Five-Year Review Report
Malta Rocket Fuel Area Superfund Site
Towns of Malta and Stillwater
Saratoga County, New York

September 2004

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name *(from WasteLAN)*: Malta Rocket Fuel Area

EPA ID *(from WasteLAN)*: NYD980535124

Region: 2 | **State:** NY | **City/County:** Malta and Stillwater/Saratoga

SITE STATUS

NPL Status: ■ Final ☐ Deleted ☐ Other (specify)_____

Remediation Status (choose all that apply): ☐ Under Construction ■ Operating ☐ Complete

Multiple OUs? ■ YES ☐ NO | **Construction completion date:** 09/1999

Has site been put into reuse? ☐ YES ☐ NO ■ N/A

REVIEW STATUS

Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Patricia Simmons Pierre

Author title: Remedial Project Manager | **Author affiliation:** EPA

Review period: 1999 to 2004

Date(s) of site inspection: 05/13/2004

Type of review:
☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion ■ Statutory

Review number: ☐ 1 (first) ■ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:
☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#
☐ Construction Completion ■ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date *(from WasteLAN)*: 09/23/1999

Due date *(five years after triggering action date)*: 09/23/2004

Does the report include recommendation(s) and follow-up action(s)? ■ yes ☐ no
Is human exposure under control? ■ yes ☐ no
Is contaminated groundwater under control? ■ yes ☐ no ☐ not yet determined
Is the remedy protective of the environment? ■ yes ☐ no ☐ not yet determined
Acres in use or available for use: **restricted:** 165 **unrestricted:** 0

Introduction

This second five-year review for the Malta Rocket Fuel Area site, located in the Towns of Malta and Stillwater, Saratoga County, New York, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM), Patricia Simmons Pierre. The review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(F)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the site decision documents. This report will become part of the site file.

In accordance with Section 1.3.3 of the five-year review guidance, a subsequent statutory five-year review is triggered by the signing date of the previous five-year review report. The first five-year review was signed on September 23, 1999.

This five-year review found that the implemented remedies are functioning as intended and continue to protect human health and the environment.

II. Site Chronology

Table 1 summarizes the site-related events from discovery to construction completion.

III. Background

Physical Characteristics

The Malta Rocket Fuel Area site, also known as the Saratoga Research and Development Center, is located off Plains Road in the Towns of Malta and Stillwater in Saratoga County, New York. Situated approximately 1.5 miles south of Saratoga Lake, and 2 miles northeast of Round Lake, the site includes a square parcel of approximately 165 acres of developed land, known as the Malta Test Station (the "Test Station"). The Test Station includes 33 buildings, numerous rocket test stands, concrete quench pits, leach fields/septic tanks, dry wells, storage areas, disposal areas, and a small artificial pond known as Muggett's Pond. A fence surrounds the majority of the Test Station, which is currently owned by the Luther Forest Technology Campus Economic Development Corporation. The site also includes portions of the predominantly undeveloped woodlands that surround the Test Station; the former General Electric (GE)/Exxon Nuclear building, which is currently owned by New York State Energy Research and Development Authority (NYSERDA); and areas located adjacent to the Test Station which have been impacted by site-related constituents in the groundwater. These areas are owned by NYSERDA and the Luther Forest Corporation (see Figure 1).

Site Geology/Hydrogeology

The site is underlain by several layers of unconsolidated sediment with a total thickness reaching up to 250 feet (ft.) in some areas. There is a surficial layer of aeolian (wind-blown) sand and silt deposits varying in thickness from 0 to 14 ft. Underlying the aeolian deposits is a thick (up to 220 ft.) sequence of glaciolacustrine (originating from glacial lakes) deposits. Below the glaciolacustrine deposits is approximately 10 to15 ft. of a dense glacial till consisting of shale fragments, silt, and clay. Directly above the bedrock and immediately below the glacial till lies a thin layer (less than 2 ft.) of fine to coarse sand with minor amounts of silt and clay (see Figure 2).

Much of the groundwater in the vicinity of the site eventually breaks out as surface water springs and seeps into ravines surrounding the site. The site is situated on a drainage divide with surface water in the northern portion of the site flowing toward Saratoga Lake, and surface water in the southern portion of the site flowing toward Round Lake and Little Round Lake. The depth to groundwater at the site ranges from approximately 15 to 55 ft. below the land surface.

The water supply system for the site consists of two active production wells located at the Test Station. The Luther Forest Well Field (LFWF) is located approximately one mile southwest of the site and north of Knapp Road, in the Town of Malta. This well field consists of five production wells connected to the Luther Forest water distribution system, which are operated by the Saratoga Water Company. Regional groundwater flow in the vicinity of the LFWF is in a southwest direction toward Round Lake. The Cold Springs Well Field (CSWF) is located approximately one mile northeast of the site, along Cold Springs Road in the Town of Stillwater. This well field consists of one well that was installed in 1990, but was not connected to the Luther Forest water distribution system until 1993. There are two additional production wells in the vicinity of the site, the Saratoga Hollow and Saratoga Ridge Wells. These wells are located along Lake Road north of the CSWF, and they provide water to the Saratoga Glen Hollow housing development and the Saratoga Ridge Townhouse development, respectively. Regional groundwater in the vicinity of the CSWF is believed to flow northeast toward Saratoga Lake (see Figure 3).

Land and Resource Use

Established by the U.S. Government Department of War (which later became the Department of Defense [DOD]) in 1945, the Test Station was used as a research and development facility for rocket and weapons testing for more than 50 years. These activities involved the use of carbon tetrachloride (carbon tet) and trichloroethylene (TCE) as solvents and degreasers.

In 1955, the U.S. Government established a perpetual restrictive safety easement around the Test Station to limit facility access to only those personnel who worked at the facility. This safety easement encompassed approximately 1,800 acres of pine forest in a circular area of a one-mile radius from the center of the Test Station. The safety easement was eliminated in 1964. The Luther Forest Corporation currently operates a logging business within the former safety easement. The land outside the former safety easement is zoned for residential use; approximately 12,000 people live within a two-mile radius of the site. The Luther Forest Residential Development, located to the

west of the site, is owned by The Luther Forest Corporation. Potable water for the Luther Forest Residential Development is obtained from the LFWF and the CSWF.

History of Contamination

Operations at the facility resulted in the contamination of the soil and groundwater with volatile organic compounds (VOC) and metals.

Initial Response

In 1979, approximately eight grams of uranium hexafluoride gas were released in a portion of the former GE/Exxon Nuclear building, depositing a thin film on the floor of the room. The area was decontaminated and the contaminated material was sent to licensed disposal facilities. A subsequent radiation survey of the building indicated that all beta and gamma readings taken were within the limits of unrestricted use.

In 1980, the combustible contents of drums containing hydrazine and CAVEA-B, experimental liquid rocket propellants, were burned on-site by NYSERDA in accordance with a New York State Department of Environmental Conservation (NYSDEC) restricted burning permit. The non-combustible drum contents were transferred to new poly-lined drums and staged until they were disposed of off-site in 1981.

In June 1985, transformers located on a portion of the Test Station leased to Power Technologies, Inc. (PTI) were tested and found to contain polychlorinated biphenyls (PCBs). NYSERDA and PTI decontaminated the transformers in 1987.

In 1985 and 1986, groundwater at the site was sampled and found to contain carbon tet, TCE, chloroform, and several metals. In 1987, an air stripper was installed (under an NYSDEC permit) on the Test Station water supply wells by the Wright-Malta Corporation (Wright-Malta) to treat the groundwater prior to its use by employees at the Test Station.

In 1987, NYSERDA sampled liquid and sludge from several septic tanks. Based on detections of VOCs in these samples, NYSERDA subsequently pumped out and rinsed the septic tanks.

In July 1987, the site was placed on the National Priorities List (NPL). Following the listing of the site on the NPL, because of concerns regarding the potential for the contaminated groundwater from the site to affect the LFWF (the CSWF and the Saratoga Hollow and Saratoga Ridge wells did not exist at that time), groundwater and surface water quality monitoring between the site and the LFWF was initiated. This monitoring system serves as an "early warning" to ensure that contaminated groundwater from the site is not migrating toward the Luther Forest Residential Development.

In 1989, a drum containing 4,270 milligrams per liter (mg/l) of lead, 235 mg/l of zinc, and 93 mg/l of copper was disposed of off-site by NYSERDA in a Resource Conservation and Recovery Act (RCRA)-compliant facility.

In September 1989, EPA issued a Unilateral Administrative Order to eight potentially responsible parties (PRPs)[1] to perform a remedial investigation and feasibility study (RI/FS). In March 1990, GE, NYSERDA, and DOD entered into a participation agreement among themselves and undertook performance of the RI/FS.

From 1991 to 1994, a comprehensive RI was performed to define the nature and extent of the contamination at the site. A total of 48 distinct areas of concern and site-wide ground water and surface water were investigated. Components of the RI field work include a groundwater investigation, including the installation of 30 wells to supplement the existing network of 18 monitoring wells; surface water and sediment investigations at six surface water bodies at the site; a radiation survey in the former GE/Exxon Nuclear building; geophysical surveys at 19 areas to identify locations of possible buried metal; soil gas surveys at 46 areas to provide a semi-quantitative evaluation of the extent of VOCs in shallow soil; a surface soil investigation of 67 samples collected from 60 locations, a subsurface soil investigation consisting of 254 shallow subsurface soil samples and three deep subsurface soil samples; a dry well investigation of 31 soil and sediment samples from 23 dry well features (dry wells, catch basins, floor drains, a swale and an open sump); and a septic tank investigation.

Several response actions were performed concurrent with the RI, including the decommissioning and removal of two compressed gas cylinders, excavating and recycling 560 empty, buried, crushed drums, cleaning out several septic tanks, catch basins, and dry wells, and cleaning out a sump.

Basis for Taking Action

Groundwater samples collected during the RI confirmed the presence of VOCs above federal drinking water standards, Maximum Contaminant Levels (MCLs). Carbon tet and TCE were detected near the center of the Test Station at maximum concentrations of 220 micrograms per liter (µg/l) and 280 µg/l, respectively.

The results of the RI sampling and analysis were used to conduct human health and ecological risk assessments for the site. Based on these risk assessments, the levels of PCBs in soil at the Building 23P area (where lead was also detected) and the levels of mercury at the Muggett's Pond Drainage Ditch Intersection (see Figure 4) were found to be unacceptable.

IV. Remedial Actions

Remedy Selection

On July 18, 1996, a Record of Decision (ROD) was signed, selecting a remedy for the site. The major components of the selected remedy are as follows:

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[1] The Respondents are Advanced Nuclear Fuels, Inc., Curtiss-Wright Corporation, GE, MTI, NYSERDA, Olin Corporation, PTI, and Wright-Malta.

1. Continued pumping of the Test Station water supply well(s) and treatment of the water by air stripping to provide an acceptable drinking water supply for the Test Station employees, which may be accomplished using the existing air stripper. Continued monitoring of the influent and effluent of the air stripper in accordance with New York State requirements to ensure that it effectively treats the on-site water supply to federal MCLs, or if more stringent, New York State drinking water standards.

2. Natural attenuation and degradation of VOCs in groundwater that are not captured by the pumping well(s) until the groundwater attains federal MCLs, or if more stringent, New York State groundwater standards.

3. Monitoring of surface water and groundwater to ensure that off-site groundwater users are not impacted by contamination from the site, that contaminated groundwater does not migrate into uncontaminated areas (*i.e.*, that the groundwater plume is contained), and that the natural attenuation and degradation processes are restoring the groundwater to the cleanup standards. The existing surface water and groundwater sample locations may be modified as necessary to meet the objectives of this monitoring program.

4. Excavation of contaminated soil at the Building 23P area to a depth of 1 foot or less having a concentration of greater than 10 milligrams per kilogram (mg/kg) of PCBs, soil at a depth below 1 foot having a concentration of greater than 25 mg/l of PCBs, and soil at any depth with a concentration of lead of greater than 1,000 mg/l.

5. Excavation of contaminated soil at the Muggett's Pond Drainage Ditch Intersection at any depth with a concentration of greater than 2 mg/l of mercury.

6. Backfilling of excavations in the Building 23P area and at Muggett's Pond Drainage Ditch Intersection with clean fill material, grading to blend with the surrounding areas, and revegetation.

7. Transportation of the excavated soil from the Building 23P area and Muggett's Pond Drainage Ditch Intersection and disposal off-site at an appropriate EPA-approved facility, consistent with RCRA and all other applicable or relevant and appropriate requirements.

8. Implementation of institutional controls, which may include new deed restrictions, to prevent ingestion of contaminated groundwater, to restrict withdrawal of groundwater within the vicinity of the plume that could adversely impact groundwater remediation, and to restrict the Test Station to its current commercial/industrial land use.

9. Evaluation of site conditions at least once every five years to ensure that the remedy is protective of human health and the environment. If justified by the review, EPA may require that additional remedial actions be implemented.

Remedy Implementation

In September 1997, EPA and the PRPs signed a Consent Decree for the performance of the work called for in the ROD. GE was designated the performing party responsible for implementation of the selected remedy.

The components of the remedy were addressed in four remedial work elements (RWEs): RWE I (Drinking Water)[2], RWE II (Groundwater), RWE III (Soil) and RWE IV (Institutional Controls).

No further remedial action was required for RWE I and RWE II after issuance of the ROD since the air stripper was already in operation and no actions were required related to natural attenuation and degradation of the VOCs in the groundwater. The remedial design related to RWE III and RWE IV was approved by EPA in September 1997.

The remedial actions performed for RWEs III and IV include the following:

RWE III (Soil)

Approximately four cubic yards of soil were excavated from the Building 23P area in July 1998. Six post-excavation soil samples were collected from the excavation and analyzed for PCBs and lead. All of the samples contained less than 10 mg/kg of total PCBs and less than 1,000 mg/kg of lead. Thus, they met the cleanup criteria specified in the ROD. The excavated area was subsequently backfilled with clean fill and seeded. The excavated soil was transferred to a roll-off container and staged.

Approximately 62 cubic yards of contaminated soil, including visible elemental mercury in soil and debris, were excavated from the concrete trough at the Muggett's Pond drainage ditch intersection and from the surrounding areas in July and September 1998. The excavated soil was transferred to 20-cubic yard roll-off containers and one-cubic yard soil boxes and staged. The elemental mercury and associated soil were placed in two one-liter glass bottles, which were stored in a five-gallon pail for secondary containment. The excavated area (except the concrete trough) was subsequently backfilled with clean fill and seeded.

Based on the analysis of samples for hazardous waste characterization, the excavated soil was determined to be nonhazardous and was shipped by truck to Waste Management Inc.'s facility in Model City, New York in November 1998. The two liter bottles containing elemental mercury and associated soil were determined to be hazardous and were transported by truck to Advance Environmental Technical Services's transfer station in Flanders, New Jersey in December 1998 and ultimately disposed of at AERC/MTI in Allentown, Pennsylvania in January 1999.

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[2] Wright-Malta provides bottled water for consumption by its Test Station employees.

RWE IV (Institutional Controls)

In accordance with the ROD, the Consent Decree required the implementation of institutional controls to prevent ingestion of contaminated groundwater, to restrict withdrawal of groundwater within the vicinity of the plume that could adversely impact groundwater remediation, and to restrict the Test Station to commercial/industrial use, which is its current land use. In 1999, to implement the institutional controls, an environmental restriction zone (ERZ)[3] was designated to prevent the capture zone of hypothetical future pumping wells from intersecting the groundwater plume of VOCs and thereby ensure containment of the plume and ERZ. Declarations of Restrictive Covenants were entered into with the property owners located within the environmental restriction zone, NYSERDA, Wright-Malta, and Luther Forest Corporation.

System Operations/Operation and Maintenance

As part of the operation and maintenance (O&M) program for RWEs I, II, and IV, the following activities are performed at the site:

- RWE I (Drinking Water): Influent and effluent water samples are collected from the on-site water supply system quarterly and analyzed for the presence of VOCs (specifically carbon tet and TCE) to ensure that the water supply is being effectively treated and meeting MCLs.[4]

- RWE II (Groundwater): As part of the Early Warning Monitoring System (EWMS), groundwater and surface water samples are collected semiannually, and analyzed for VOCs, hexavalent chromium, and total chromium, and groundwater elevations are measured at well locations to evaluate potential changes in the size and shape of the contaminant plume to ensure that off-site groundwater users are not impacted by site contamination.

- RWE IV (Institutional Controls): Site conditions are observed during the groundwater sampling activities in the ERZ to determine if any changes or development (specifically, installation of groundwater wells) have occurred. In addition, representatives from NYSERDA, Luther Forest Corporation, and Wright-Malta are asked about current or proposed changes in land use, groundwater usage, and compliance with the notice requirements in the respective deed restrictions.

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[3] The ERZ extends approximately 1,500 ft. from the upgradient and lateral edges of the VOC plume, and approximately 1,500 ft. from the downgradient edge of the VOC plume (see Figure 3).

[4] In response to a request made by the New York State Department of Health (NYSDOH) in February 2003, GE began analyzing selected samples for ammonium perchlorate. These analyses are not currently documented as part of the approved long-term monitoring program for the site, but are scheduled to continue through the end of 2004.

GE submits Operation and Maintenance reports to the EPA semiannually. These reports contain, among other things, an explanation of the operation, maintenance and monitoring activities performed, and the analytical results obtained during the reporting period.

The annual cost incurred by GE in relation to operation, maintenance, and long-term monitoring activities at the site is approximately $50,000.

V. Progress Since the Last Five-Year Report

The first five-year review for this site was approved on September 23, 1999, pursuant to OSWER Directives 9355.7-02 (1991), 9355.7-02A (1994), and 9355.7-03A (1995). The 1999 five-year review concluded that the response actions implemented at the site were in accordance with the remedy selected by EPA and that the remedy continues to be protective of human health and the environment. There were no issues, recommendations, or follow-up actions identified in the previous five-year review.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of Patricia Simmons Pierre (RPM), Michael Sivak (Risk Assessor), and Mindy Pensak (Biological Technical Assistance Group Coordinator), all of EPA, and Mark Chamberlain (Hydrogeologist) of the United States Army Corps of Engineers.

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the site, Cecilia Echols, published a notice in the *Saratogian,* a local newspaper, on June 10, 2004, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review to ensure that the remedies implemented at the site remain protective of public health and are functioning as designed. It was also indicated that once the five-year review is completed, the results will be made available in the local site repositories. In addition, the notice included the RPM's and the CIC's addresses and telephone numbers for questions related to the five-year review process or the site. A similar notice will be published when the review is completed.

Document Review

The documents, data, and information which were reviewed in completing the five-year review are summarized in Table 2.

Data Review

Influent and effluent water samples are collected from the on-site air stripper treatment system quarterly and analyzed for the presence of VOCs (specifically carbon tet and TCE). Influent concentrations of both carbon tet and TCE tended to fluctuate throughout the review period. Carbon tet concentrations ranged from a maximum of 43 µg/l to a minimum of 10.6 µg/l, while TCE concentrations ranged from a maximum of 28.2 µg/l to a minimum of 12.3 µg/l. Carbon tet and TCE concentrations in the effluent samples remained either undetectable or at estimated levels below the 1 µg/l analytical method reporting limit and well below the 5 µg/l MCL. Treatment system influent and effluent TCE and carbon tet concentrations are summarized in Table 3 and Table 4.

As was noted above, in February 2003, GE began analyzing air stripper samples for ammonium perchlorate.[5] As can be seen in Table 5, estimated concentrations of ammonium perchlorate (below the analytical method reporting limit of 2 µg/l) were detected during the February 2003 sampling event. Ammonium perchlorate was not detected in either the October 2003 or May 2004 samples. GE is scheduled to continue analyzing samples for ammonium perchlorate through the end of 2004. When the scheduled sampling is completed, EPA will determine whether or not ammonium perchlorate sampling should continue at the site.

As part of the EWMS, groundwater and surface water samples are collected semiannually and analyzed for the presence of VOCs, hexavalent chromium, and total chromium. Groundwater samples collected from monitoring wells DGC-3S, DGC-4S, M-27S, M-27D, M-33S, and M-33I are analyzed for the presence of VOCs, while groundwater samples collected from monitoring wells 13S, M-27S, and M-27D are analyzed for the presence of hexavalent chromium and total chromium. Surface water samples collected from locations SW-A and SW-D are analyzed for VOCs and samples from location SW-B are analyzed for the presence of VOCs, hexavalent chromium, and total chromium. In April 2003, samples from the EWMS monitoring wells and three surface water sampling locations were collected and analyzed for ammonium perchlorate. The analytical results showed no detections of ammonium perchlorate in the monitoring wells or the surface water locations. (All sampling locations are depicted in Figure 1.)

During the review period, VOCs were not detected in monitoring wells DGC-3S, DGC-4S, M-27S, M-33S, and M-33I, while concentrations of carbon tet and TCE in monitoring well M-27 D remained fairly consistent throughout the review period. Detections ranged from 5.1 to 28.9 µg/l, and from 2.4 to 27 µg/l for carbon tet and TCE, respectively. VOC results for monitoring well M-27D are summarized in Table 6.

Total chromium and hexavalent chromium concentrations in monitoring wells M-27S and M-27D were, generally, not detected. In the instances where either chromium or hexavalent chromium was detected, the levels were significantly lower than the New York State Groundwater Standard of 50

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[5] In February 2003, GE analyzed samples from the air stripper's influent, effluent, and two recovery wells (RW-1 and RW-2) for ammonium perchlorate. Since analytical results revealed no detections of ammonium perchlorate either at or above the data quality reporting limit, only the air stripper's effluent was analyzed for ammonium perchlorate during the October 2003 sampling event. Subsequently, NYSDOH requested that influent (instead of the effluent) samples be analyzed for ammonium perchlorate.

µg/l. The maximum concentration detected was 6.1 µg/l of total chromium in M-27D. Concentrations of total chromium and hexavalent chromium in monitoring well M-13S tended to fluctuate throughout the review period, with concentrations of total chromium and hexavalent chromium ranging from 13.4 to 249 µg/l, and 3.59 to 262 µg/l, respectively. Total chromium and hexavalent chromium results for monitoring well M-13S are summarized in Table 7.

VOC concentrations in surface water samples collected from all three locations during this review period were either not detected or less than performance standards.[6] Similarly, chromium results in samples collected at SW-B were well below the MCL of 50 µg/l; the maximum concentration detected was 3.1 µg/l.

Interviews

For this five-year review, John Strang, NYSDEC Project Manager, Steven Meier, GE Remedial Project Manager, and GE's Consultant, Brian Neumann, Project Manager for Shaw Environmental, Inc. were interviewed regarding background information and site operations.

Site Inspection

A site inspection related to this five-year review was conducted on May 13, 2004. Those in attendance included Patricia Simmons Pierre, Michael Sivak, Mark Chamberlain, John Strang, Steven Meier, and Brian Neumann.

The site inspection revealed that the fence around the Test Station is intact, the monitoring wells are in good condition, maintenance activities are being performed according to schedule and the air stripper treatment system is functional.

VI. Technical Assessment

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

The 1996 ROD called for the excavation and off-site disposal of contaminated soils. Soil contamination has been addressed through removal of contaminated soil and backfilling with clean soil. This approach reduces or eliminates on-site exposures through dermal contact with and ingestion of contaminated soil. Potential impacts of contaminated soil on groundwater have been addressed through removal of the contaminated source.

With regard to the groundwater, the ROD called for continued pumping of the Test Station water supply well(s) and natural attenuation and degradation of VOCs in groundwater that are not captured by the pumping well(s) until contaminant levels in the groundwater reach federal or state standards. Currently, six monitoring wells are periodically sampled for VOCs, and groundwater elevations are

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[6] Since surface water is being addressed under RWE III - Groundwater, MCLs are being used as the surface water performance standards for this site.

collected regularly from five on-site monitoring wells. Based upon the hydraulic gradients documented at the site, as groundwater flows laterally away from the source areas, it also flows downward. Although groundwater and surface water samples collected during the review period indicate that, in general, concentrations of VOCs are not increasing, it is unclear whether this is a result of natural attenuation or migration of the groundwater plume (laterally and/or vertically) to other areas of the site that are not currently being monitored as part of the EWMS. Further evaluation of the site is necessary to confirm whether or not natural attenuation is occurring.

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

An ecological risk assessment (ERA) was conducted during the RI and identified mercury in soil at the Muggett's Pond Drainage Ditch Intersection as posing a significant risk to terrestrial receptors. A cleanup goal of 2 mg/kg mercury was derived from the ERA. Subsequently, this area was excavated and backfilled with clean fill material. Since the toxicity values have not changed, the remedial action goal of preventing unacceptable risk continues to be met.

Surface water sampling data collected during this review period indicate that surface water concentrations of VOCs and chromium are either not detected or below surface water values protective of the environment. For this five-year review, the evaluation of groundwater focused on two primary exposure pathways, direct ingestion (as a potable water source) and the possibility of vapor intrusion into buildings.

The implemented remedy allows for on-site groundwater to be used as a potable supply for the site, as it is being treated prior to use and the effluent is consistently below MCLs. In the evaluation of direct ingestion, groundwater use is not expected to change during the next five years. A comparison of data from untreated groundwater sampled from the monitoring well network is presented in Table 8. This table includes both the maximum detected concentrations and the most recently detected concentrations of groundwater contaminants and their respective MCLs and state groundwater quality standards. As shown in bold in the table, the maximum detected concentrations of carbon tet, TCE, and total chromium and hexavalent chromium all exceed their respective standards, while the most recently detected concentrations of carbon tet, TCE, and hexavalent chromium exceed their respective standards. No private potable supply wells are in use in the vicinity of the site, and all neighboring residential communities obtain their potable water from either the LFWF or the CSWF, which are not impacted by site-related contaminants. Therefore, no direct exposure pathways for groundwater are complete, and the remedy is protective.

The second exposure pathway for groundwater, the evaluation of the potential for vapor intrusion, is based on the conservative (health protective) assumption that residences are located above the maximum detected concentrations, as well as the most recently detected concentrations, and uses the health-based screening criteria provided in the *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* This guidance provides calculations for concentrations of chemicals in groundwater associated with indoor air concentrations at acceptable levels of cancer risk (1×10^{-6}) and noncancer hazard (hazard quotient of 0.1). As shown in Table 9, both the maximum detected concentrations and the most recently detected concentrations of

carbon tet and trichloroethylene exceeded their vapor intrusion screening values. However, residential properties are not currently located above the plume, and since the ERZ is restricted to commercial/industrial use, vapor intrusion is not a concern at the site.

The remedy for soils includes excavation and off-site disposal of soils contaminated with PCBs, lead, and mercury; the specific remediation goals are listed in Section IV (Remedial Actions) of this five-year review. The remedy also includes institutional controls which restrict the land use within the ERZ to commercial/industrial. In addition, only the land beyond the former safety easement, which encompassed approximately 1,800 acres of pine forest in a circular area of a one-mile radius from the center of the Test Station, is zoned for residential use. Therefore, no residential or recreational development is expected either on-site or within one mile of the Test Station. If, however, the land use beyond the ERZ changes in the future, the remedy for soils should be reevaluated, with a particular focus on the remedial goals of 10 mg/kg of total PCBs and 1,000 mg/kg of lead, to ensure that the remedy is protective for the types of land use included in the redevelopment.

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

The Luther Forest Technology Campus Economic Development Corporation (a division of the Saratoga Economic Development Corporation) is planning the construction of a $10 billion technology center, to be called The Luther Forest Technology Campus. The entire Malta Rocket Fuel Area site is included in the area proposed for the Luther Forest Technology Campus building site.

The redevelopment effort should be monitored over the next five-year period to ensure that the remedy remains protective of human health and the environment. Since the remedy includes institutional controls which restrict land use to commercial/industrial, any changes in this land use as proposed and implemented in the redevelopment plan must be evaluated. This includes assessing populations that are not consistent with commercial/industrial populations, such as children, who may potentially have access to the property if a facility such as a day-care center is included in the redevelopment plans. The construction of any buildings over the groundwater plume should take into account the potential for vapor intrusion. Also, any new construction or redevelopment should evaluate off-site potable water supply sources to service the area since the ROD prohibits the installation of new groundwater wells within the ERZ.

Finally, groundwater samples in the monitoring well network should continue to be analyzed for ammonium perchlorate, as scheduled, through the end of 2004. When the scheduled sampling has been completed, EPA will review the results and determine whether or not ammonium perchlorate sampling should be continued at the site.

Technical Assessment Summary

Based upon the results of the five-year review, it has been concluded that:

- Site soils have been cleaned to protective levels;
- Surface water concentrations of VOCs and chromium are either not detected or below surface water values protective of the environment;
- The Test Station water supply extraction and treatment system is operating properly;
- The treated groundwater meets drinking water standards;
- Maintenance activities are being performed according to schedule;
- The fence around the Test Station is intact and in good condition;
- The groundwater monitoring wells are functional;
- There is no evidence of trespassing, vandalism or damage (to the monitoring wells or the fence);
- There are no drinking water wells within the plume of contamination and none are expected to be drilled;
- The current network of EWMS wells needs to be modified to further evaluate groundwater quality at the site[7];
- Additional groundwater elevation data needs to be collected to chart current groundwater flow patterns at the site; and
- Although surface water sampling data collected during this review period indicate that surface water concentrations of VOCs and chromium are either not detected or below surface water values, no surface water samples or samples of spring water are being collected north of the site, even though groundwater reportedly flows radially from the center of the site.

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[7] Although groundwater and surface water samples collected during the review period indicate that, in general, concentrations of VOCs are not increasing, it is unclear whether this is a result of natural attenuation or migration of the groundwater plume to other areas of the site that are not currently being monitored as part of the EWMS.

VII. Recommendations and Follow-Up Actions

Ongoing monitoring and groundwater remediation are being conducted at the site. As anticipated by the decision documents, these activities are subject to routine modifications and adjustments. While this review did not identify any specific recommendation or follow-up action necessary to protect public health or the environment over the next five years, the EPA review team did identify several ways to improve the current monitoring program (recommendations are listed in Table 10). The EPA Remedial Project Manager will discuss these recommendations with GE and seek implementation of these modifications.

VIII. Protectiveness Statement

Based upon a review of the *Semi-Annual O&M Reports for Remedial Work Elements I, II, and IV*, and an inspection of the site, it has been concluded that the remedies at the site are being implemented in accordance with the remedies selected in the 1996 ROD, and that the remedies continue to protect human health and the environment.

IX. Next Review

The next five-year review for the Malta Rocket Fuel Area Superfund site will be completed before September 23, 2009.

Approved:

William McCabe — 9-21-04

George Pavlou, Director — Date
Emergency and Remedial Response Division

FIGURES

FIGURE 1

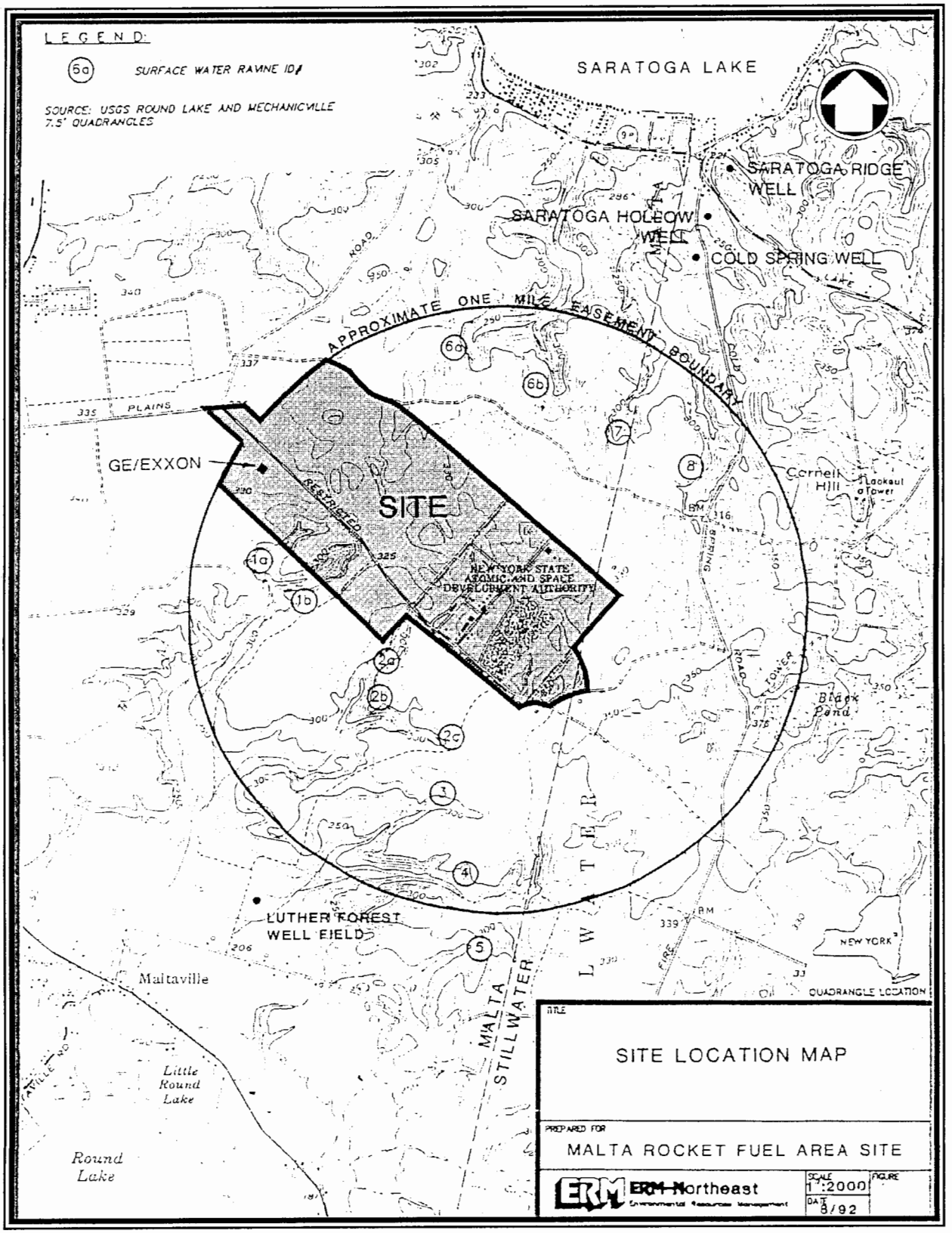
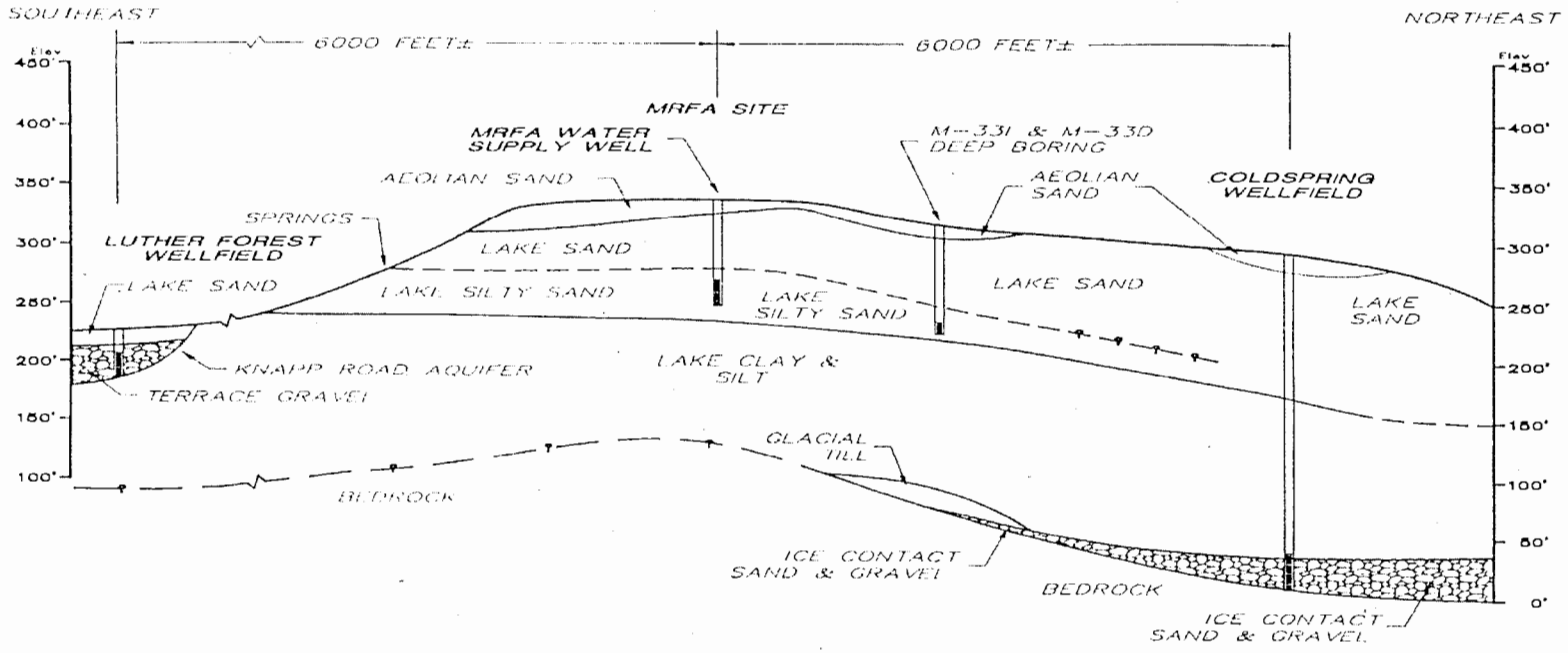

LEGEND:
6a SURFACE WATER RAVINE ID#
SOURCE: USGS ROUND LAKE AND MECHANICVILLE 7.5' QUADRANGLES
SARATOGA LAKE
SARATOGA RIDGE WELL
SARATOGA HOLLOW WELL
COLD SPRING WELL
APPROXIMATE ONE MILE EASEMENT BOUNDARY
PLAINS
GE/EXXON
RESTRICTED
SITE
NEW YORK STATE ATOMIC AND SPACE DEVELOPMENT AUTHORITY
Cornell Hill
Lookout Tower
Black Pond
LUTHER FOREST WELL FIELD
Maltaville
Little Round Lake
Round Lake
MALTA STILLWATER
NEW YORK
QUADRANGLE LOCATION
TITLE
SITE LOCATION MAP
PREPARED FOR
MALTA ROCKET FUEL AREA SITE
ERM-Northeast
SCALE 1":2000
DATE 8/92
FIGURE

FIGURE 2



SCHEMATIC ILLUSTRATING CONCEPTUALIZED UNCONSOLIDATED AQUIFER SYSTEMS IN VICINITY OF THE MRFA SITE

PREPARED FOR

MALTA ROCKET FUEL AREA SITE

ERM-Northeast

SCALE: NTS

FIGURE:

DATE: 04/04

NOTE
DRAWING IS NOT TO SCALE

FIGURE 3

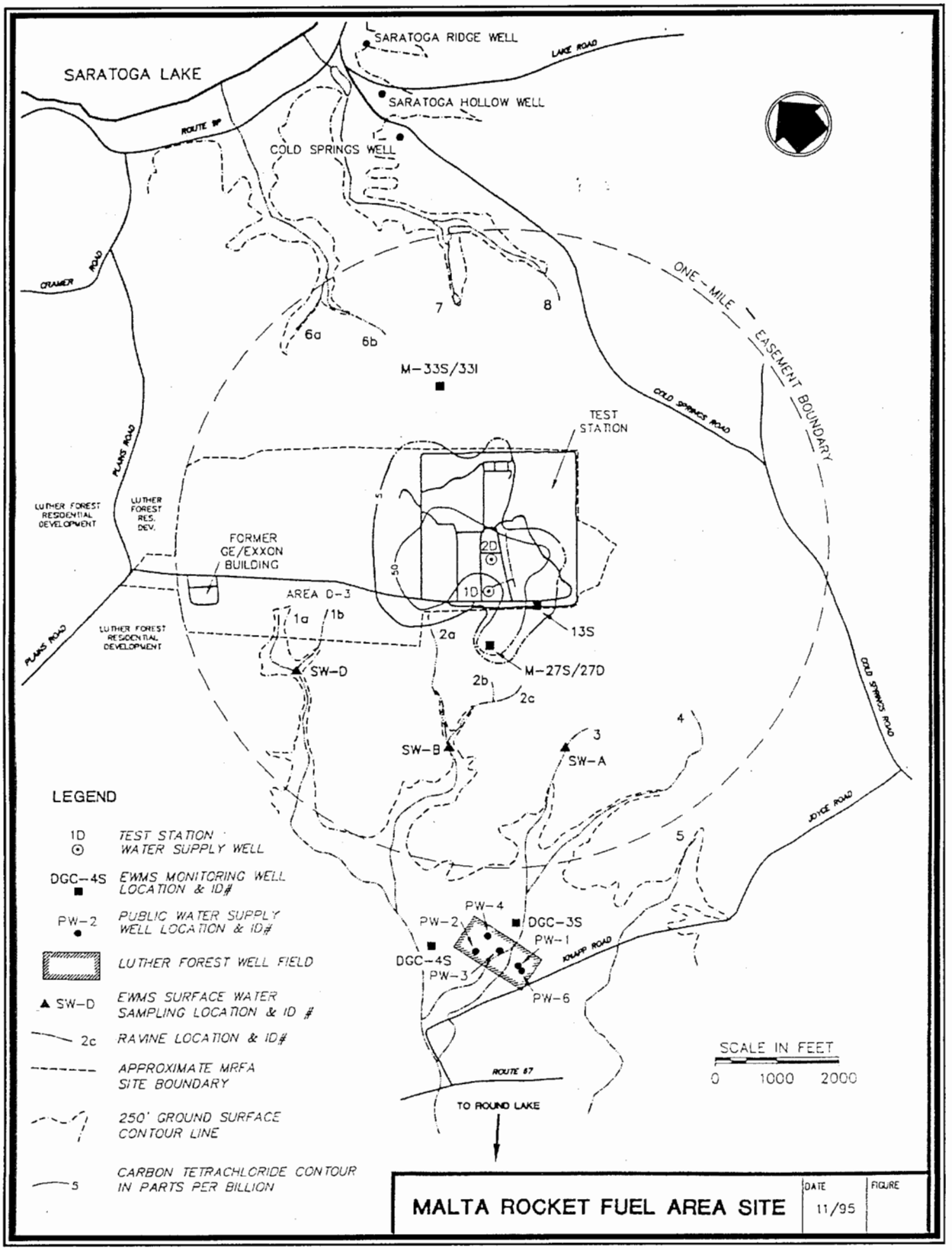
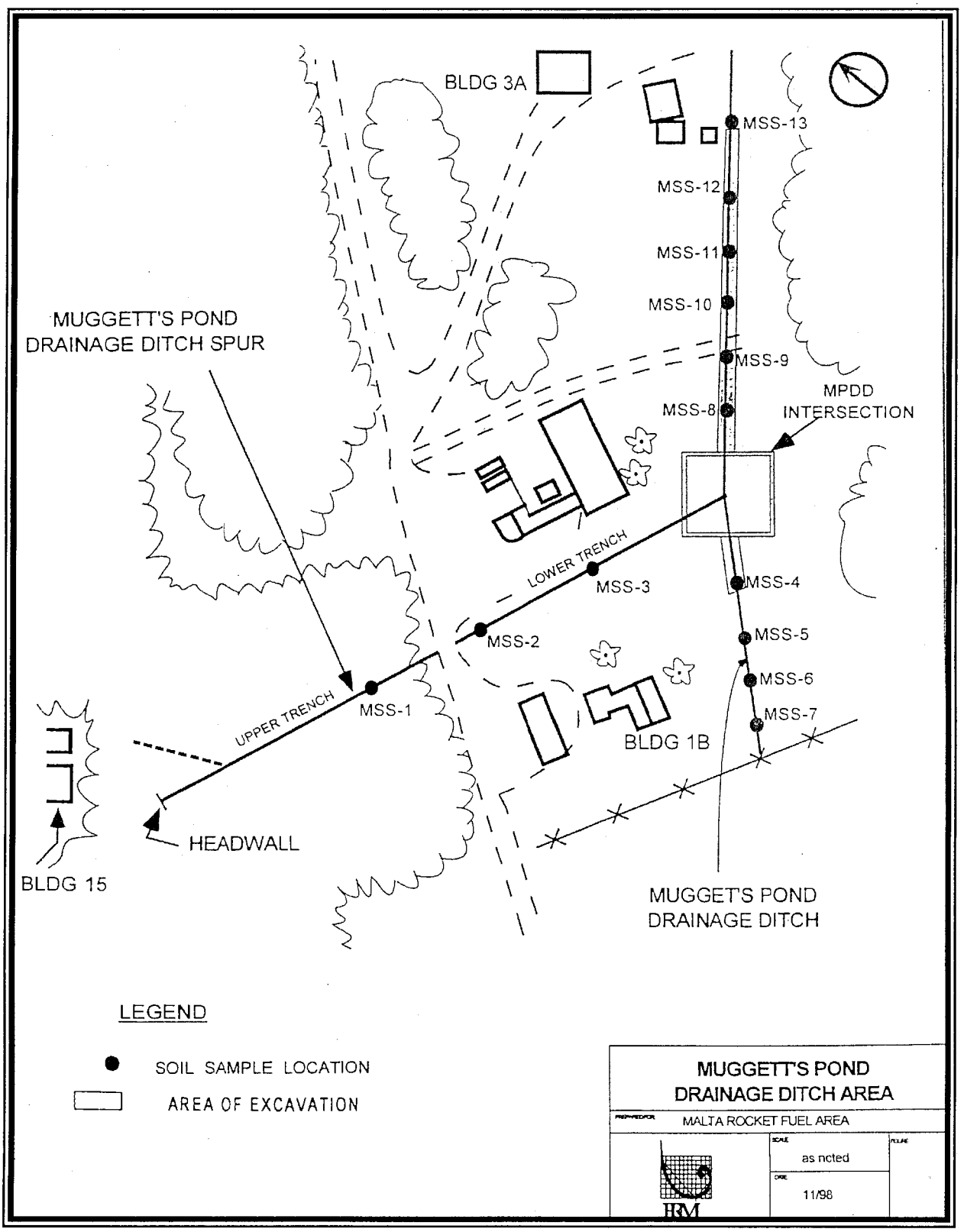

SARATOGA LAKE
SARATOGA RIDGE WELL
SARATOGA HOLLOW WELL
COLD SPRINGS WELL
LAKE ROAD
ROUTE 9P
CRAMER ROAD
ONE-MILE EASEMENT BOUNDARY
COLD SPRINGS ROAD
PLANK ROAD
LUTHER FOREST RESIDENTIAL DEVELOPMENT
LUTHER FOREST RES. DEV.
FORMER GE/EXXON BUILDING
AREA D-3
TEST STATION
M-33S/33I
M-27S/27D
13S
SW-D
SW-B
SW-A
DGC-3S
DGC-4S
PW-1
PW-2
PW-3
PW-4
PW-6
JOYCE ROAD
KNAPP ROAD
ROUTE 67
TO ROUND LAKE
SCALE IN FEET
0 1000 2000
LEGEND
1D TEST STATION / WATER SUPPLY WELL
DGC-4S EWMS MONITORING WELL LOCATION & ID#
PW-2 PUBLIC WATER SUPPLY WELL LOCATION & ID#
LUTHER FOREST WELL FIELD
SW-D EWMS SURFACE WATER SAMPLING LOCATION & ID #
2c RAVINE LOCATION & ID#
APPROXIMATE MRFA SITE BOUNDARY
250' GROUND SURFACE CONTOUR LINE
5 CARBON TETRACHLORIDE CONTOUR IN PARTS PER BILLION
MALTA ROCKET FUEL AREA SITE
DATE 11/95
FIGURE

FIGURE 4


BLDG 3A
MSS-13
MSS-12
MSS-11
MSS-10
MSS-9
MSS-8
MPDD INTERSECTION
MUGGETT'S POND DRAINAGE DITCH SPUR
LOWER TRENCH
MSS-3
MSS-4
MSS-2
MSS-5
MSS-6
MSS-7
UPPER TRENCH
MSS-1
BLDG 1B
HEADWALL
BLDG 15
MUGGET'S POND DRAINAGE DITCH
LEGEND
SOIL SAMPLE LOCATION
AREA OF EXCAVATION
MUGGETT'S POND DRAINAGE DITCH AREA
MALTA ROCKET FUEL AREA
as noted
11/98
HRM

TABLES

Table 1: Chronology of Site Events	
Event	**Date**
U.S. Government establishes the Test Station	1945
U.S. Government establishes restrictive safety easement around the Test Station	1955
NYSERDA's predecessor purchases Test Station property and easement interest	1964-1968
A series of environmental incidents reported at the site and remedial responses are conducted by NYSERDA under NYSDEC supervision	1979-1985
NYSERDA sells 81 acres of the Test Station property and its interest in the easement to Wright-Malta Corporation	1984
Carbon tet and TCE found in the site groundwater	1985-1986
Site is placed on the NPL and EPA assumes the enforcement lead	1987
Wright-Malta Corporation installs air stripper installed on Test Station water supply wells and EWMS is established at the site	1987
UAO issued for the performance of the RI/FS	1989
Performance of the RI/FS	1991-1994
ROD signed	1996
Consent Decree signed by EPA and PRPs for the performance of the RD/RA	1997
RD performed	1996-1997
Performance of remedial actions	1998-1999
First Five-Year Review conducted	1999
Preliminary Site Close-Out Report	1999
The Luther Forest Technology Campus Economic Development Corporation purchases the Test station property	2004

Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review
• Remedial Investigation Report, Volumes I - VIII, ERM-Northeast, Inc., February 1995
• Record of Decision, EPA, July 1996
• Remedial Design Reports, Remedial Work Elements I, III, and IV, ERM-Northeast, August 25, 1997
• Operation and Maintenance Manual, Remedial Work Element II, Groundwater, ERM-Northeast, Inc., January 1998
• Consent Decree, United States v. Curtiss-Wright Corporation, et al., Civil Action No. 98-CV-0014, entered in the United States District Court for the Northern District of New York on March 16, 1998
• Operation and Maintenance Manual, Remedial Work Element IV, Institutional Controls, IT Corporation, September 1999
• Five-Year Review Report, EPA, September 1999
• Operation and Maintenance Manual, Remedial Work Element I, Drinking Water, IT Group, January 2002
• Semi-Annual O&M Reports, Remedial Work Elements I, II, and IV, IT Corporation, January 2000 through January 2002
• Semi-Annual O&M Reports, Remedial Work Elements I, II, and IV, Shaw Environmental, Inc., July 2002 through February 2004
• Draft Five-Year Data Review Report, Shaw Environmental, Inc., May 2004
• EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new applicable or relevant and appropriate requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD

Table 3: Treatment System Influent and Effluent TCE Concentrations		
Date	**Infuent (µg/l)**	**Effluent (µg/l)**
10/26/99	27.8	<1.0
2/3/00	28.2	<1.0
5/22/00	17.1	<1.0
8/30/00	12.3	<1.0
10/24/00	18	<1.0
2/28/01	17.2	<1.0
5/15/01	13.1	<1.0
8/30/01	14.8	<1.0
10/23/01	19.9	<1.0
3/27/02	24.1	<1.0
5/29/02	20.4	<1.0
8/27/02	16.1	0.13
10/29/02	19.2	0.22
2/26/03	14.8	0.29
5/29/03	17.7	0.47
8/28/03	15.3	0.61
10/9/03	12.3	0.56

Notes:

Performance Standard for TCE = 5 µg/l
Performance Standard for Carbon tet = 5 µg/l

Table 4: Treatment System Influent and Effluent Carbon Tetrachloride Concentrations		
Date	**Infuent (µg/l)**	**Effluent (µg/l)**
10/26/99	27.2	<1.0
2/3/00	43	<1.0
5/22/00	21.3	<1.0
8/30/00	15.8	<1.0
10/24/00	22.7	<1.0
2/28/01	20.4	<1.0
5/15/01	15.8	<1.0
8/30/01	19.3	<1.0
10/23/01	32.2	<1.0
3/27/02	28.5	<1.0
5/29/02	28.8	<1.0
8/27/02	24.9	0.16
10/29/02	22.1	0.18
2/26/03	15.9	<1.0
5/29/03	12.9	0.15
8/28/03	10.7	<1.0
10/9/03	10.6	0.23

Notes:

Performance Standard for TCE = 5 µg/l
Performance Standard for Carbon tet = 5 µg/l

Table 5: Summary of Ammonium Perchlorate Results

Date	Remedial Action Objective	Drinking Water Treatment System				Early Warning Monitoring Well System									
		RW-1	RW-2	Total Influent	Total Influent	DGC-3S	DGC-4S	M-33I	M-33S	M-13S	M-27S	M-27D	SW-A	SW-B	SW-D
02/03	5	1.6	0.9	1.9	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
04/03	5	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10/03	5	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
05/04	5	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 6: Summary of VOC Results in Monitoring Well M-27D

Compound	Remedial Action Objective	10/26/99	5/22/00	10/24/00	5/15/01	10/23/01	5/29/02	10/29/02	4/9/03	10/29/03
Benzene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	None	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	22.3	28.9	19.8	13.8	16.2	14.5	24.2	5.1	16.6
Chloroform	7	1.8	ND	1.7	1.1	1.1	0.94	2.4	ND	1.0
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorothylene	5	10.7	12.8	26.5	19.4	27	22.7	14	2.4	21.8
Trichlorofluoro-methane	5	1.4	1.9	2.9	2	2.2	1.5	0.96	0.21	2.3

Table 7: Summary of Total Chromium and Hexavalent Chromium Results in Monitoring Well 13-S

Compound	Remedial Action Objective	10/26/99	5/22/00	10/24/00	5/15/01	10/23/01	5/29/02	10/29/02	4/9/03	10/29/03
Total Chromium	50	169	249	29.9	136	43.3	13.4	34.8	52.2	49.4
Hexavalent Chromium	50	178	262	41	12.3	43.6	18	3.59	45	51.5

Notes: Units are µg/l unless otherwise stated. ND = Not detected. NA = Not analyzed.

Table 8: Comparison of Concentrations in Groundwater to Federal and State MCLs (10/99 - 10/03)

Contaminant of Concern	Maximum Detected Conc. (ug/l)	Well Location (Sampling Date)	Most Recent Detected Conc. (ug/l)	Well Location (10/03)	Federal MCL (ug/l)	State Groundwater Quality Standard (ug/l)
Carbon Tetrachloride	**28.9**	M-27D (05/00)	**16.6**	M-27D	5	5
Chloroform	2.4	M-27D (10/02)	1.0	M-27D	80	7
Trichloroethylene	**26.5**	M-27D (10/00)	**21.8**	M-27D	5	5
Trichlorofluoromethane	2.9	M-27D (10/00)	2.3	M-27D	NA[1]	5
Chromium (total)	**249**	13-S (05/00)	49.4	13-S	100	50
Chromium (hexavalent)	**262**	13-S (05/00)	**51.5**	13-S	NA[2]	50

Notes:

1. Not available. There is no federal MCL for trichlorofluoromethane. The Drinking Water Exposure Limit (DWEL), which is a non-promulgated value that represents a lifetime exposure concentration protective of adverse, non-cancer health effects and assumes that all exposure is through drinking water is set at 10 ug/l.

2. Not available. There is no federal MCL for hexavalent chromium.

Bolded values indicate a concentration in excess of a screening level.

Table 9: Comparison of Concentrations in Groundwater to Vapor Intrusion Guidance Screening Values (10/99 - 10/03) [1]

Contaminant of Concern	Maximum Detected Conc. (ug/l)	Well Location (Sampling Date)	Most Recent Detected Conc. (ug/l)	Well Location (Sampling Date)	Vapor Intrusion Screening Value[2] (ug/l)
Carbon Tetrachloride	**28.9**	M-27D (05/00)	**16.6**	M-27D (10/03)	0.13
Chloroform	2.4	M-27D (10/02)	1.0	M-27D (10/03)	8.0
Trichloroethylene	**26.5**	M-27D (10/00)	**21.8**	M-27D (10/03)	0.053
Trichlorofluoromethane	2.9	M-27D (10/00)	2.3	M-27D (10/03)	18

Notes:

1. Values are from "Draft Guiance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" EPA 530-F-02-052 (November 2002).

2. Values are based on a Cancer Risk of E-06 or a Hazard Quotient of 0.1.

Bolded values indicate a concentration in excess of a screening level.

Table 10: Recommendations and Follow-Up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
The current network of EWMS wells needs to be modified to further evaluate groundwater quality at the site.	A modified network of monitoring wells should be established. This network should consist of wells focused at depths equal to or greater than 250 ft. above MSL, and should be sampled periodically as part of the EWMS at least until the next five-year review. This will allow for a proper evaluation of potential changes in the size and shape of the contaminant plume in the groundwater to ensure that off-site groundwater users are not impacted by site contamination.	PRP	EPA	5/05	N	N
Although groundwater and surface water samples collected during the review period indicate that, in general, concentrations of VOCs are not increasing, it is unclear whether this is a result of natural attenuation.	Sampling for MNA parameters should be performed to evaluate whether MNA is occurring.	PRP	EPA	5/05	N	N
Groundwater elevations are collected regularly from five on-site monitoring wells. This appears to be insufficient to chart current groundwater flow patterns at the site.	Groundwater elevation measurements should be collected periodically from additional (shallow and deep) on-site wells, and groundwater elevation contour maps should be prepared to evaluate whether on-site groundwater flow patterns have changed over time.	PRP	EPA	5/05	N	N
Although surface water sampling data collected during this review period indicate that surface water concentrations of VOCs and chromium are either not detected or below surface water values, no surface water samples or samples of spring water are being collected north of the site, when groundwater reportedly flows radially from the center of the site.	Additional surface water sampling should be performed periodically in locations north of the site to verify that site-related contaminants are not migrating in that direction	PRP	EPA	5/05	N	N

Table 11: Acronyms Used in this Document	
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CSWF	Cold Springs Well Field
EPA	United States Environmental Protection Agency
ERA	Environmental Risk Assessment
ERZ	Environmental Restriction Zone
EWMS	Early Warning Monitoring System
GE	General Electric Company
LFWF	Luther Forest Well Field
MCL	Maximum Contaminant Level
MSL	Mean Sea Level
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Protection
NYSERDA	New York State Energy Research and Development Authority
O&M	Operation and Maintenance
PCB	Polychlorinated Biphenyl
µg/l	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter
PRP	Potentially Responsible Party
RA	Remedial Action
RCRA	Resource Recovery and Conservation Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RWE	Remedial Work Element
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
VOC	Volatile Organic Compound