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**FINAL  
PRELIMINARY CLOSE OUT REPORT**

**REMEDIAL ACTION OVERSIGHT**

**RE-SOLVE, INC. SITE  
NORTH DARTMOUTH, MASSACHUSETTS**

**RESPONSE ACTION CONTRACT (RAC), REGION I**

**For  
U.S. Environmental Protection Agency**

**By  
Tetra Tech NUS, Inc.  
and Raytheon Engineers & Constructors, Inc.**

**EPA Contract No. 68-W6-0045  
EPA Work Assignment No. 010-ROBF-0118  
TtNUS Project No. 7588**

**August 1998**

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**TETRA TECH NUS, INC.**

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## 1.0 INTRODUCTION

This Preliminary Close Out Report documents that the U.S. Environmental Protection Agency (EPA) has completed construction activities for the final operable unit (OU3) at the Re-Solve, Inc. Site (Site) in accordance with *Close Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-09). Previously completed construction activities for operable units 1 and 2 are also summarized in this report. EPA and the Massachusetts Department of Environmental Protection (MADEP) conducted a pre-final inspection on June 11, 1998, and determined that the contractors have constructed the OU3 portion of the remedy in accordance with remedial design (RD) plans and specifications. Operation and maintenance of the remedy will continue until the target remediation level corresponding to a  $1 \times 10^{-5}$  cancer risk level is attained. The 1987 Record of Decision (ROD) estimated the target remediation level could be achieved within 10 years. Due to the Site's identification as a dense non-aqueous phase liquid (DNAPL) site, operation and maintenance of the remedy will likely extend beyond ROD-estimated 10 year period.

## 2.0 SUMMARY OF SITE CONDITIONS

This section describes historical site information and construction activities completed under operable units 1, 2, and 3.

### 2.1 Background

Re-Solve, Inc. was a waste chemical reclamation facility situated on a six-acre parcel of land on North Hixville Road in North Dartmouth, Massachusetts. The Site is in a rural area in the southeastern portion of the state, near the Rhode Island border. The Site is bounded by wetlands to the north and east and a pine and mixed hardwood forested area to the south and west. An Algonquin Gas Pipeline right-of-way abuts the eastern boundary of the Site.

The land surrounding the Site is predominantly zoned for single family residential use. Approximately 110 people live within a one-half mile radius of the Site, and approximately 700

people live within a one-mile radius of the Site. Three residences are located within 150 yards of the Site, one to the northwest, one to the west, and the other to the southwest, and six other residences are found along North Hixville Road within one-quarter mile of the Site. All residences in the area obtain water from private wells located on their property.

The Copicut River, classified as Class B by the Commonwealth of Massachusetts, is located along the eastern edge of the Site. Class B waters are designated for protection and propagation of fish, other aquatic life, and wildlife; and for primary and secondary contact recreation. Carol's Brook is located along the southern edge of the Site and drains into the Copicut River. The Copicut River drains directly into Cornell Pond, approximately one-quarter mile down river from the Site. Cornell Pond is popular for sport fishing and has been designated as a secondary water supply for the City of Fall River.

Re-Solve, Inc. operated as a waste chemical reclamation facility from 1956 until its closure in 1980. A variety of hazardous materials were handled at the Site including solvents, waste oils, organic liquids and solids, acids, alkalies, inorganic liquids and solids, and polychlorinated biphenyl compounds (PCBs).

In December of 1980, the Massachusetts Division of Hazardous Waste agreed to accept Re-Solve Inc.'s offer to surrender its hazardous waste disposal license on the condition that all hazardous waste be removed from the Site. In late 1981, after the Massachusetts Attorney General sued Re-Solve, Inc. and its principals, Re-Solve, Inc. removed drums and other debris, including buildings, from the Site. The Site was then covered with a large quantity of sand. The contents of the four on-site lagoons, cooling pond, and oil spreading operation were not removed. The Site was placed on the final National Priorities List (NPL) on September 8, 1983 (48 F.R. 40670).

EPA commenced a Remedial Investigation and Feasibility Study (RI/FS) to assess the extent of on-site source contamination and evaluate remedial alternatives in the fall of 1982. The RI/FS was completed in June of 1983. This study identified the on-site contamination source as

approximately 3,100 cubic yards of lagoon wastes and 3,900 cubic yards of contaminated soil.

## 2.2 1983 ROD - Operable Unit 1

On July 1, 1983, a Record of Decision (ROD) was signed by the EPA Regional Administrator for the selection of a source control remedial action for the Site. This ROD called for the excavation of approximately 7,000 cubic yards of material (i.e., four waste lagoon areas, former cooling pond area, oil spreading area, and other "hot spots"), transportation of the material to an off-site disposal facility, and site capping as the source control remedy. The remedial action work performed in accordance with the 1983 ROD is considered to be Operable Unit 1 (OU1). Work performed in connection with OU1 is detailed in the Site Specific Quality Management Program Final Report for Construction dated September 21, 1987, and prepared by the Army Corps of Engineers (USACE).

Through an interagency agreement, EPA contracted with USACE to perform the design and construction of the selected remedy. The design called for the excavation and disposal of materials known to be contaminated with PCB concentrations greater than 50 parts per million (ppm). During remedial design, the quantity of waste requiring disposal was increased to a total of 15,000 cubic yards. Excavation under OU1 began in July of 1984. Near the completion of excavation, additional studies conducted to evaluate the effectiveness of the remedial action indicated that soils contaminated with PCBs at concentrations greater than 50 ppm remained to a depth of 10 feet below seasonal low groundwater. USACE informed EPA of these findings in April of 1985. At that point, the remedial action contract was terminated and a Supplemental RI was initiated to determine the further extent of on-site residual contamination in soils. Site capping did not occur. The final inspection of OU1 work was conducted by EPA, Massachusetts Department of Environmental Quality Engineering (predecessor of MADEP), Town of Dartmouth, and USACE on June 24, 1985. Construction deficiencies noted during the inspection were corrected as of January 30, 1986.

Concurrent with the USACE activity, EPA had initiated an Off-Site RI/FS in September of 1983 to assess the extent of contamination that had migrated beyond the boundaries of the Site. The final draft of the RI was completed in February of 1985. The results indicated that the Site was acting as a continuous source of contamination and contamination migrating off site was impacting groundwater, surface water, and sediment.

In April 1985, the Off-Site FS was nearing completion when EPA was informed of the extent of contamination that still existed on site. As part of the development of alternatives in the Off-Site FS, it had been assumed that the on-site source removal activity would be completed and that the on-site cap would be already in place. Due to the discovery of additional contamination, the cap was not installed and EPA elected to conduct the Supplemental RI to determine the nature and extent of contamination in off-site soils and to supplement information presented in the Off-Site RI. It was determined that, upon completion of a Supplemental RI, a comprehensive FS would be developed for both source control and management of migration.

The Supplemental RI was initiated in September of 1985 and completed in February of 1987. The results indicated approximately 31,000 cubic yards of soil were contaminated with volatile organic compounds and approximately 61,000 cubic yards of soil were contaminated with PCBs. The report also documented contamination of on-site and off-site groundwater with volatile and semi-volatile organic compounds and PCBs, contamination of downgradient surface water by volatile organic compounds (VOCs), PCB and VOC contamination of sediments, and PCB contamination of fish.

The FS was released to the public for review and comment on June 2, 1987. EPA published notice of completion of the FS and of the proposed plan on June 17, 1987. The final remedial action to be implemented at the Site is embodied in a second ROD executed by the Regional Administrator on September 24, 1987, with the concurrence of the Commonwealth of Massachusetts. The Responsible Parties (RPs) formed the "Re-Solve Site Group" and assumed responsibility for Site remediation. A mixed funding Consent Decree was signed on May 31,

1989, requiring EPA to reimburse the RPs approximately 30 percent of the reasonable remedial action costs, but with a cap of approximately \$6.9 million.

### 2.3 1987 ROD - Operable Units 2 and 3

The main contaminants at the Site are PCBs and VOCs. The remedy selected in the 1987 ROD includes both source control and management of migration (MOM) components. The source control component called for site security and excavation of: 1) PCB-contaminated soils above 25 ppm in the Waste Management Area (WMA) (upland area) portion of the Site; and 2) PCB-contaminated sediments above 1 ppm for treatment by on-site dechlorination. The MOM component included treatment of VOC-contaminated groundwater by an on-site process involving metals removal, air stripping, and carbon adsorption to reduce contaminants to levels which would result in an excess cancer risk of  $1 \times 10^{-5}$ . The ROD estimated it would require 10 years to achieve the groundwater remediation level; however, this period will likely be extended due to the presence of DNAPL at the Site (which was not known at the time of the signing of the 1987 ROD). The source control component of the remedy is Operable Unit 2 (OU2) and the management of migration component of the remedy is Operable Unit 3 (OU3).

In 1992, source control pilot tests determined that on-site treatment of contaminated soil using the dechlorination process was economically impractical and would significantly increase the volume of liquid residuals requiring off-site disposal. Based on the results of the pilot tests, on June 11, 1993, EPA issued an Explanation of Significant Differences (ESD) which decoupled the dechlorination process (DeChlor) from the low-thermal desorption process (X\*TRAX) for on-site soil treatment. The ESD permitted the organic liquid residual waste stream generated by the low-thermal desorption process to be shipped directly to an off-site RCRA and TSCA-permitted incinerator for disposal.

The OU3 remedy called for reinjection of treated groundwater into the aquifer to encourage flushing of the contaminants. This portion of the remedy was removed during the MOM design process. Source control remediation was assumed to mitigate the need for soil flushing since soils above the seasonal groundwater low (SGL) level in VOC-hot spot areas were excavated

and treated. The minimal remaining VOC contamination (i.e., soils above SGL not excavated) would be addressed by degradation or by natural flushing due to precipitation. Also, groundwater modeling simulations showed that the inclusion of reinjection wells might pose a risk of remobilizing DNAPL. Treated groundwater is discharged directly to the Copicut River.

The 1987 ROD also required deed restrictions and other institutional controls to ensure non-interference with the performance of the work and prohibit the use of the WMA, including the groundwater thereunder, after completion of the remedial action.

## 2.4 Remedial Construction Activities Under the 1987 ROD

### Operable Unit 2

Source control pilot activities began in September of 1991; major activities included the construction of a temporary water treatment plant, installation of a concrete pad with sheetpiling for the soil treatment unit, construction and pilot testing of the X\*TRAX/DeChlor soil treatment unit, and construction of a Support Zone. Following decoupling of DeChlor from the X\*TRAX process, full-scale operation of the X\*TRAX process commenced on June 21, 1993. Full-scale X\*TRAX treatment of PCB-contaminated soils and sediments was completed on July 19, 1994, and site demobilization was completed on December 21, 1994. A total of approximately 36,000 cubic yards of PCB-contaminated soils were excavated, treated, and backfilled on site. Approximately 1,500 cubic yards of PCB-contaminated sediments were excavated and backfilled on site; 210 cubic yards of the excavated sediments required treatment prior to backfilling.

EPA, MADEP, and EPA's oversight contractor conducted a Source Control closeout Site walk over on December 14, 1994, to inspect the completion of the Source Control remedy, resulting in a list of items to be addressed for Site closeout. On May 2, 1995, EPA, MADEP, EPA's oversight contractor, and the RP contractors conducted another Site walk over to evaluate the wetlands hydrology and check on the status of the Source Control Site closeout items. On June 21, 1995, EPA, MADEP, EPA's oversight contractor, the RP contractors, and members of

the Re-Solve Site Group conducted a final Source Control Closeout Issues inspection. During this inspection, EPA determined that all the Source Control closeout issues had been adequately addressed and declared the Source Control remedy complete. The Source Control remedial action is detailed in the Final Remedial Action Report, Source Control Remedial Action dated February 1996.

### Operable Unit 3

The Management of Migration (MOM) remedial action contractor was retained by the RPs on August 1, 1996. EPA conditionally approved the MOM 100% Design on July 10, 1996 and gave final approval on October 23, 1996. MOM construction, which took place during 1997 and 1998, included the installation of eight groundwater extraction wells, 25 additional monitoring wells, and wetland piezometers; groundwater extraction well pump tests; construction and testing of the groundwater treatment plant, including subsurface extraction well piping; and baseline environmental monitoring.

A two-tiered groundwater extraction system was installed. The inner group of four groundwater extraction wells (Tier I) was installed along the eastern boundary of the WMA to contain the DNAPL contamination and prevent migration beyond the WMA boundary. The outer group of four groundwater extraction wells (Tier II) was installed along the eastern boundary of the dissolved VOC plume to clean up the contamination to the established cleanup standards. The new monitoring wells supplement existing wells to form a network to be used for both water level measurements and water quality sampling.

Equipment, performance, and operations testing of the groundwater treatment plant were completed in accordance with the final Field Operations Support Plan (FOSP). Following review of the test results, EPA granted approval and the RPs commenced full-scale operation of the MOM remedy on April 27, 1998. EPA and MADEP conducted a pre-final inspection on June 11, 1998, and identified minor "punch list" items requiring completion.

The operation and maintenance phase of the MOM remedy includes operation and maintenance of the groundwater treatment plant (GWTP), process monitoring of the treatment system, and performance monitoring. Process monitoring includes sampling and analysis of: groundwater from each extraction well; combined influent to the GWTP; process water at various stages within the treatment system; effluent from the GWTP; sludge and spent carbon produced during plant operation; and influent and effluent vapors from the catalytic oxidation system. Process monitoring will determine: 1) the effectiveness of operation of the primary unit processes within the GWTP; and 2) compliance with effluent discharge and air emission criteria.

Environmental performance monitoring includes sampling and analysis of groundwater, surface water, fish, and residential wells, and wetlands monitoring. Performance monitoring for groundwater will provide the basis for evaluating whether the cleanup standards are being attained downgradient of the Tier I (DNAPL source containment) extraction wells and, if so, whether one or more of the Tier II (dissolved plume containment and remediation) extraction wells can be shut down. As the groundwater cleanup proceeds, the outer set (Tier II) of extraction wells will be successively shut down, followed by interim monitoring to ensure that cleanup standards continue to be attained downgradient of the wells. The Tier I extraction well system will continue to operate and contain the DNAPL from migrating beyond the WMA. Tier II compliance monitoring of groundwater will be performed for the entire area downgradient of the Tier I extraction well system following shutdown of the entire Tier II extraction well system (i.e., upon remediation of the dissolved plume) to determine whether the cleanup standards continue to be attained downgradient of the Tier I extraction wells. Comprehensive compliance monitoring will continue for 3 years following the shutdown of all extraction wells to determine that the ROD-specified cleanup standards continue to be satisfied. Performance monitoring results for surface water, wetlands, fish, and residential wells will be used to demonstrate that there are no detrimental impacts to these media. After EPA and MADEP have certified that the remedial action is complete, all treatment and extraction system equipment will be decommissioned and site closure activities completed.

## Institutional Controls

Institutional controls, including site security, land access and deed restrictions have been put in place, as required by the 1987 ROD, Consent Decree and SOW. The Site is fenced with secured traffic gates and bilingual warning signs along the fence line. Land access has been ensured through an Easement and Non-Interference Agreement, executed on June 11, 1998, between the Settling Defendants and Mr. & Mrs. John Reed. This Agreement grants access to property owned by the Reeds to perform work relating to the Consent Decree and ensures non-interference in the conduct of such work. The 1998 Agreement modifies and supersedes the terms of an earlier, Easement and Non-Interference Agreement, dated July 8, 1989.

On May 22, 1989, Re-Solve, Inc. and the Settling Defendants entered into an Easement and Restriction Agreement. A second Restriction Agreement was executed on July 17, 1995, to clarify the scope of the existing restrictions and conform them to the precise wording of the Consent Decree and SOW. These restrictions are perpetual and will remain in force after the completion of the work. The goal of these deed restrictions is to prohibit the use of the WMA, including groundwater thereunder, after all remedial activities are completed.

### **3.0 DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE AND QUALITY CONTROL**

Activities completed at the Site were consistent with the ROD, the ESD, and all EPA-approved project plans. Specifically, the remediation activities associated with the source control/management of migration were conducted in compliance with the respective approved 100% Remedial Designs, which were consistent with EPA Quality Assurance and Quality Control (QA/QC) procedures. Detailed project plans for all activities, including sampling and analyses, were reviewed and approved by EPA prior to initiation of field work. EPA approved all sampling and analytical methods that were utilized for these studies. All analytical data were reviewed and validated in accordance with applicable EPA-approved project plans. All performance data were reviewed by EPA and EPA's oversight contractor. Oversight split samples were collected by EPA's oversight contractor during the Source Control and MOM activities to assess the validity of the RP contractors' sampling and analysis programs, and to

verify that all sample results are in conformance with the limits set forth in the EPA-approved project plans. Relative percent difference analyses have been performed on selected oversight split sample results to assess the precision of RP contractor results.

The QA/QC program utilized throughout the Remedial Action was sufficiently rigorous and was adequately complied with to enable EPA and the State to determine that analytical results reported are accurate to the degree needed to assure satisfactory execution of the RA, consistent with the ROD, ESD, and RD plans and specifications.

#### 4.0 ACTIVITIES AND SCHEDULE FOR SITE COMPLETION

As previously mentioned, the 1987 ROD estimated that the groundwater remediation level corresponding to a  $1 \times 10^{-5}$  cancer risk level could be achieved in 10 years. However, this time period will likely be extended due to the presence of DNAPL at the Site. Comprehensive compliance monitoring will be performed for three years following shutdown of the extraction wells. Construction completion requirements for the Site have been met as specified in OSWER Directive 9320.2-09. Specifically, all remedial action activities identified in the ROD and ESD have been successfully implemented and a joint pre-final inspection by EPA and the State for OU3 has been conducted.

Based upon the 1987 ROD completion schedule for OU3, the following activities will be performed:

Task	Estimated Completion	Responsible Organization
Groundwater Extraction & Treatment System Operational & Functional COMPLETE, Operations & Maintenance START	4/27/98	RP Contractor with EPA/MADEP oversight
Complete Punch List Items	9/98	RP Contractor with EPA/MADEP oversight
Second Five-Year Review	9/30/98	EPA
Third Five-Year Review	2003	EPA
Fourth Five-Year Review	2008	EPA
Operations & Maintenance COMPLETE, Comprehensive Compliance Monitoring START	2008*	RP Contractor with EPA/MADEP oversight
Comprehensive Compliance Monitoring COMPLETE	2011*	RP Contractor with EPA/MADEP oversight

Task	Estimated Completion	Responsible Organization
Final Inspection	2011*	EPA/State
Final Close Out Report	2011*	EPA

\* Estimated completion dates; dates are contingent upon attainment of groundwater performance standards and DNAPL containment at the WMA boundary.

**5.0 FIVE-YEAR REVIEW**

Hazardous substances will remain at the site above health-based levels after the completion of the remedial actions. Pursuant to CERCLA section 121(c), the first five-year review of the Site was conducted in 1993. Subsequent five-year reviews will be conducted to ensure that the remedy remains protective of public health and the environment. All five-year reviews will be conducted pursuant to OSWER Directive 9355.7-02, "Structure and Components for Five-Year Reviews". The second five-year review is scheduled for completion by September 30, 1998.

Approved By:

  
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 Larry Brill, Chief  
 Remediation & Restoration I Branch

*August 19, 1998*  
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 Date

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July 1, 1983

Site Specific Quality Management Program

Final Report for Construction of Contract No. DACW45-84-C-0079

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Re-Solve, Inc. Superfund Site

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Explanation of Significant Differences

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Re-Solve, Inc. Superfund Site

Halliburton NUS Corporation and Raytheon Engineers & Constructors, Inc. for EPA

February 1996

Final Management of Migration Remedial Action Field Operations Support Plan

Re-Solve, Inc. Superfund Site

Roy F. Weston, Inc. for the Re-Solve Site Group

April 1997