adjusted for Drinking Water)	6 (as di (2-ethylhexyl)phthalate)	6 (as di (2-ethylhexyl)phthalate)	30



Pentachlorophenol	NG	220, (MCLG not MCL)	1	1	0.3
2,4-Dichlorophenol	NG	NG	NG	NG	20
4-chloro-3-methylphenol	NG	NG	NG	NG	NG
Di-n-butyl phthalate	NG	NG	NG	NG	700
Benzo(k)fluoranthene	NG	NG	NG	NG	0.5
Pyrene	NG	NG	NG	NG	200
Isophorone	NG	NG	NG	NG	40
N-nitrosodi-n-propylamine	NG	NG	NG	NG	10
Fluoranthene	NG	NG	NG	NG	300
Aluminum	NG	NG	NG	50 to 200 based on secondary standard	200
Barium	1,000	4,700	2,000	2,000	6,000
Beryllium	NG	NG	4	4	1
Cadmium	3.7	5.0	5	5	4
Calcium	NG	NG	NG	NG	NG
Chromium	50 (NJ Pollution Discharge Elimination System (NJPDES)-Groundwater Protection)	100 (Proposed Safe Drinking Water Act MCL)	100	(total) 100	70 (total)
Cobalt	NG	NG	NG	NG	NG
Copper	NG	1,300 (Proposed Safe Drinking Water Act MCL)	1,300 (Action Level - trigger point at which remedial action is to take place)	Treatment Technique Action Level = 1,300 T	1,300
Iron	NG	300 (Safe Drinking Water Act Secondary Standards)	NG	300 (Safe Drinking Water Act Secondary Standards)	300
Lead	50	50 (Safe Drinking Water Act Primary Standards)	15 (Action Level - trigger point at which remedial action is to take place)	15 Treatment Technique	5
Magnesium	NG	NG	NG	NG	NG

Manganese	NG	50 (Safe Drinking Water Act Secondary Standards)	NG	50 (Secondary Standard)	50
Mercury	2 (NJAC 7:9-6 Groundwater Standards, NJ Water Pollution Control Act)	2 (Safe Drinking Water Act Primary Standards)	2	2	2 (total)
Nickel	13.4	NG	'No MCL - (monitoring required).	NG	100 (based on soluble salts)
Potassium	NG	NG	NG	NG	NG
Selenium	10 (NJAC 7:9-6 Groundwater Standards, NJ Water Pollution Control Act)	10 (Safe Drinking Water Act Primary Standards)	50	50	40 (total)
Silver	50	50 (Safe Drinking Water Act Primary Standards)	NG	100 (Secondary Standard)	40
Sodium	NG	NG	NG	NG	50,000
Tin	NG	NG	NG	NG	NG
Vanadium	NG	NG	NG	NG	NG
Zinc	NG	5,000 (Safe Drinking Water Act Secondary Standards)	NG	5,000 (Safe Drinking Water Act Secondary Standards)	2,000



Table 3. EPA Region VI PRGs, and NJDEP clean-up criteria.

Note: ROD cleanup levels are 10 mg/kg for SVOCs and 1.0 mg/kg for VOCs.

Note 2: Results of post treated soil showed the highest total Target Compound List (TCL) VOC concentration was 0.028 mg/kg and the highest total TCL SVOC concentration was 1.143 mg/kg.

Chemical of Concern	Region VI PRGs (mg/kg) Cancer Risk of 1 x 10E-06	Region VI PRGs (mg/kg) Non-Cancer HI = 1	NJDEP Residential Direct Contact Soil Cleanup Criteria (mg/kg)	NJDEP Impact to Groundwater Soil Cleanup Criteria (mg/kg)
<b>Volatile Organic Compounds (VOCs)</b>				
Acetone		14,000	1000	100
2-Butanone (methyl ethyl ketone)		22,000	1000	50
Tetrachloroethene	0.48	38	4	1
1,1,1-Trichloroethane		2,000	210	50
1,2-Dichloroethene		43 (cis) 69 (trans)	79 (cis) 1000 (trans)	1 (cis) 50 (trans)
Toluene		660	1000	500
Ethylbenzene		1,900	1000	100
Total Xylenes		270	410	67
Chlorobenzene		150	37	1
<b>Semi Volatile Organic Compounds (SVOCs)</b>				
Bis-2-Ethylhexyl phthalate	35	1200	49 (proposed value 35)	100
Di-n-octyl phthalate		2,400	1100	100
Di-n-butyl phthalate		6,100	5700	100
Butylbenzyl phthalate		12,000	1,100	100
Fluoranthene		2,300	2,300	100
Pyrene		2,300	1,700	100