

FIVE-YEAR REVIEW REPORT

**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. 027-FRFE-0118
TtNUS Project No. N7877**

September 1998



TETRA TECH NUS, INC.

FIVE-YEAR REVIEW REPORT

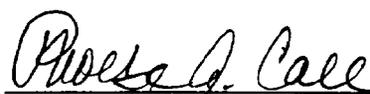
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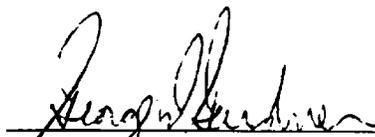
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Phoebe A. Call
Project Manager



George D. Gardner, P.E.
Program Manager

1.0 INTRODUCTION

As requested by EPA, a second five-year review was conducted of the remedial action selected for the Re-Solve, Inc. Superfund Site (Site) in North Dartmouth, Massachusetts. The first five-year review of the Site was conducted in 1993. Pursuant to Section 121 (c) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended, and Section 300.430 (f) (4) (ii) of the National Oil and Hazardous Substances Pollution Contingency Plan, reviews are mandated for all remedial actions which result in any hazardous substances remaining at the site. Reviews are conducted at least every 5 years after the initiation of the remedial action to assure that human health and the environment are being protected by the implemented remedial action.

The activities conducted for the five-year review were based on the Scope of Work attached to the Work Assignment Form prepared by EPA and signed on June 18, 1998 and on the Draft Work Plan, Five-Year Review, Re-Solve, Inc. Site, prepared by Tetra Tech NUS and Raytheon Engineers & Constructors and dated July 1998. Work conducted for this review was authorized under Work Assignment No. 027-FRFE-0118. This five-year review is consistent with OSWER Directive 9355.7-02, "Structure and Components of Five-Year Reviews."

The first five-year review was conducted because a Record of Decision (ROD) was signed for the Site in September 1987. The source control full-scale remedial action began shortly following completion of the first five-year review and was completed approximately 2 years later. The management of migration full-scale remedial action activities began subsequent to the completion of the source control remedial action and are currently ongoing.

1.1 Scope of the Five-Year Review

Activities conducted to complete the five-year review included:

- Document Review: Applicable site-related documents were reviewed to become familiar with the site history and status. The following documents or files were reviewed:
 - Records of Decision signed on July 1, 1983 and on September 24, 1987;
 - Consent Decree (May 31, 1989);
 - Explanation of Significant Differences (ESD) (June 9, 1992);
 - Final Five-Year Review Report (June 1993);
 - Final Remedial Action Report - Source Control Remedial Action (February 1996);
 - Draft Preliminary Close Out Report (July 1998); and
 - Available analytical results to date on effluent water and effluent air samples from the groundwater treatment plant (constructed during the management of migration remedy), and the last six monthly progress reports.
- Standards/ARARs Review: Federal regulations which were listed in the ROD were reviewed and updated with revisions promulgated subsequent to the implementation of the 1987 ROD, with respect to site-related contaminants of concern and components of the remedy listed in the ROD. Revisions that were promulgated prior to June 1993 are detailed in the 1993 Five-Year Review Report. State standards and regulations are under review by the Massachusetts Department of Environmental Protection (MADEP). Upon completion of the MADEP review, their information may be attached to, or supplement, this Five-Year Review Report, as necessary. Selected EPA Region I officials were interviewed regarding pertinent regulatory revisions promulgated subsequent to the 1987 ROD and 1993 Five-Year Review Report. The purpose of this review was to ensure that the selected remedy remains protective of human health and

the environment, in light of revised standards, such as lowered MCLs. Table 3-1 presents the applicable standards as listed in the 1987 ROD, with revisions effective as of August 1998.

- Planning Board Director Interview: The Town of Dartmouth Planning Board Director was interviewed concerning the current site zoning, town drinking water supply well locations, and any proposed changes.

1.2 Description of the Remedy

In July 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 polychlorinated biphenyl compounds (PCB)-contaminated soils for off-site disposal and site capping as the source control remedy. During remedial design, the quantity of waste requiring disposal was increased to a total of 15,000 cubic yards. Because studies conducted near the completion of excavation to evaluate the effectiveness of the remedial action indicated that extensive PCB contamination remained, the remedial action was terminated in 1985. Additional investigation was undertaken to further define the extent of on-site PCB contamination and resulted in the signing of a second ROD in September 1987.

The selected remedy described in the 1987 ROD is a comprehensive approach for site remediation which includes both a source control and management of migration component. The source control component entails:

- "Excavation of 22,500 cubic yards of PCB-contaminated soils located in the unsaturated zone and treatment on-site in a mobile dechlorination facility. The health-based cleanup level for on-site soils contaminated with PCBs is 25 ppm. This cleanup level corresponds to a 10^{-5} cancer risk level. Soils will be treated in the dechlorination facility to a level of 25 ppm PCBs and then placed back on-site."

- “Excavation of 3000 cubic yards of PCB-contaminated sediments located in wetland resource areas to the north and east of the site and treatment on-site in the mobile dechlorination facility. The cleanup level for PCB-contaminated sediments is 1 ppm. Achievement of the target cleanup level will require the disturbance and temporary loss of areas classified as wetlands. The unavoidable impacts to these resource areas will be mitigated to the maximum extent possible and following such activities, a wetland restoration program will be implemented.”

The ROD further stated that if dechlorination, based on the results of the pilot-scale studies, is determined not to be implementable at the Re-Solve site, EPA will select on-site incineration as the principal treatment technology for this component of the selected remedy.

The management of migration component, implemented upon completion of the source control component, entails:

- “Active restoration of the overburden and bedrock aquifers contaminated with volatile organic compounds (VOCs) using on-site treatment involving air stripping and carbon adsorption. Groundwater will be treated to reduce contaminants to levels which result in an excess cancer risk of 1×10^{-5} , assuming additivity. EPA estimates that this target remediation level can be achieved within 10 years.”
- “EPA has determined that it is technically infeasible to remediate PCBs located in the saturated zone soil matrix on-site and ensure that the resultant concentration in groundwater would attain a level that is equivalent to a 10^{-5} cancer risk level. However, treatment of VOCs will render the PCBs relatively immobile, thus restricting contamination to the waste management area, only. Since PCBs will be present in groundwater in excess of the health-based cleanup level upon completion of groundwater remediation, it will be necessary to implement institutional controls on groundwater use within the waste management boundary.”

The Source Control dechlorination process was divided into two components: low-thermal desorption (X*TRAX™), to vaporize and transfer the contaminants from the solid phase (soil/sediments) and then condense into an organic liquid phase. Treated soil containing less than the 25 ppm clean up level would be backfilled on site. The second component, dechlorination (DeChlor), would treat the organic condensate to break down the PCBs into less toxic compounds, which would be disposed off-site. Following the 1992 pre-design pilot studies, the Source Control Pre-Design Report documented that the DeChlor process significantly increased the volume of process residuals that required off-site disposal and was not economically feasible. The Report recommended that DeChlor be removed from the treatment process and that the concentrated PCB liquids and other system residuals be shipped off-site to a TSCA-permitted facility for disposal.

EPA analysis of the results of the pilot testing against the six criteria specified in Section III.D. of the Scope of Work (SOW) found the recommended modification to be consistent with EPA's waste minimization philosophy and to be more cost-effective, environmentally sound, and safe. The resultant treatment train would still be protective of human health and the environment.

In concurrence with the recommended modification, EPA signed an Explanation of Significant Differences on June 11, 1993 to formally decouple the DeChlor from the full-scale remediation. Consistent with the ESD, EPA modified the RD/RA SOW in 1993 to more accurately describe the remedy as a "Non-Incineration Soil Treatment Technology."

The Site soil and sediment cleanup standard includes only PCBs. Site-related groundwater indicator compounds identified in the ROD include trichloroethylene (TCE), tetrachloroethylene (PCE), and methylene chloride. Treatment to 5 ppb for TCE, PCE, and methylene chloride is expected to reduce other compounds identified in groundwater to non-detectable levels. Additional groundwater cleanup standards identified in the Consent Decree include all Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act in effect at the time of the entry of the Consent Decree (May 31, 1989), including, but not limited to, lead, vinyl chloride, p-dichlorobenzene, and 1,1-dichloroethylene. The three indicator

compounds and these four additional compounds are referred to as the Site contaminants of concern in this five-year review.

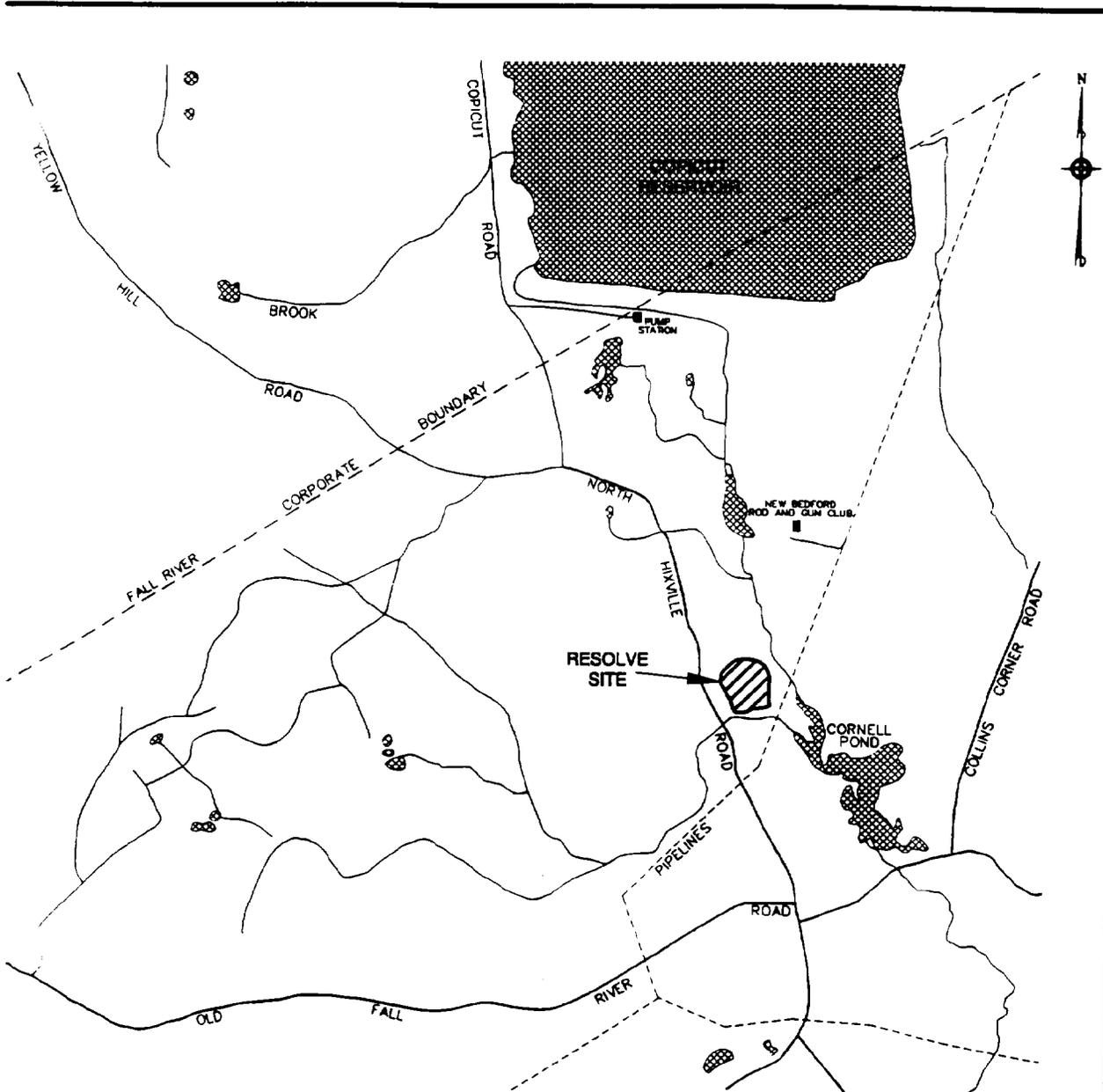
2.0 SITE DESCRIPTION AND BACKGROUND

Re-Solve, Inc. was a waste chemical reclamation facility that operated from 1956 until its closure in 1980. The Site is located on a rural 6-acre parcel in North Dartmouth, Massachusetts (in the southeastern portion of the state) and was placed on the Final NPL on September 8, 1983. A site location map is presented in Figure 2-1. A Remedial Investigation/Feasibility Study (RI/FS) was completed in 1983 and was followed by a ROD signed on July 1, 1983 (described in Section 1.2). The main contaminants at the site are PCBs, VOCs, and metals.

1983 ROD - Operable Unit 1

The remedial action work performed in accordance with the 1983 ROD is considered to be Operable Unit 1 (OU1). The subsequent remedial action involved excavation of 15,000 cubic yards of PCB-contaminated soils for off-site disposal. Studies conducted near the completion of excavation to evaluate the effectiveness of the remedial action specified in the 1983 ROD indicated that extensive PCB contamination remained. As a result, the remedial action was terminated in April 1985 and a Supplemental RI was initiated in September 1985 to determine the further extent of on-site residual contamination. Concurrent with the on-site activity, an off-site RI/FS was conducted to assess the extent of contamination that had migrated beyond the boundaries of the Site. The final draft of the off-site RI was completed in February 1985. The results indicated that the Site was acting as a continuous source of contamination and that contamination migrating off site was impacting groundwater, surface water, and sediment. EPA elected to develop a comprehensive FS for both source control and management of migration upon completion of the Supplemental RI.

The Supplemental RI was completed in February 1987. The results indicated approximately 31,000 cubic yards of soil were contaminated with VOCs 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 VOCs, semi-volatile organic compounds (SVOCs), and



NOTES:

1. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
2. PLAN **NOI** TO BE USED FOR DESIGN.

GRAPHIC SCALE

0' 500'

1 INCH = 500 FEET

SITE LOCATION MAP		FIGURE 2-1	
FIVE-YEAR REVIEW REPORT			
RESOLVE SITE - NORTH DARTMOUTH, MA		 TETRA TECH NUS, INC.	
DRAWN BY: D.W. MACDOUGALL	REV.: 0	55 Jonspin Road Wilmington, MA 01887 (978)658-7899	
CHECKED BY: M. RAMBELLE	DATE: SEPTEMBER 2, 1998		
SCALE: 1" = 500'	ACAD NAME: DWG\RESOLVE\FIG_2-1.DWG		

PCBs, contamination of downgradient surface water by VOCs contamination of sediments by VOCs, and contamination of fish by PCBs.

1987 ROD - Operable Units 2 and 3

A second ROD was signed on September 24, 1987. The second ROD, described in Section 1.2, called for site security, excavation and treatment of PCB-contaminated soils and sediments by on-site dechlorination, and treatment of VOC-contaminated groundwater by an on-site process involving metals removal, air stripping, and carbon adsorption. 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). The Responsible Parties (RPs) formed the "Re-Solve Site Group" and assumed responsibility for Site remediation.

On May 31, 1989, a Consent Decree was entered which resolved the liability of 224 generator parties (Settling Defendants) who contributed hazardous substances to the Site. In September of 1989, the United States entered into two administrative settlements with additional generator parties.

Based on the results of the source control pilot tests, on June 11, 1993, EPA issued an 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 resultant treatment train remained protective of human health and the environment.

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 dense non-aqueous phase liquid (DNAPL) which had been encountered during Source Control soil excavation activities in 1993. 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.

Remedial Construction Activities - Operable Unit 2

Source control pilot activities began in September of 1991. 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. 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.

Two wetland areas, from which PCB-contaminated sediments were excavated, were backfilled with clean materials and restored to approximate the diversity of wetland species formerly present. Periodic wetland inspections have been performed; successful restoration of the east and north wetland areas has been documented.

During the June 21, 1995, final Source Control 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.

Remedial Construction Activities - Operable Unit 3

Management of Migration (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 Waste Management Area (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 Final Preliminary Close Out Report (August 1998) documents the completion of construction activities for OU3.

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.

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. 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, ReSolve, 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 STANDARDS REVIEW AND UPDATE

The National Contingency Plan (NCP) requires that applicable or relevant and appropriate Federal criteria, advisories, and guidance, and State standards be considered during the evaluation of proposed remedial action alternatives. Federal environmental laws which are applicable or relevant and appropriate to the recommended source control and management of migration alternatives at the Re-Solve Site were listed in the 1987 ROD as follows:

- Resource Conservation and Recovery Act (RCRA)
- Clean Water Act
- Safe Drinking Water Act
- Executive Order 11990 (Protection of Wetlands)
- Toxic Substances Control Act (TSCA)
- Clean Air Act

The 1987 ROD describes the applicable or relevant and appropriate requirements (ARARs) of portions of the above-referenced federal environmental laws to the Site. While conducting this five-year review, these portions of the federal environmental laws were reviewed and several EPA officials were interviewed regarding any changed regulations. Such changes that were made during the 5 years following the signing of the 1987 ROD were described in the 1993 Five Year Review Report. Therefore, changes that were made during the past 5 years are described in this report.

The State has identified state requirements that are more stringent than the federal ARARs described in the 1987 ROD. The state requirements for the Site are found in Table IV of

Appendix A to the 1987 ROD. These state requirements include Massachusetts regulations in the areas of air quality control, wetlands, water supply, hazardous waste, and water pollution control. MADEP is reviewing these regulations as part of this Five-Year Review. Upon completion of the MADEP review, their information may be attached to, or supplement, the Five-Year Review, as necessary. A detailed review and update of the specific ARARs follows.

3.1 Resource Conservation and Recovery Act

The 1987 ROD stated that the applicable or relevant and appropriate RCRA regulations are those concerning closure performance standards and groundwater protection requirements. The RCRA regulations cited in the ROD were reviewed with Mr. James Thompson of EPA Headquarters and Mr. Frank Battaglia of EPA Region I during this five-year review. Mr. Thompson is a RCRA Land Disposal Regulations (LDR) specialist and was interviewed regarding the source control portion of the remedy. Mr. Battaglia is an official with the Region I Hazardous Waste Program Unit, specializing in RCRA Corrective Action programs in Massachusetts and was interviewed regarding the MOM portion of the remedy. No changes to these regulations since the first five-year review (1993) were found that may affect the selected remedies.

3.2 Clean Water Act

Source Control (OU2)

Treated water discharged from the water treatment system (WTS) during the source control remedy was required to meet surface water discharge limits of the Clean Water Act regulations. In order to comply with National Pollutant Discharge Elimination System (NPDES) equivalency requirements, the RPs prepared and submitted a Wastewater Treatment System Permit Equivalency Submittal, Revision 1, dated December 23, 1991, which was approved by EPA. This submittal presents effluent discharge limits based on federal Ambient Water Quality Criteria and federal and Massachusetts drinking water

standards. Several of these limits were revised in a letter dated January 2, 1992 from Serrine Environmental Consultants, a ReSolve Site Group contractor.

One change to the WTS discharge limits was made during full-scale source control remediation. It was discovered that the acetone limit published by the MADEP, Office of Research and Standards, in the "Drinking Water Standards and Guidelines for Chemicals in Massachusetts Drinking Waters, updated: Spring 1993" was 3 mg/L, and not the 0.7 mg/L used to determine the effluent limit for acetone. Based on this drinking water limit, EPA approved a request to change the monthly effluent discharge limit for acetone from 0.7 mg/L to 3.0 mg/L, and to change the daily limit to 15 mg/L. This request was approved by EPA on February 16, 1994 contingent upon an increase in the frequency of bioassay testing from semi-annually to quarterly for the duration of the Source Control Remedy and for 1 year after the implementation and start-up of the MOM. Based on the results of the Source Control remedy, EPA incorporated the acetone discharge limit into the final MOM Field Operations Support Plan and approved a semi-annual bioassay sampling frequency.

Wetlands

The 1987 ROD stated that regulations promulgated under Section 404(b)(1) of the Clean Water Act (CWA) apply to the wetlands excavation, filling, and restoration portion of the selected remedy. The U.S. Army Corps of Engineers (COE) enforces this portion of the CWA. Ms. Karen Adams, Massachusetts Permit Section Chief, COE, was interviewed for this review and stated that there have been no changes to these regulations within the past 5 years that would affect the selected remedy.

Management of Migration (OU3)

In order to comply with NPDES equivalency requirements, effluent discharge limits for water treated on site during the MOM portion of the remedy were derived and set in the RP contractor's Implementation Plan (March 1996). These effluent discharge limits were based on requirements set forth in EPA's letter to ENSR dated October 13, 1992, which

requires discharge limits to be set based on the dilution factor approach using the federal Ambient Water Quality Criteria (AWQC). However, in cases where limits based on Best Available Technology (BAT) were lower, such lower limits were used. AWQC applicable to the Site include fresh water acute criteria, fresh water chronic criteria, and human health criteria based on the consumption of organisms (fish) only. Human health criteria based on drinking water do not apply, since the Copicut River (receiving water) is not used as a drinking water supply. In addition, effluent discharge limits for several compounds were set at Massachusetts Drinking Water Standards (MMCL) listed under 310 CMR 22.00 because it was the only regulatory standard available. The approved effluent discharge limits are listed in Table 3-3 of the MOM Remedial Design Implementation Plan (IP) and are based upon an anticipated average flow of 40 gpm.

Current Massachusetts Drinking Water Standards (May 1998) and federal AWQC (1995) were reviewed for all applicable effluent discharge limits, as shown in Table 5-6 of the 60% Design Report. Massachusetts Drinking Water Standards have not changed from those listed in the 60% Design for parameters with limits based on MMCLs, and federal AWQC have not been established for the parameters to which MMCLs have been applied. Federal AWQC, however, have changed for several parameters since effluent discharge limits were set in the 60% Design. The only discharge limits affected by the federal AWQC changes are the daily maximum and average monthly limits for cadmium, copper, and mercury; the daily maximum limits for arsenic, silver, and zinc; and the average monthly limit for nickel, as shown in Table 3-1. As a result of the AWQC changes, some discharge limits increased and some decreased.

The AWQC average monthly discharge limit for mercury increased from 0.2 ppb to 15 ppb based upon the Chronic Continuous Concentration of 0.9081 ppb, (U.S. EPA, 1995 Update: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water). The document states "the CCC of 0.9081 ppb might not adequately protect such important fishes as the rainbow trout, coho salmon, and blue gill." During the Copicut River fish sampling, trout were present in the river. Currently, the mercury discharge limit will remain at 0.2 ppb until adequate data are produced that justify raising the limit. The

TABLE 3-1
EFFLUENT DISCHARGE LIMITS COMPARISON: 1998/1994
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RE-SOLVE, INC. SITE
NORTH DARTMOUTH, MASSACHUSETTS
(all units in ug/l)

PARAMETER	1998		1994 ⁽¹⁾	
	Daily Maximum	Average Monthly	Daily Maximum	Average Monthly
Cadmium	38	25	34	13
Copper	133	95	174	123
Mercury	32	15 ⁽²⁾	45	0.2
Nickel		550		1,668
Arsenic	6,443		6,822	
Silver	23		17	
Zinc	1,251		1,232	

NOTES: Only changed limits are shown.

(1) Defined in MOM Intermediate (60%) Design Report.

(2) Based upon the Chronic Continuous Concentration (CCC) of 0.9081 ppb shown in EPA's 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (September 1996). The document states "The CCC of 0.9081 ug/l might not adequately protect such important fishes as the rainbow trout, coho salmon, and bluegill."

revised AWQC daily maximum limits for copper and mercury were lowered from 174 ppb to 133 ppb, and from 45 ppb to 32 ppb, respectively. The average monthly discharge limits for copper and nickel were lowered from 123 ppb to 95 ppb, and 1,668 ppb to 550 ppb, respectively.

In addition, Ms. Cindy Roberts of EPA headquarters Health and Ecological Criteria Division, interviewed for this review, indicated that beryllium currently has no AWQC because EPA withdrew its recommendations for it.

The human health criterion for PCBs for consumption of organisms is 0.000045 ppb for each Aroclor. Based on this value, the 60% MOM Design Report established 0.0033 ppb as the total PCB effluent discharge limit. Because this low concentration was below a reasonable detection limit for PCBs, the discharge limit was set at a typical detection limit of 0.5 ppb. Note: recently proposed revisions may increase the human health criterion to 0.00017 ppb for each Aroclor, or a total PCB effluent discharge limit of 0.0124 ppb (still below the typical analytical detection limit).

During this Five-Year Review, other analytical methods which can achieve lower detection limits were evaluated. Mr. David Pincumbe of the EPA Region I Water Quality Unit, interviewed for this review, indicated that modified Method 680 can be used to obtain PCB detection limits in the 0.010 ppb range. Ms. Lucy Guzman, TetraTech NUS, Inc. Lead Chemist, stated that EPA Method 680 was proposed in 1985, but never finalized, and is relatively expensive (about \$800 per analysis versus about \$150 per analysis for EPA Method 8080, which is currently used on site). Some commercial laboratories are offering a lower detection limit with a modified Method 1668. Considering cost and availability of the modified Methods 680 or 1668, EPA should consider an alternate analytical method for PCB effluent analysis to provide a lower detection limit, and thus a lower discharge limit.

As indicated earlier, the effluent discharge limits were based upon an average flow of 40 gpm. As of August 3, 1998, the system is operating at 50 gpm to improve capture of the

groundwater contamination. The groundwater treatment system was designed to treat contaminated groundwater at flows ranging from 40 gpm to 80 gpm. Table 3-3, Note 3, of the EPA-approved Implementation Plan states that "if average design flow is changed during system start-up, limits will be proportionally modified." Based on the increase in flow to 50 gpm, the effluent discharge limits should be proportionally modified.

MOM effluent data collected through July 22, 1998, have been reviewed; all effluent discharges have complied with the established discharge limits. Elevated pH levels (above the 8.3 unit discharge limit) were observed in the effluent discharge during the first 2 weeks of operation of the groundwater treatment system (April 1998). The pH steadily declined to 6.8 units. The initial pH fluctuation was attributed to the fresh carbon in the 10,000-pound aqueous-phase carbon vessels in the MOM treatment system. Once a sufficient volume of water moved through the system, the pH quickly declined. Based on this pH fluctuation, EPA required the pH levels in the system to be monitored during every change out of a 10,000-pound carbon vessel as follows: before the first carbon vessel, after the first carbon vessel, and after the second carbon vessel. This monitoring will be performed daily for the first 3 weeks after change out, or until the pH is consistently below 8.3, and for at least the first 3 years of operation. EPA requires reinstatement of this monitoring after that period if the carbon is manufactured through a different process or supplied by a different carbon vendor.

Arsenic effluent discharge limits have not been exceeded during operation of the MOM groundwater treatment system. However, elevated arsenic levels were observed in the effluent during the first few days of operation. The source of the elevated arsenic was the fresh carbon in the 10,000-pound aqueous-phase carbon vessels. Based on this initial arsenic fluctuation, EPA required additional arsenic monitoring during every carbon vessel change out.

3.3 Safe Drinking Water Act

Federal drinking water standards in effect in 1987 for site contaminants of concern were presented in the ROD and are shown in Table 3-2 for comparison with current federal drinking water standards, which were last published in October 1996. The federal drinking water standards are the Maximum Contaminant Levels (MCLs) as defined in the Safe Drinking Water Act. New MCLs established subsequent to the entry of the Consent Decree on May 31, 1989 were included in the first (1993) Five-Year Review report and are included in Table 3-2. MCLs for site contaminants of concern have not changed since the 1993 Five-Year Review.

In 1992, EPA promulgated treatment methods in the Final National Primary Drinking Water Standards for lead. This regulation establishes treatment techniques that are to be used when an action level of 15 ppb of lead is exceeded at ten percent of the taps sampled that use a public drinking water supply. This regulation vacated the previous MCL of 50 ppb. The SOW filed with the ESD on June 11, 1993 states that the MCL for lead in effect at the time the Pre-Design Workplan is approved shall be the cleanup standard. As the MOM Design Refinement Workplan, dated August 1992, was approved after the lead MCL was vacated, the concentration of 15 ppb serves as the lead action level.

Although the ROD called for the attainment of federal MCLs in groundwater beyond the waste management area, it should be noted that the Massachusetts MCL for p-Dichlorobenzene (1,4) has been lowered from 75 ppb (federal MCL) to 5 ppb. During the remedy's compliance monitoring period, p-Dichlorobenzene (1,4) should be monitored to ensure compliance with the Massachusetts MCL.

3.4 Executive Order 11990 (Protection of Wetlands)

Mr. Edward Reiner, an EPA Region I official in the Wetland Protection Program, was interviewed for this five-year review and also the previous five-year review. Mr. Reiner indicated that there have been no changes to wetlands regulations within the past 5 years

TABLE 3-2
DRINKING WATER STANDARDS COMPARISON: 1998/1993/1987
DRAFT FIVE-YEAR REVIEW REPORT
RE-SOLVE, INC. SITE
NORTH DARTMOUTH, MASSACHUSETTS
(all units in ug/l)

CONTAMINANTS OF CONCERN	1998/1993 MCLs	1987 MCLs
Trichloroethylene	5	5
Tetrachloroethylene	5	None
Methylene chloride	5	None
Lead	15 ⁽¹⁾	50
Vinyl Chloride	2	2
p-Dichlorobenzene	75 ⁽²⁾	75 ⁽³⁾
1,1-Dichloroethylene	7	7

NOTES:

- (1) Action Level
 - (2) Massachusetts MCL is 5 ug/l in 1998
 - (3) In effect at signing of Consent Decree (May 31, 1989)
- MCL = Maximum Contaminant Level (from Safe Drinking Water Act)

that would affect the selected remedy. Mr. Reiner stated during the first five-year review that the following additional regulations would apply to the remedy:

- Executive Order 11988 (Protection of Floodplains) - This executive order was signed on the same date as Executive Order 11990, and states that floodplain values should not be damaged. The selected remedy is in accordance with this order as excavated areas have been restored to their approximate original elevation.
- Fish and Wildlife Coordination Act - This act gives the federal Fish and Wildlife Service the option to be involved with wetland alterations. The U.S. Fish and Wildlife Service has reviewed and approved wetlands restoration plans and participated in several inspections of the wetlands.
- Memorandum of Agreement between EPA and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act, Section 404(b)(1) - This memorandum was signed on February 6, 1990 (effective February 7, 1990) and provides additional guidance on the cited Clean Water Act section regarding avoidancy, minimization, and compensatory mitigation of wetlands disturbances. Mr. Reiner indicated that the selected remedy appears to comply with this memorandum.

3.5 Toxic Substances Control Act

The 1993 Five-Year Review report stated that TSCA regulations concerning the storage of PCBs were determined to be ARARs for the Site. An EPA letter dated November 23, 1992 states that the TSCA regulations at 40 CFR 761.65 (a), (b), and (c) set forth substantive requirements for the temporary storage of PCBs at concentrations of 50 ppm or greater prior to disposal.

Revised TSCA regulations went into effect on August 28, 1998. Ms. Kim Tisa, TSCA PCB Coordinator for EPA Region I, was interviewed for this five-year review. Ms. Tisa stated

that the filter cake generated by the filter press during operation of the groundwater treatment plant is considered a remediation waste under TSCA. Under the revised regulations, remediation waste containing less than 50 ppm PCBs (the Site filter cake contained 23 ppm PCBs) is exempt only from TSCA disposal requirements. She indicated that EPA's preliminary decision under the revised regulations is to require compliance of remediation waste with all other, non-disposal, TSCA requirements (e.g., temporary storage). Temporary storage requirements for TSCA-regulated wastes have not been revised in the past 5 years. Drums containing filter cake are stored within the treatment plant building and comply with TSCA storage requirements.

Ms. Tisa stated that the new TSCA regulations call for a groundwater cleanup level of 0.5 ppb PCBs for non-restricted water usage areas. She indicated that this level does not apply to the waste management area of the Site as future use of groundwater in this area will be restricted, but a TSCA-mandated risk assessment may be necessary to determine a site-specific cleanup level. However, the 0.5 ppb cleanup level is expected to apply to the groundwater beyond the waste management area. As groundwater at the waste management area boundary and beyond will be cleaned up to a 10^{-5} (1 chance in 100,000) cancer risk (0.08 ppb PCBs), this TSCA regulation will be met in non-restricted water usage areas (i.e., beyond the waste management area).

3.6 Clean Air Act

Mr. Robert Judge of the EPA Region I Air Quality Planning Unit Office of Ecological System Protection and Mr. David Conroy, Chief of the unit, were interviewed for this review. They indicated that no additional requirements under the Clean Air Act would apply to the Site.

The MOM 60% Design Report requires a Destruction and Removal Efficiency (DRE) of 95% (as required in 40 CFR 264.1032) of total VOCs in the catalytic oxidation unit. Mr. Judge indicated that establishment of a DRE for the site is not a CAA requirement. All air sampling to date has shown compliance with 95% DRE for total VOCs.

3.7 Additional Compliance Issues

All of the analytical results for the soil and sediments treated and backfilled during the Source Control remedy were well below the cleanup level of 25 ppm PCB. The overall average treated soil concentration backfilled on site was 2.8 ppm.

The SOW appended to the Consent Decree stated that, in addition to the regulations listed above, the Solid Waste Disposal Act (SWDA) and Occupational Safety and Health Act (OSHA) were ARARs for the Site. Ms. Cynthia Green of EPA Region I, interviewed for this five-year review, indicated that it appeared that the only applicable portion of the SWDA is the requirement for RCRA hazardous wastes to be disposed of appropriately. The RP contractor confirmed that no RCRA hazardous wastes are generated on site. OSHA requires the preparation of and compliance with a site-specific Health and Safety Plan (HASP). The RP contractor complied with the April 1997 HASP prepared for site activities.

3.8 Zoning, Deed Restrictions, and Site Security

Mr. Donald Perry, the Town of Dartmouth Planning Board Director, was interviewed for this five-year review. The Site is still located within an Aquifer Protection District Area 3, according to Town of Dartmouth zoning by-laws. The purpose of the Aquifer Protection District is to protect existing and potential groundwater supplies and recharge areas, particularly those areas which contribute to the public water supply. Area 3 is the least restrictive of the three area designations and includes potential groundwater development areas and those areas that provide recharge to Area 2 (which is the recharge area generated by a public water supply well). Commercial, industrial, and residential development are permitted in Area 3 with certain restrictions.

The Site is also subject to the underlying zoning, Single-residence B, which allows only single-family residential uses and is more restrictive than the Aquifer Protection District Area 3 by-laws. This underlying zoning had been Single-residence A in 1993, which

allows only single-family residential and agricultural uses. No changes to the Site's Aquifer Protection District area designation or to the Site's underlying zoning are anticipated.

Currently, the properties surrounding the site are all supplied with drinking water through private residential wells. The closest public drinking water supply wells are approximately 3 miles south of the site along Route 6.

The SOW (page 15) calls for the Settling Defendants to obtain deed restrictions with respect to the Waste Management Area to provide for the following:

- i. no intrusive earthwork activities beyond 6 inches and only for superficial regrading;
- ii. no off-site trucking of on-site soils;
- iii. desired landscaping to be done by bringing fill onsite;
- iv. all plans for development to be approved by EPA and the Commonwealth;
- v. residential development restrictions."

A primary purpose of the deed restrictions is to prohibit the use of the Waste Management Area, including the groundwater thereunder, after completion of the Remedial Action. The above deed restrictions have been obtained and were entered on July 17, 1998 at the Bristol County Registry of Deeds.

In addition, a revised Easement and Non-Interference Agreement by and between Mr. and Mrs. Reed (adjacent property holders) and the ReSolve Site Group was recorded on June 26, 1998 with the Bristol County Registry of Deeds. The agreement was prepared to facilitate sampling and maintenance activities in connection with the implementation of the MOM Remedy.

Institutional controls concerning site security (described in the SOW appended to the Consent Decree) have been put in place on-site. These institutional controls include fencing, a secured front gate, bilingual warning signs along the perimeter fence and Site boundary, and the provision of bilingual warning signs to the Dartmouth Board of Health for placement along the Copicut River and Cornell Pond.

4.0 FIVE-YEAR REVIEW SUMMARY OF FINDINGS

The primary purpose of this five-year review was to evaluate whether the remedial action selected for the Re-Solve, Inc. Site remains protective of public health and the environment. The review focused on both the effectiveness of the selected cleanup technologies and on the specific performance levels established in the ROD. As discussed in Section 3, sampling and analytical data indicate that the source control (dechlorination technology) operations achieved the cleanup performance levels established in the ROD and Consent Decree. Sampling and analytical data collected to date during the management of migration (groundwater treatment technology) operations indicate compliance with NPDES regulations. Compliance with groundwater cleanup performance levels established in the ROD and Consent Decree will be evaluated upon completion of the MOM portion of the remedy. The remedy is expected to be protective of public health and the environment upon completion.

Changes in federal environmental laws since the 1987 ROD do not affect the protectiveness of the remedy. As noted in Section 3, state standards and regulations are under review by the MADEP. Upon completion of the MADEP review, their information may be attached to, or supplement, the Five-Year Review, as necessary. Changes in federal environmental laws in the 5 years since the 1987 ROD was signed were addressed in the first five-year review conducted in 1993. Changes in Site ARARs (federal) since the 1993 five-year review are discussed in Section 3 and are summarized below.

Clean Water Act

As noted in the 1993 report, Clean Water Act regulations concerning discharges to surface water (National Pollutant Discharge Elimination System, or NPDES) should be considered an ARAR for the selected remedy because treated water is being discharged to the Copicut River during management of migration (and also was discharged during source control). This was not included as an ARAR in the 1987 ROD because the treatment and discharge of water was not anticipated at that time.

Since the 1993 Five-Year Review, the only discharge limits affected by the federal AWQC changes are the daily maximum and average monthly limits for cadmium, copper, and mercury; the daily maximum limits for arsenic, silver, and zinc; and the average monthly limit for nickel, as shown in Table 3-1. As a result of the AWQC changes, some discharge limits increased and some decreased. The increase of the average monthly limit for mercury from 0.2 ppb to 15 ppb is based upon the Chronic Continuous Concentration of 0.9081 ppb, which "might not adequately protect such important fishes as the rainbow trout, coho salmon, and bluegill." During the Copicut River fish sampling, trout were present in the river. Currently, the mercury discharge limit will remain at 0.2 ppb until adequate data are produced that justify raising the limit. In addition, beryllium currently has no AWQC. The remedy is designed to adequately remove these metals and remains protective of human health and the environment.

The use of an alternate analytical method for PCBs in the effluent to allow for lower detection limits, and thus a lower discharge limit, should be considered. Modified EPA Methods 680 or 1668 can be used to obtain PCB detection limits in the 0.010 ppb range. However, they are more expensive than the method currently used on site and Methods 680 and 1668 have not been finalized and approved by EPA.

The groundwater treatment plant effluent flow rate has been increased from 40 gpm to 50 gpm to improve the capture of groundwater contamination. The groundwater treatment system was designed to treat contaminated groundwater at flows ranging from 40 gpm to 80 gpm. Based on the increase in flow to 50 gpm, the effluent discharge limits should be proportionally modified. Since the current flow is within the design range, the groundwater treatment system remains protective of human health and the environment.

MOM effluent data collected through July 22, 1998, have been reviewed; all effluent discharges have complied with the established discharge limits. Based on pH fluctuations (above the 8.3 unit effluent discharge limit) observed during the first 2 weeks of operation of the groundwater treatment system (April 1998), EPA required the pH levels in the system to be monitored at specific locations and frequencies during every change out of a

10,000-pound carbon vessel. EPA requires reinstatement of this monitoring after a 3-year period if the carbon is manufactured through a different process or supplied by a different carbon vendor. Similarly, based on an initial fluctuation in arsenic effluent discharge concentrations, EPA required additional arsenic monitoring during every carbon vessel change out.

Safe Drinking Water Act

No new federal MCLs for Site contaminants of concern were established since the 1993 five-year review. The lead MCL was vacated from 50 ppb in June 1992, when EPA promulgated a treatment technique regulation for lead. As the MOM Design Refinement Workplan, dated August 1992, was approved after the lead MCL was vacated, a concentration of 15 ppb serves as the lead action level.

The Massachusetts MCL for p-Dichlorobenzene (1,4) has been lowered from 75 ppb (federal MCL) to 5 ppb. The groundwater treatment system was designed to remove the volatile organic, semi-volatile organic, and metals site contaminants of concern to the MCLs shown in Table 3-2. The system will adequately treat p-Dichlorobenzene (1,4) to the Massachusetts MCL. Since the groundwater treatment system is designed to remove this contaminant, the system remains protective of human health and the environment.

Toxic Substances Control Act

An EPA official indicated that under revised TSCA regulations, which went into effect on August 28, 1998, the filter cake generated by the filter press during operation of the MOM groundwater treatment plant is considered a remediation waste. Under the revised regulations, remediation waste containing less than 50 ppm PCBs (the Site filter cake contained 23 ppm PCBs) is exempt only from TSCA disposal requirements. Temporary storage requirements for TSCA-regulated wastes have not been revised in the past five years. Drums containing filter cake are stored within the treatment plant building and comply with TSCA storage requirements.

The new TSCA regulations call for a groundwater cleanup level of 0.5 ppb PCBs for non-restricted water usage areas. This level does not apply to the waste management area of the Site as future use of groundwater in this area will be restricted, but a TSCA-mandated risk assessment may be necessary to determine a site-specific cleanup level. However, the 0.5 ppb cleanup level is expected to apply to the groundwater beyond the waste management area; it is expected that this cleanup level will be met in non-restricted water usage areas (i.e., beyond the waste management area).

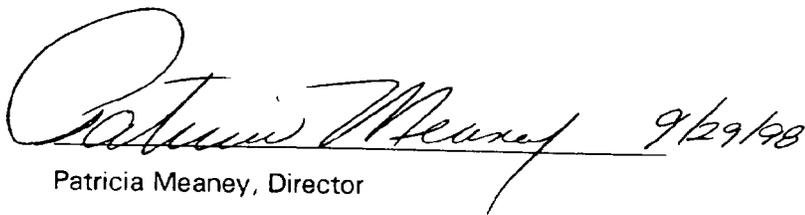
As indicated in Section 3.0, zoning at the Site has changed from single-family residential and agricultural to only single-family residential since 1993. This change does not affect the implementation of the Remedy and no zoning changes at the Site are anticipated. Deed restrictions to prohibit the use of the Waste Management Area, including the groundwater thereunder, after completion of the Remedial Action have been entered at the Bristol County Registry of Deeds. In addition, a revised Easement and Non-Interference Agreement between adjacent property holders and the ReSolve Site Group was recorded to facilitate sampling and maintenance activities in connection with the implementation of the MOM Remedy.

Institutional controls concerning site security have been put in place on-site as indicated in Section 3.0.

A separate site visit was not required for this five-year review since EPA Contractor personnel are actively involved in present site activities.

A brief evaluation was conducted to determine whether a higher level of review (e.g., Level II) is necessary in accordance with OSWER Directive 9355.7-02. A determination was made that a higher level of review of the Re-Solve Site is not necessary.

I certify that the remedy selected for this site remains protective of human health and the environment. The next five-year review will be conducted by 2003.

 9/29/98

Patricia Meaney, Director

Office of Site Remediation and Restoration, Region I