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EPA Superfund
Record of Decision:

MALTA ROCKET FUEL AREA
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RECORD OF DECISION

Malta Rocket Fuel Area Site
Towns of Malta and Stillwater, Saratoga County, New York

United States Environmental Protection Agency
Region II
New York, New York

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Malta Rocket Fuel Area Site
Towns of Malta and Stillwater, Saratoga County, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of the remedial action for the Malta Rocket Fuel Area site (the Site) in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 et seq. and to the extent practicable the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. An administrative record for the Site, established pursuant to the NCP, 40 CFR 300.800, contains the documents that form the basis for EPA's selection of the remedial action (see Appendix III).

The New York State Department of Environmental Conservation has been consulted on the planned remedial action in accordance with CERCLA §121(f), 42 U.S.C. §9621(f), and it concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Site consists of one (1) operable unit and this ROD addresses the entire site. The remedy addresses the principal threats to human health and the environment that are posed by conditions at the Site. Exposure to soil contamination at the Malta Test Station will be addressed by excavation and off-site disposal of the contaminated soil. Ingestion of contaminated ground water by on-site employees will be addressed by pumping the Test Station water supply wells and treating the water to acceptable drinking water standards using an air stripper. Monitoring of surface water and ground water, such as that currently performed for the Early Warning Monitoring System (EWMS), will continue to ensure that off-site ground water users are not impacted by contamination emanating from the Site. Ground water not captured by the air stripper will be remediated to cleanup standards through natural attenuation and degradation processes, which will require monitoring of this long-term project. The selected remedy is consistent with several other EPA-approved response actions taken during the remedial investigation (RI) and feasibility study, including decommissioning and removal of two (2) compressed gas cylinders; excavation and recycling of 560 empty, buried crushed drums; cleanouts of several septic tanks, catch basins, and dry wells; cleanout of a sump; cleanup of surface debris; and disposal of waste generated during the RI.

The major components of the selected remedy include the following:

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 ground water that are not captured by the pumping well(s) until the ground water attains Federal MCLs, or if more stringent, New York State ground water standards.

3) Monitoring of surface water and ground water to ensure that off-site ground water users are not impacted by contamination from the Site, that contaminated ground water does not migrate into uncontaminated areas

(i.e., that the ground water plume is contained), and that the natural attenuation and degradation processes are restoring the ground water to the cleanup standards. The existing surface water and ground water sample locations of the EWMS may be modified as necessary to meet the first objective of this monitoring program.

4) Excavation of contaminated soil at the Building 23P area at a depth of 1 foot or less having a concentration of more than 10 ppm of PCBs, soil at a depth below 1 foot having a concentration of more than 25 ppm of PCBs, and soil at any depth with a concentration of lead of more than 1000 ppm.

5) Excavation of contaminated soil at the Muggett's Pond Drainage Ditch Intersection at any depth with a concentration of more than 2 ppm 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 regulations and all other ARARs.

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

9) Evaluation of Site conditions at least once every 5 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.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121, 42 U.S.C. §9621: (1) it is protective of human health and the environment; (2) it attains a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attains the legally applicable or relevant and appropriate requirements (ARARs) under federal and state laws; (3) it is cost-effective; (4) it utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable; and (5) it satisfies the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site to the extent that it requires treatment of the Test Station water supply.

A review of the remedial action pursuant to CERCLA §121(c), 42 U.S.C. §9621(c), will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based levels.

<IMG SRC 0296274>
Jeanne M. Fox Date
Regional Administrator

RECORD OF DECISION
DECISION SUMMARY

Malta Rocket Fuel Area Superfund Site
Towns of Malta and Stillwater, Saratoga County, New York

United States Environmental Protection Agency
Region II
New York, New York

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SITE NAME, LOCATION AND DESCRIPTION

The Malta Rocket Fuel Area Superfund Site (the Site), also known as the Saratoga Research and Development Center, is located on Plains Road in the Towns of Malta and Stillwater, Saratoga County, New York, approximately 1.5 miles south of Saratoga Lake and 2 miles northeast of Round Lake (see Figure 1). The Site includes a square parcel of approximately 165 acres of developed land, known as the Malta Test Station (the Test Station), which has been used as a research and development facility for rocket and weapons testing for more than fifty (50) years. The Test Station has thirty-three (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.

In addition to the Test Station, the Site includes portions of the predominantly undeveloped woodlands that surround the Test Station, including a) the former G.E./Exxon Nuclear building; b) Area D-3; c) the Triangular Parcel; and d) areas adjacent to the Test Station that have been impacted by Site-related constituents in ground water. The former G.E./Exxon Nuclear building was built between 1968 and 1970 by the New York State Atomic and Space Development Authority, the predecessor agency of the New York State Energy Research and Development Authority (NYSERDA). It was used for experiments on low-level radiation of medical equipment and food preservation and for a gas centrifuge uranium enrichment research project conducted by the General Electric Company (G.E.) and the Exxon Nuclear Company (now Advanced Nuclear Fuels, Inc.). NYSERDA currently leases the former G.E./Exxon Nuclear building to Optimum Air Corporation, which manufactures equipment to dry industrial coatings. Area D-3, also owned by NYSERDA, consists of a ravine (Ravine lb) partially filled with debris and covered with vegetated soil, which reportedly was used by the New York State Department of Transportation for disposal of construction and demolition debris during the construction of Interstate 87. The Triangular Parcel, owned by Wright-Malta Corporation, is an area of forest adjacent to the southeast corner of the Test Station that was evaluated, but never used, for research and development testing. The portion of the Site beyond the Test Station boundary that has been impacted by contaminated ground water is owned by the Luther Forest Corporation and forms part of a safety easement of approximately 1,500 acres of pine forest surrounding the Test Station. The Luther Forest Corporation, which built the Luther Forest housing development to the northwest of the Site, operates a logging business within the safety easement (see Figure 1). The land outside the safety easement is zoned for residential use. Approximately 12,000 people live within a two-mile radius of the Site.

There are two public water supply systems that serve the Luther Forest residential community, the Luther Forest Well Field and the Cold Springs Well. The Luther Forest Well Field is located approximately 1 mile southwest of the Site. These wells tap the Knapp Road sand and gravel aquifer to provide water for the Luther Forest residential development. The Cold Springs Well is located approximately 1 mile northeast of the Site. The Cold Springs Well and two (2) others located nearby, the Saratoga Hollow Well and the Saratoga Ridge Well, tap unnamed sand and gravel aquifers near Saratoga Lake.

Ground water and surface water sampling conducted as part of an Early Warning Monitoring System (EWMS) has been performed since June 1987 to verify that these public water supplies are not impacted by the Site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The U.S. Government (throught the Department of War, which later became the Department of Defense [DOD]) established the Test Station in 1945. Since then, all or part of the Test Station has been leased to G.E., Wright-Malta Corporation, Exxon Nuclear Company, Olin Corporation, Iso-Nuclear Corporation, Mechanical Technology, Inc. (MTI), and Power Technologies, Inc. (PTI) and used for a wide range of rocket and weapons testing programs and for space and other research. Major research efforts conducted included Project Hermes, reportedly the first U.S. rocket engine program (Army and Navy), and Projects Vanguard (Navy) and Vega (National Aeronautics and Space Administration, or NASA), which were designed to launch satellites into space. Another NASA project at the Site involved simulating conditions for nose cone re-entry from space into the earth's atmosphere. These activities involved, among other things, the use of carbon tetrachloride (carbon tet) and trichloroethylene (TCE) as solvents and degreasers. Detailed information regarding the history of the Site can be found in the Literature Search Report, which is available in the informational repositories and is part of the Administrative Record File for the Site (see

Appendix III).

In 1955, the U.S. Government established a perpetual restrictive safety easement surrounding the Test Station. The easement covered approximately 1,800 acres in a circular area of one-mile radius from the approximate geographic center of the Test Station, not including the Test Station itself. The holder of the easement has the right to prohibit hunting and human habitation, remove buildings being used for human habitation, post signs, and enter the easement area to exercise these rights. In 1964, NYSERDA's predecessor purchased the 165-acre Test Station and the easement interest, and in 1968 it purchased an additional 280 acres within the easement area. Because a single entity (NYSERDA's predecessor) then held both the easement interest and owned a portion of the property that was subject to the easement restrictions, the easement restrictions on that 280-acre parcel were extinguished. In 1984, NYSERDA sold 81 acres of the original Test Station property and its interest in the easement (now affecting approximately 1,500 acres) to Wright-Malta Corporation, which continues to own this portion of the Test Station and hold the easement.

On July 23, 1979, approximately 8 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 cleaned and the contaminated material was sent to licensed disposal facilities. A radiation survey of the building was conducted on December 20, 1979 and all beta and gamma readings taken were within the limits of unrestricted use.

In 1980, NYSERDA found drums containing 200 pounds of the amine nitrate CAVEA-B and 10 rusting 55-gallon drums of hydrazine fuels and rainwater on a concrete storage pad, called Area S-4. Hydrazine and CAVEA-B, a nitrogen-based mixture, were experimental liquid rocket propellants used at the Site. On July 16, 1980, NYSERDA obtained a permit from the New York State Department of Environmental Conservation (NYSDEC) for restricted burning of some of the waste. From July 18-21, 1980, combustible waste was burned in accordance with the permit requirements and the non-combustible drum contents were transferred to new poly-lined drums and staged until they were disposed of off-site in July 1981.

In June 1985, transformers located on a portion of the Test Station leased to PTI (Areas S-8 and S-9) were tested and found to contain polychlorinated biphenyls (PCBs). NYSERDA and PTI conducted a cleanup and decontamination of the transformers in 1987. In October 1985, a buried container of triethyl aluminum exploded when it was punctured by earth-moving activities.

In 1985 and 1986, ground water at the Site was sampled and found to contain carbon tet, TCE, and chloroform, along with several metals. In January 1987, an air stripper was permitted by NYSDEC and installed on the Test Station water supply wells by Wright-Malta Corporation to treat ground water prior to its use by employees at the Test Station. As purveyor of water, Wright-Malta Corporation is responsible for ensuring that the on-site water supply is in compliance with Part 5 of the New York State Sanitary Code. The New York State Department of Health reviews the monitoring data collected from the on-site water supply. As noted above, in June 1987, the EWMS was established between the Test Station and the Luther Forest Well Field to detect any contamination emanating from the Site before it impacted the water supply for the Luther Forest residential development. To date, the EWMS results have indicated that the Site has not impacted the water quality of the Luther Forest residential development.

In 1987, NYSERDA sampled liquid and sludge from septic tanks at Buildings 20, 25, and the former G.E./Exxon Nuclear building. Based on detections of VOCs in these samples, including toluene at the former G.E./Exxon Nuclear building, NYSERDA had the septic tanks pumped out and rinsed in May 1988.

In 1988, a drum was discovered in storage Area S-2 and sampled. Analysis of the drum contents indicated the liquid contained 4,270 parts per million (ppm) of lead, 235 ppm of zinc, and 93 ppm of copper. NYSERDA disposed of the drum off-site in April 1989 in accordance with Resource Conservation and Recovery Act (RCRA) regulations.

On June 10, 1986, EPA proposed the Site for inclusion on the National Priorities List (NPL). Final listing on the NPL occurred on July 22,1987. Subsequently, at NYSDEC's request, EPA took the enforcement lead for the Site. EPA identified the following potentially responsible parties (PRPs): Advanced Nuclear Fuels, Inc. (the successor of Exxon Nuclear Fuels, Inc.; Curtiss-Wright Corporation; G.E.; MTI, NYSERDA; Olin

Corporation; PTI; the U.S. Government (DOD [Army, Navy, Air Force], Department of Energy, NASA), and Wright-Malta Corporation.

In September 1989, EPA unilaterally issued an Administrative Order to eight of the PRPs for performance of the RI/FS. The Respondents to the Order are Advanced Nuclear Fuels, Inc.; Curtiss-Wright Corporation; G.E.; MTI; NYSERDA; Olin Corporation; PTI; and Wright-Malta Corporation. In March 1990, G.E., NYSERDA, and DOD entered into a participation agreement among themselves and undertook performance of the RI/FS.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

In October 1991, EPA held a public meeting and issued a fact sheet to announce the start of the RI field work. Following the meeting, EPA finalized its Community Relations Plan, which included information EPA had gathered from interviews with local residents and community leaders. During the RI, EPA issued three fact sheets (January 1992, February 1993, and September 1994) to report the progress of the investigation and sent them to all persons on EPA's mailing list for the Site. In addition, in October 1991, EPA established local informational repositories at the Malta Town Hall and the Round Lake Library and an Administrative Record File at the EPA Docket Room in Region II, New York, New York. Throughout the RI/FS, EPA added site-related documents to the local informational repositories and made them available for public inspection.

As part of the Superfund program, EPA provides communities with the opportunity to apply for Technical Assistant Grants (TAG Grants) of up to $50,000 per site. In September 1993, EPA awarded a three-year TAG Grant to the Ermine Lair Neighborhood Association, one of the three homeowner associations of the Luther Forest residential development. The Ermine Lair Neighborhood Association chose not to utilize its TAG Grant during the RI/FS.

On April 16, 1996, EPA mailed out copies of the Proposed Plan to all persons on EPA's mailing list. On April 17, 1996, EPA published a notice in a local newspaper, the Saratogian, announcing the availability of the RI report, the FS report, and the Proposed Plan for public inspection at the informational repositories and inviting public comment on these documents from April 17 to May 16, 1996.

On April 24, 1996, EPA conducted a public meeting at the Malta Town Hall to inform local officials and interested citizens about the Superfund process, to summarize the results of the RI/FS, to review current and planned remedial activities at the Site, and to respond to any questions from area residents and other attendees. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

The overall cleanup plan for the Site includes treatment of the on-site water supply system by air stripping, remediation of the ground water plume by natural attenuation and degradation processes, and remediation of contaminated soil by excavation and off-site disposal. The remedy is consistent with several response actions that have already been performed in accordance with EPA-approved work plans submitted as part of the RI/FS and which are described in detail in the Summary of Site Characteristics section of this ROD, including 1) decommissioning and removal of two compressed gas cylinders, 2) excavation and recycling of 560 empty, buried crushed drums; 3) cleanouts of several septic tanks, catch basins, and dry wells; 4) cleanout of a sump; and 5) disposal of waste generated during the RI, called investigation-derived waste or IDW. By having these response actions performed during the RI/FS rather than at a later date, EPA substantially reduced the scope of work required for this final cleanup remedy.

In addition, the remedy utilizes ongoing remedial actions where possible to meet the cleanup goals for the Site. For example, acceptable drinking water for the Test Station employees is achieved by continued use of the existing air stripper installed at the Test Station in 1987 and monitoring to ensure that off-site ground water users are not impacted by Site contamination is provided by the ongoing EWMS. Institutional controls to restrict ground water withdrawal within the vicinity of the plume and to restrict the Test Station to a commercial/industrial land use are consistent with the current land use, the existing fencing, and restrictions of the safety easement.

SUMMARY OF SITE CHARACTERISTICS

The Site characteristics were determined through performance of a comprehensive RI. The purpose of the RI was to determine the nature and extent of contamination at the Site and to obtain sufficient information to conduct a risk assessment and to evaluate cleanup alternatives. Field work began in October 1991 and was completed in May 1994. A total of 48 distinct areas of concern and the Site-wide ground water were investigated.

The Site is situated on a topographic drainage divide. Streams in Ravines 6a, 6b, 7, and 8 north of the Site flow northward toward Saratoga Lake. Streams in Ravines 1a, 1b, 2a, 2b, 2c, 3, 4, and 5 south of the Site flow southward toward Round Lake (see Figure 1).

The Site is underlain by the unconsolidated aeolian sand, Lake Albany sand, and Lake Albany silty sand units, which have a combined thickness of up to 250 feet (see Figure 2). The depth to ground water is approximately 15 to 55 feet below land surface. Below these sand layers is an approximately 100-foot layer of clay and silt that hydraulically separates the Lake Albany sand/silty sand aquifer above from the bedrock below. Muggett's Pond at the Test Station was created by excavating a small area (0.07 acre) down to the ground water table of the Lake Albany aquifer. Ground water at the Site is influenced by the topographic divide and by the geologic layering. In general, ground water flows from the Triangular Parcel across the Test Station and discharges both northward to Ravines 6a, 6b, 7, and 8 and southward to Ravines 1a, 1b, 2a, 2b, 2c, and 3. The water supply system for the Site consists of 2 active production wells located at the Test Station. As noted above, an air stripper is currently treating the Test Station water supply.

Analytical results from the RI samples of surface water, sediment, ground water, surface soil, subsurface soil, and septic tank liquid were compared to screening levels established for the Site, also known as the comparative criteria. The comparative criteria for ground water, surface water, and sediment were a combination of their respective maximum measured background concentrations and available federal and state regulatory standards, guidance values, and criteria. The comparative criteria for surface and subsurface soil were a combination of the maximum statistical background concentrations; available federal and state regulatory standards, guidance values, and criteria; and health-based comparative criteria (for 25 inorganic anatytes including essential nutrients). Septic tank liquid samples were compared to the ground water effuent standards for discharge to Class GA (drinking water) aquifers set forth in the NYSDEC Quality Standards for Groundwater. In general, detections below the comparative criteria indicated no concern and were not investigated further, while detections above the comparative criteria indicated a potential for concern and were investigated further. All of the RI sample results were evaluated in the risk assessment. Tables 1 through 9 show the comparative criteria and the analytical results for all RI samples that exceeded the comparative criteria for surface water, sediment, surface soil, subsurface soil, ground water, dry wells, and septic tanks. Key activities conducted during the RI and their results are as follows:

Radiation Survey: A radiation survey was conducted with a geiger counter to assess the potential presence of residual radiation in the ambient air at the former G.E./Exxon Nuclear building, where radioactive materials reportedly had been used in the past. The survey revealed no radiation above background levels.

Geophysical Surveys: Geophysical surveys were conducted at 19 areas to identify locations of possible buried metal. A total of 82 anomalies in 13 areas were interpreted as areas of possible buried metal. Subsurface investigations (81 test pits and 9 soil borings) revealed that most of the buried metal at the Site is construction-related scrap metal debris or scrap artillery projectiles. Two areas of empty, buried crushed drums and an unlabeled compressed gas cylinder were found in Area S-1, a burn pit structure and a third area of empty, buried crushed drums were found at Area D-l, and a compressed gas cylinder labeled pentaborane was found at Area D-4. At Area D-5, 4 five-gallon pails of sodium hydroxide and 3 thirty-five gallon stainless steel drums, 1 approximately half-full with an unidentified black, oily caustic liquid (pH>13) were found. During the RI, the compressed gas cylinders were decommissioned and disposed of off-site. In October 1995, the stainless steel drums and 560 empty, crushed drums were excavated and taken off-site for recycling. The chemicals (the sodium hydroxide and the black caustic liquid) were stored in overpack drums and removed from the Site in February 1996. All these response actions were performed in accordance with EPA-approved work plans.

Soil Gas Surveys: Soil gas surveys were performed at 46 areas of the Site, with a total of 844 soil gas points installed and sampled. These surveys were used as a screening-level tool to provide a semi-quantitative evaluation of the extent of volatile organic compounds (VOCs) in shallow soil. The soil gas analytical results were used to select locations for soil borings and monitoring wells.

Ground Water Investigation: Thirty (30) wells were installed at the Site to supplement the existing network of 18 monitoring wells and water supply wells. Ground water samples were collected and analyzed in June 1992, November 1992, and March 1994. These sample results confirm the presence of VOCs in ground water above Federal drinking water standards (Maximum Contaminant Levels, or MCLs) and were used to prepare a map of the ground water plume (see Figure 1). The 5-parts per billion (ppb) limit of ground water plume is well within the easement area. Carbon tet and TCE were detected near the center of the Test Station at maximum concentrations of 220 ppb and 280 ppb, respectively, compared to their MCLs of 5 ppb. The EWMS and RI ground water and surface water samples show that VOC concentrations are generally steady or decreasing, suggesting that the plume is not migrating in the subsurface into uncontaminated areas under current ground water flow conditions. Three additional ground water samples taken from within the plume in January 1996 were consistent with the RI results.

Surface Water Investigation: Fourteen (14) surface water samples were collected from 6 surface water bodies (quench pits at Buildings 3, 4, and 25; Muggett's Pond; and Ravines 1b and 6a). EWMS and surface water data from other sampling events were used to evaluate Ravines 1a, 2a, 2b, 2c, 3, 4, 5, 6b, 7, and 8. Analytical results from samples collected in Ravine 6a were interpreted to be representative of background conditions. Samples from Ravine 1b at Area D-3 showed concentrations of several inorganics (aluminum, calcium, iron, manganese, potassium, and sodium) above the comparative criteria. The 3 quench pits showed iron, manganese, and antimony above the comparative criteria and the Building 3 quench pit also showed two (2) pesticides (aldrin and heptachlor epoxide) above the comparative criteria. Surface water samples from Muggett's Pond showed only iron and manganese above the comparative criteria. The data from the EWMS and other historical sampling events indicate that low levels of carbon tet and TCE are present in the headwaters of Ravine 2b where the ground water plume discharges to surface water, and that they volatilize before reaching midstream or downstream sampling locations (see Appendix F of risk assessment report).

Sediment Investigation: Sediment samples were collected from Muggett's Pond and the ravines at the same locations where the RI surface water samples were taken. Because the Muggett's Pond Drainage Ditch rarely contains water, the results from samples taken there are reported in the following section on surface soil investigation. Sediment samples from Ravine 6a were interpreted as representative of background conditions. Samples from Ravine 1b showed only inorganic analytes above the comparative criteria, such as aluminum, barium, manganese, and potassium. Sediment samples from the 3 quench pits and Muggett's Pond showed detections above the comparative criteria for organic and inorganic analytes, including PCBs, lead, manganese, mercury, nickel, and zinc. Additional sampling indicated that the exceedences were localized.

Surface Soil Investigation: Twenty-one (21) surface soil samples were collected and analyzed for a background soil quality investigation, which was used in developing the comparative criteria for surface soil. In addition, 67 surface soil samples were analyzed from 60 locations at the Site. The results showed localized exceedences of semivolatile organic compounds (SVOCs) at Buildings 6, 24, and 27 that are likely attributable to nearby asphalt paving. PCBs were found at concentrations from 720 ppb to 20.3 ppm and lead from 102 to 1090 ppm at Building 23P, and mercury was found at concentrations of 0.02 to 124 ppm at Muggett's Pond Drainage Ditch Intersection, where a spur joins the main drainage ditch (see Figures 1 and 3).

Subsurface Soil Investigation: Thirty-three (33) subsurface soil samples were collected and analyzed as part of the background soil quality investigation. In addition, 254 shallow subsurface soil samples and 3 deep subsurface soil samples were collected and analyzed from 172 shallow borings, 3 deep borings (now monitoring wells), and 23 test pit locations at the Test Station, Area D-3, and the former G.E./Exxon Nuclear building. The soil samples showed detections of inorganics and various VOCs and SVOCs above the comparative criteria in small areas at several locations on the Test Station.

Dry Well Investigation: Thirty-one (31) soil and sediment samples were collected and analyzed from 23 dry well features (dry wells, catch basins, floor drains, a swale, and an open sump) at the Site. Thirteen (13) of the dry wells (12 on the Test Station and 1 at the former G.E./Exxon Nuclear building) showed detections

of inorganic and organic analytes above the comparative criteria. Additional sampling below and adjacent to these dry wells confirmed that the exceedences were localized. The sump at Building 1A was cleaned out in October 1992 and 4 catch basins and 1 dry well were cleaned out in October and November 1995 in accordance with an EPA-approved work plan.

Septic Tank Investigation: Seven (7) liquid samples and 2 sludge samples were collected from septic tanks on the Site. The analytical results showed detections above the comparative criteria, including inorganics, VOCs and PCBs. These septic tanks were cleaned out from October 1995 to February 1996 in accordance with an EPA-approved work plan. Additional soil sampling confirmed that these constituents had not contaminated soil outside the septic tanks or beneath the cesspools.

SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the Site if no remedial action were taken.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment-determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The human health risk assessment began with selection of contaminants of concern that would be representative of Site risks. These contaminants included VOCs, SVOCs, PCBs, and inorganics in surface water, sediment, ground water, soil, and dry well sediment. Several of the contaminants, including carbon tet and TCE, are known to cause cancer in laboratory animals and are suspected to be human carcinogens. The summary of the contaminants of concern for human receptors in sampled media is listed in Table 10.

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. The current land use of the Test Station and former G.E./Exxon Nuclear building area is industrial and much of the land surrounding the Site is subject to easement restrictions that prohibit human habitation and hunting. Therefore, the potential current receptors identified were an on-site employee, a utility worker, and a youth trespasser. Other potential receptors identified were future on-site residents (adult and child), who could be present at the Site if the current land use of the Test Station was changed to residential or if the easement restrictions were discontinued, and a future excavation worker.

The baseline risk assessment evaluated the health effects that could result from exposure to contamination as a result of ingestion, inhalation, and dermal contact with ground water; ingestion and dermal contact with surface and subsurface soils; and ingestion and dermal contact with surface water and sediments, for both potential present and future land use scenarios. A total of 21 exposure pathways were quantitatively or qualitatively evaluated under possible on-site current and future land-use conditions (see Table 11). For each pathway evaluated quantitatively, the reasonable maximum exposure was assessed.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the site are presented in Table 12. A summary of the noncarcinogenic risks associated with these chemicals across various exposure pathways is found in Table 13.

As can be seen from Table 14, the HI for noncarcinogenic risk, based on a reasonable maximum exposure scenario, is less than 1.0 for a current on-site worker, a current utility worker, a current youth trespasser, and a future excavation worker. The HI is approximately 2.0 for a future on-site adult or child resident, assuming no remediation of contaminated soil at Building 23P. However, as shown in Table 14, the HI was calculated to be less than 1.0 for each receptor and 0.8 for the child resident, a sensitive subpopulation, when remediation of PCBs in soil at Building 23P was considered.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. Sfs, which are expressed in units of (mg/kg-day)-1, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 12.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between 10-4 to 10-6 to be acceptable. This level indicates that an individual has not greater than a 1 in 10,000 to a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site.

The cumulative upper-bound cancer risk at the Site for a current on-site employee, a current utility worker, a current youth trespasser, and a future excavation worker were all within the acceptable risk range of 10-4 to 10-6 or lower (see Table 15). For example, the excess cancer risk to an on-site worker under current conditions is approximately 7 x 10-5 (7 in 100,000), which is within the acceptable risk range. The risk assessment indicated that the carcinogenic risk may be unacceptable under a future resident scenario due to the concentration of PCBs in soil at the Building 23P area. For example, the carcinogenic risk with the contaminated soil is 2 x 10-4 (2 in 10,000) for a future child resident, a sensitive subpopulation. Assuming the top foot of contaminated soil is cleaned up to 10 ppm of PCBs and contaminated soil below a depth of one foot is cleaned up to 25 ppm of PCBs, based on EPA policy, the risk is reduced by half to 1 x 10-4 (see Table 15).

The baseline risk assessment indicated that the carcinogenic risk associated with ground water at the Site is acceptable for all current and future human receptors (see Table 16). For example, the carcinogenic risk for current Test Station employees who ingest ground water treated by the existing air stripper is 9 x 10-7 (9 in 10 million), which is negligible. If the existing air stripper were discontinued, the carcinogenic risk for Test Station employees drinking untreated ground water would be 4 x 10-5 (4 in 100,000), which is higher but still within the acceptable risk range. The carcinogenic risk calculated for exposure of a future child resident, a sensitive subpopulation, is 1 x 10-5 (1 in 100,000), which is also within the acceptable risk range. Although the risk due to ground water contamination falls within the acceptable risk range, the remedy requires treatment of the Test Station water supply to provide potable drinking water for the Test Station employees, and monitoring of natural attenuation and degradation processes until the ground water

plume attains ground water cleanup standards, consistent with the NCP. All calculations in the risk assessment are conservatively protective of human health; therefore, any actual risk posed by exposure is unlikely to be underestimated.

The baseline risk assessment did not include a calculation of the risk associated with lead in soil because appropriate toxicity factors do not exist, and therefore the calculation could not be performed. However, the maximum detection of lead in soil (1090 ppm at Building 23P) was determined to be unacceptable because it is slightly above 1000 ppm, which is a generally accepted cleanup level used by EPA for lead in soil for a commercial/industrial land use. For comparison, EPA's cleanup level for residential land use is 400 ppm. Other detections of lead in soil at the Site were less than 1000 ppm and determined to be acceptable under the Site's current commercial/industrial land use.

Ecological Risk Assessment

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: Problem Formulation - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. Exposure Assessment--a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. Ecological Effects Assessment--literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. Risk Characterization-measurement or estimation of both current and future adverse effects.

The ecological risk assessment began with selection of contaminants of concern that would be representative of Site risks and identification of the Site-specific biological species and their habitats. The summary of the contaminants of concern for environmental receptors in sampled media is provided in Tables 17, 18, and 19 for surface water, sediment, and surface soil, respectively. Potential ecological receptors identified were benthic invertebrates and aquatic plants, terrestrial plants, soil invertebrates such as the earthworm, and terrestrial vertebrates such as the meadow vole, the short-tailed shrew, the red-tailed hawk, the barn swallow, and the red fox.

The ecological risk assessment indicated that the soil contaminated with mercury at the Muggett's Pond Drainage Ditch Intersection may pose an ecological risk to terrestrial species. A cleanup goal of 2 ppm of mercury was established for these soils based on ecological risk calculations. The potential risk posed to Muggett's Pond itself was determined to be minimal based on its small size (0.07 acre) and limited habitat for aquatic receptors.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual is likely to actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the site, and is unlikely to underestimate actual risks related to the site.

Site-specific uncertainties associated with the risk assessment for the Site include the fact that seven (7) tentatively identified compounds (TICs) were not included in the quantitative risk assessment due to the uncertainties associated with the identification and quantities of these compounds. Each of the TICs lack both a cancer slope factor and a reference dose. The lack of current toxicity criteria for these TICs does not allow quantitative estimation of risk. Thus, elimination of the TICs could lead to a slight underestimation of the risks. Another site-specific uncertainty is associated with the future resident scenario, which assumed ground water would not be filtered prior to consumption. Turbidity sampling of the Malta Test Station water supply wells and several monitoring wells, as well as the current practice of using a settling tank at the Test Station to reduce the solids content before ground water consumption, suggest that a future resident water supply would also require some types of solids removal (e.g., settling or filtration) before consumption. Therefore, the use of unfiltered water in the risk assessment has likely lead to a slight overestimation of risk with respect to that scenario. More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

Based on the results of the risk assessment, EPA has determined that actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. They specify the contaminants of concern, the receptors, and acceptable contaminant levels for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The following remedial action objectives were established for the Site:

Ground Water

! Prevent ingestion of ground water with concentrations of Site-related constituents (primarily the VOCs carbon tet and TCE) above current Federal drinking water standards or, if more stringent, New York State drinking water standards. Specifically, prevent the ingestion of ground water containing concentrations of carbon tet above 5 ppb; TCE above 5 ppb, tetrachloroethylene (PCE) above 5 ppb; chloromethane above 5 ppb; 1,1,1,-trichloroethane above 5 ppb, and total trihalomethanes (which includes chloroform) above 100 ppb.

! Prevent ingestion of ground water with concentrations of Site-related VOCs that pose an unacceptable risk to human health (total carcinogenic risk greater than 1 in 10,000 or a noncarcinogenic Hazard Index greater than 1).

! Prevent further migration of the ground water plume containing Site-related VOCs above current Federal drinking water standards or, if more stringent, New York State ground water standards, into areas with concentrations of contaminants in ground water below such standards. Specifically, prevent further migration of ground water containing more than 5 ppb of carbon tet, 5 ppb of TCE, 5 ppb of PCE, 5 ppb of chloromethane, 5 ppb of 1,1,1,-trichloroethane, and 7 ppb of chloroform.

! Restore ground water so that concentrations of VOCs in the aquifer at the Site are reduced to current Federal drinking water standards or, if more stringent, New York State ground water standards. Specifically, restore the ground water to concentrations that do not exceed 5 ppb for carbon tet, 5 ppb for TCE, 5 ppb for PCE, 5 ppb for chloromethane, 5 ppb for 1,1,1,-trichloroethane, and 7 ppb for chloroform.

Soil

! Prevent human exposure to soil at the Building 23P area containing concentrations of PCBs that pose an unacceptable risk to human health (i.e., an excess cancer risk greater than 1 in 10,000) and concentrations of lead in excess of generally accepted cleanup levels for lead in soil for commercial/industrial land use. Specifically, prevent human exposure to PCBs in soil at concentrations greater than 10 ppm from the surface to a depth of 1 foot and in soil at concentrations greater than 25 ppm for soil below a depth of 1 foot, and prevent human exposure to lead in soil at the Building 23P area at concentrations greater than 1000 ppm.

! Prevent unacceptable ecological risk attributable to mercury in soil at the Muggett's Pond Drainage Ditch Intersection. Specifically, prevent ecological exposure to mercury in soil at concentrations greater than 2 ppm.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

This ROD evaluates in detail, five (5) remedial alternatives that address ground water contamination associated with the Malta Rocket Fuel Area Site and four (4) remedial alternatives that address the soil contamination. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the PRPs, or procure contracts for design and construction, or conduct operation and maintenance at the Site.
The present worth cost for each alternative is calculated for 30 years at a 5% discount rate. The remedial alternatives for ground water are:

Alternative G1: No Action

Capital Cost:	$0
Operation and Maintenance Cost:	$0/yr
Present-Worth Cost:	$0
Implementation Time:	None

CERCLA requires that the "no action" alternative be considered as a baseline for comparison with other alternatives. Under Alternative G1, no action would be taken to remediate, control or monitor the contaminated ground water. The existing air stripper would be disconnected and would no longer treat the Test Station water supply to acceptable drinking water levels. The EWMS would be discontinued and there would be no monitoring of contaminants in surface water or ground water. There would be no institutional controls to restrict human habitation at the Test Station or the withdrawal of ground water within the vicinity of the plume. The concentrations of VOCs in ground water would be reduced to acceptable levels in an estimated 110 years by natural attenuation and degradation processes such as dilution, dispersion, adsorption, and possibly biological and chemical degradation. Ground water would continue to discharge naturally to the ravines, where concentrations of VOCs are reduced to acceptable levels in surface water through volatilization. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years.

Alternative G2b: Pump Test Station Water Supply Well(s), Treat using the Existing Air Stripper, Natural Attenuation, and Institutional Controls

Capital Cost:	$7,000
O & M Cost:	$17,100/yr
Present Worth Cost:	$269,900

Construction Time: None

Under Alternative G2b, the Test Station water supply well(s) would continue to pump contaminated ground water and the existing air stripper would continue to treat the Test Station water supply system to acceptable drinking water levels. The pumping rate for the Test Station water supply wells would be determined by demand, which is currently estimated to be 0.6 gallons per minute (gpm). The concentrations of VOCs in ground water would be reduced to acceptable levels by natural attenuation and degradation processes, and to a lesser extent by the pumping and treating, in an estimated 110 years. Ground water and surface water would continue to be monitored to ensure that off-site ground water users are not impacted by contamination from the Site, that the ground water plume does not migrate into uncontaminated areas, and that natural attenuation and degradation processes are restoring the ground water to cleanup standards. Ground water would continue to discharge naturally to the ravines, where concentrations of VOCs are currently reduced to acceptable levels through volatilization. The air stripper influent and effluent would continue to be monitored. Institutional controls, such as new deed restrictions, would be implemented to prevent ingestion of contaminated ground water and to restrict the withdrawal of ground water within the vicinity of the plume that could adversely impact restoration of the contaminated ground water. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c) would require that Site conditions be reviewed at least once every 5 years to ensure that the remedy is protective of human health and the environment. If justified by the review, EPA may require implementation of additional remedial actions.

Alternative G3: Pump Test Station Water Supply Well(s), Treat at Maximum Capacity of Existing Air Stripper, Natural Attenuation, and Institutional Controls
Capital Cost: $247,000
O & M Cost: $46,200/yr
Present Worth Cost: $957,400
Construction Time: 1 to 2 months

Alternative G3 incorporates the provisions of Alternative G2b (pumping Test Station water supply wells, treatment of the water using the existing air stripper, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls), except that the Test Station water supply system would be operated to maximize the capacity of the air stripper (approximately 25 gpm). Water pumped and treated in excess of the water supply demand of the Site would be discharged on-site in a manner that enhances the ground water remediation and in compliance with applicable regulations. Various discharge options, such as an outfall discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 90 years. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c)would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Alternative G4a: Pump Test Station Water Supply Well(s), Treat using New Air Stripper, Natural Attenuation, and Institutional Controls
Capital Cost: $348,700
O & M Cost: $47,600/yr
Present Worth Cost: $1,080,400
Construction Time: 4 to 6 months

Alternative G4a incorporates many of the provisions of Alternative G3 (pumping the Test Station water supply wells, treatment by air stripping, discharge of water in excess of on-site demand, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls). However, Alternative G4a would require that the 2 on-site water supply wells be pumped at a combined pumping rate of approximately 75 gpm to capture most of the ground water with concentrations of individual VOCs greater than 50 ppb. A new air stripper would be required to treat this volume of pumped water. As with Alternative G3, treated water in excess of the water supply demand of the Site would be discharged on-site in

a manner that enhances ground water remediation and in compliance with applicable regulations. Various discharge options, such as a discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 80 years. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c) would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Alternative G4b: Pump Existing Test Station Water Supply Wells and Two New Wells, Treat using New Air Stripper, Natural Attenuation, and Institutional Controls

Capital Cost:	$649,600
O & M Cost:	$51,800/yr
Present Worth Cost:	$1,445,900
Construction Time:	4 to 6 months

Alternative G4b incorporates many of the provisions of Alternative G4a (pumping of the existing water supply wells, treatment by a new air stripper, discharge of water in excess of on-site demand, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls). In Alternative G4b, however, water would be pumped from 4 wells (2 new wells and 2 existing water supply wells) at a combined pumping rate of approximately 140 gpm, to capture all of the ground water with concentrations of individual VOCs greater than 50 ppb. A new air stripper would be required to treat the increased volume of pumped water. Treated water in excess of the water supply demand of the Site would be discharged on-site in a manner that enhances ground water remediation and in compliance with applicable regulations. As in Alternatives G3 and G4a, various discharge options, such as a discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 60 years. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c) would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

SOIL ALTERNATIVES

Alternative S1: No Action

Capital Cost:	$ 0
O & M Cost:	$ 0/yr
Present Worth Cost:	$ 0
Construction Time:	None

CERCLA requires that the "no action" alternative be considered as a baseline for comparison with other alternatives. Under Alternative S1, no action would be taken to remediate or control the contaminated soil. The contaminated soil at the Building 23P area and at the Muggett's Pond Drainage Ditch Intersection would be left in place. No action would be taken to control access to the contaminated soil, such as maintaining the existing fence around the Test Station or enforcing the easement restrictions. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c)would require that Site conditions be reviewed at least once every 5 years.

Alternative S2: Institutional Controls

Capital Cost:	$16,800
O & M Cost:	$0/yr
Present Worth Cost:	$16,800
Construction Time:	None

Under Alternative S2, human exposure to contaminated soil at the Building 23P area would be reduced through institutional controls, such as deed restrictions, that would restrict the Test Station property to its current commercial/industrial land use and thereby eliminate a future residential scenario. Ecological exposure to contaminated soil at Building 23P and the Muggett's Pond Drainage Ditch Intersection would be

reduced through maintenance of the existing fencing around the Test Station, which would restrict access for some species but not others. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c) would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Alternative S3b: Asphalt Caps and Institutional Controls
Capital Cost: $ 27,000
O & M Cost: $1,000/yr
Present Worth Cost: $ 42,400
Construction Time: 1 week

Under Alternative S3b, asphalt caps would be placed over the contaminated soil at the Building 23P area (estimated area 15 ftx 5 ft) and the Muggett's Pond Drainage Ditch Intersection (estimated area 3 ff x 30 ft), in addition to institutional controls to limit the Test Station to commercial/industrial land use (e.g., deed restrictions). Placement of the cap in the drainage ditch would require altering the ditch to maintain flow and prevent erosion. Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA §121(c), 42 U.S.C. §9621(c) would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Alternative S4: Excavation and Off-Site Disposal and Institutional Controls

Capital Cost:	$25,100
O & M Cost:	$0/yr
Present Worth Cost:	$25,100
Construction Time:	1 week

Alternative S4 involves excavation of the contaminated soil at Building 23P (estimated volume 3 to 5 cubic yards [yd3]) and at the Muggett's Pond Drainage Ditch Intersection (estimated volume 3 yd3). Excavated areas would be backfilled with clean fill material, graded to blend with the surrounding areas, and revegetated. The excavated soil would be transported to an appropriate off-site facility for final disposal. Institutional controls, such as deed restrictions, would be implemented to restrict the Test Station to its current commercial/industrial land use.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of federal and state environmental statutes and requirements or provide grounds for

invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the site.

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. State acceptance indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, or opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

! Overall Protection of Human Health and the Environment

Ground Water Alternatives
Alternative G1: No Action is not protective of human health and the environment, because it does not prevent ingestion of contaminated ground water or require ground water restoration or monitoring to ensure that the ground water plume does not migrate into uncontaminated areas. Alternatives G2b, G3, G4a, and G4b would be protective of human health and the environment, because ingestion of contaminated ground water and plume migration would be prevented through on-site ground water pumping and treatment, institutional controls, and surface water and ground water monitoring. Although Alternative G4b would be the most protective of the environment because it would restore the ground water in the shortest period of time, all the ground water alternatives are expected to restore the contaminated ground water to acceptable levels within similar relative timeframes (i.e, from 60 to 110 years). Alternative G2b would be somewhat more protective of the ravine habitat than Alternatives G3, G4a, and G4b because there would
be no potential impact to the streams due to discharge of large volumes of treated water in excess of the Test Station water supply demand; this impact could be reduced by using reinjection wells or infiltration trenches upgradient of the streams rather than through a discharge structure at the head of Ravine 2a.

Soil Alternatives
Alternative S1: No Action is not protective of human health and the environment because it does not prevent human exposure to contaminated soil at Building 23P or reduce ecological risks associated with contaminated soil at Muggett's Pond Drainage Ditch Intersection. Of the remaining alternatives, S2 is the least

protective of human health and the environment because it relies on institutional controls. Alternative S3b is more protective of human health and the environment, because exposure to contaminated soil would be reduced through capping and institutional controls. Alternative S4 is the most protective of human health and the environment because exposure to contaminated soil would be reduced through excavation and off-site disposal and institutional controls.

! Compliance with ARARs

Ground Water Alternatives
All of the ground water alternatives except the no action alternative would attain the chemical-specific ARARs identified for the Site. The ARARs for the treatment of the Test Station water supply are the Federal MCLs for drinking water or, if more stringent, New York State drinking water standards. Examples of these levels are 5 ppb for carbon tet and 5 ppb for TCE. These standards would be met for each ground water alternative utilizing an air stripper (i.e., all but Alternative G1: No Action).

All of the ground water alternatives are expected to attain the chemical-specific ARARs identified for restoration of the ground water plume within estimated restoration time periods ranging from 60 to 110 years. The ARARs for ground water restoration are the Federal MCLs or, if more stringent, New York State ground water standards. The estimated time to attain MCLs is 110 years for Alternatives G1 and G2b, 90 years for Alternative G3, 80 years for Alternative G4a, and 60 years for Alternative G4b. As noted above, actual timeframes for ground water restoration may be shorter or longer than these time periods, which are estimated based on ground water fate and transport modeling.

There are no location-specific or action-specific ARARs associated with Alternative G1, which requires no action. The remaining alternatives would be expected to meet all of their location-specific or action-specific ARARs. Alternative G2b and G3 utilize the existing air stripper, which was permitted by NYSDEC and has met the New York State Air Emissions Requirements (VOC Emissions for Air Strippers and Process Vents, General Air Quality). Alternatives G4a and G4b require new air strippers, which also could be designed to meet these requirements. Alternatives G3, G4a, and G4b, which involve discharge of treated water in excess of the on-site demand, would have additional ARARs depending on the method of discharge selected in remedial design. For example, discharge to Ravine 2a through an outfall structure would be designed to comply with the Federal and New York State Pollutant Discharge Elimination System Programs (NPDES and SPDES, respectively), the Federal Fish and Wildlife Coordination Act, and the Federal Clean Water Act (Part 404(b) Army Corps of Engineers Nationwide Permit Program). Discharge through reinjection wells or infiltration trenches would be designed to comply with the Federal Underground Injection Control (UIC) Program of the Safe Drinking Water Act and SPDES.

Soil Alternatives
All the ARARs associated with the soil alternatives would be attained. There are no location-specific or action-specific ARARs associated with Alternatives S1 or S2. Alternative S3b would comply with RCRA requirements for detection monitoring. Alternative S4 would comply with RCRA requirements for transport of the excavated soil and disposal at an EPA-approved landfill. There are no chemical-specific ARARs that establish the cleanup level for the PCB-contaminated soil at Building 23P, since the concentrations are below 50 ppm and therefore are not regulated by the Toxic Substances Control Act (TSCA). Similarly, there are no ARARs for the cleanup level of mercury in soil at the Muggett's Pond Drainage Ditch Intersection or the lead in soil at Building 23P. However, Alternative S4 would comply with EPA's "Guidance on Remedial Actions for Superfund Sites with PCB Contamination," OSWER Directive No. 9355.4-01, dated August 1990, which utilizes the TSCA PCB spill policy to establish cleanup levels for PCBs at restricted access (industrial) sites. Alternative S4 would also meet the Site-specific cleanup level for mercury (2 ppm) and the generally accepted cleanup level for lead in soil for a commercial/industrial land use (1000 ppm).

! Long-Term Effectiveness and Permanence

Ground Water Alternatives
Alternative G1 is neither effective nor permanent because it would not prevent ingestion of contaminated ground water and does not provide a means for restoring or monitoring the ground water plume. Alternatives G2b, G3, G4a, and G4b all would be effective and permanent in the long-term, because each prevents ingestion

of contaminated ground water, eventually restores ground water to acceptable levels, and includes provisions for monitoring the ground water over time.

Soil Alternatives
Alternative S1 is neither effective nor permanent because it would not address the long-term risks due to exposure to contaminated soils at Building 23P and Muggett's Pond Drainage Ditch Intersection. Of the remaining alternatives, S2 is the least effective means of reducing long-term risk because it relies solely on institutional controls. Alternative S3b uses capping, which is somewhat more effective in the long-term. Alternative S4 would have the greatest long-term effectiveness and permanence, because the risks would be reduced through excavation and proper off-site disposal to an approved facility.

! Reduction in Toxicity, Mobility, or Volume via Treatment

Ground Water Alternatives
Alternative G1: No Action would not employ treatment to reduce the toxicity, mobility or volume of VOCs in ground water. Of the remaining alternatives, G2b assumes the lowest pumping rate and would offer the least reduction in toxicity, mobility, and volume through treatment by air stripping. Alternative G3 would require a higher pumping rate than Alternative G2b and therefore would offer greater reduction through treatment. Alternative G4b would require the highest pumping rate and would utilize treatment to the greatest extent to reduce toxicity, mobility, and volume of contaminants. Alternatives G2b, G3, and G4b would rely upon natural attenuation and degradation processes in addition to treatment to reduce the toxicity, mobility, and volume of VOCs in the ground water.

Soil Alternatives
Alternatives S1 and S2 require no action and institutional controls, respectively, and therefore would not reduce the toxicity, mobility, or volume of contaminated soil at Building 23P or at the Muggett's Pond Drainage Ditch Intersection. The asphalt caps required by Alternative S3b would reduce the mobility of the contaminated soil from wind and water erosion, but would not reduce its toxicity or volume. Alternative S4 provides the greatest reduction in toxicity, mobility, and volume by excavation of the contaminated soil and off-site disposal in an EPA-approved facility. Because of the small volume of soil involved (6-8 yd3), none of the soil alternatives utilizes an on-site treatment technology to reduce the toxicity, mobility or volume of contaminants in soil.

! Short-Term Effectiveness

Ground Water Alternatives
Alternatives G1, G2b, and G3 do not pose any short-term risk during construction because they rely on either no action or utilize existing systems. Alternatives G4a and G4b require installation of a new air stripper and disassembly of the existing one, which may pose short-term safety risks to construction workers. Alternatives G4a and G4b are equivalent with respect to this potential risk, which is expected to be easily controlled through proper construction and standard health and safety practices. Alternative G4b is the most effective during implementation, because cleanup goals would be expected to be met in the shortest period of time compared to the other alternatives.

Soil Alternatives
Alternative S1 and S2 do not pose any short-term risk because they rely on either no action or institutional controls. Alternative S3b would pose minimal short-term risk to workers and the environment during asphalt capping of the contaminated soil. Alternative S4 would pose minimal short-term risk for a short period of time when the contaminated soil is excavated and disposed of off-site. However, this risk is expected to be easily controlled through standard health and safety practices.

! Implementability

Ground Water Alternatives
Alternative G1 would not require any construction, operation, or monitoring; therefore it is easily implementable. Alternatives G2b, G3, and G4a would use the existing wells, and Alternatives G2b and G3 would also use the existing air stripper treatment system, making these alternatives easy to implement.

Installation of new pumping wells (G4b), installation of a new air stripper (G4a and G4b) and construction of a discharge system for excess treated water (G3, G4a, and G4b) would require no specialty equipment or contractors and could be implemented using common construction practices.

Soil Alternatives
Alternatives S1 and S2 require no action and institutional controls, respectively, and are readily implementable. The routine asphalt caps of Alternative S3b and the excavation and off-site disposal required of Alternative S4 could be easily implemented using readily available materials, equipment, and construction practices.

Ground Water Alternatives
Costs for the ground water alternatives G1 to G4b are as follows:

	Capital	O&M/yr	Present Worth
G1	$0	$0	$0
G2b	7,000	17,100	269,900
G32	47,200	46,200	957,400
G4a	348,700	47,600	1,080,400
G4b	649,600	51,800	1,445,900

The capital and present worth costs for Alternatives G1 and G2b are relatively low or zero. Alternatives G3 and G4a are intermediate with present worth costs of approximately $1 million, and Alternative G4b is the most expensive at approximately $1.5 million.

Soil Alternatives
Costs for the soil alternatives S1 to S4 are as follows:

	Capital	O&M/yr	Present Worth
Sl	$0	$0	$0
S21	16,800	0	16,800
S3b	27,000	1,000	42,400
S4	25,100	0	25,100

The present worth cost for Alternative S1 is zero. Of the remaining alternatives, S2 is the least expensive at $16,800, S4 is intermediate at $25,100, and S3b is the most expensive at $42,400.

! State Acceptance

The State of New York concurs with the selected remedy. A letter of concurrence is attached as Appendix IV.

! Community Acceptance

Community acceptance of the selected remedy was assessed at the public meeting and during the public comment period. At the April 24, 1996 public meeting, the Town Supervisor read a prepared statement signed by himself and members of the Town Board in support of EPA's remedy. During the public comment period, EPA received one letter, which was submitted by two of the PRPs (G.E. and NYSERDA) and supported EPA's remedy. A responsiveness summary is attached as Appendix V.

SELECTED REMEDY

EPA and the State of New York have determined, after reviewing the alternatives and public comments, that Alternative G2b: Pump Water Supply Well(s), Treat using the Existing Air Stripper, Natural Attenuation, and Institutional Controls and Alternative S4: Excavation and Off-Site Disposal and Institutional Controls, is the appropriate remedy for the Site, because it best satisfies the requirements of CERCLA §121, 42 U.S.C. §9621, and offers the best trade-offs among the alternatives with respect to the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430(e)(9).

The major components of the selected remedy are as follows:

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 ground water that are not captured by the pumping well(s) until the ground water attains Federal MCLs, or if more stringent, New York State ground water standards.

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

4) Excavation of contaminated soil at the Building 23P area at a depth of 1 foot or less having a concentration of more than 10 ppm of PCBs, soil at a depth below 1 foot having a concentration of more than 25 ppm of PCBs, and soil at any depth with a concentration of lead of more than 1000 ppm.

5) Excavation of contaminated soil at the Muggett's Pond Drainage Ditch Intersection at any depth with a concentration of more than 2 ppm 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 regulations and all other ARARs.

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

9) Evaluation of Site conditions at least once every 5 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.

STATUTORY DETERMINATIONS

As previously noted, CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA §121, 42 U.S.C. §9621 and provides the best balance of trade-offs among alternatives with respect to the evaluation criteria:

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. Soil at Building 23P and the Muggett's Pond Drainage Ditch Intersection with concentrations of contaminants above acceptable levels will be excavated and disposed of off-site. The Test Station water supply will be treated by air stripping to provide a safe drinking water supply for Test Station employees, and the surface water and ground water will be monitored to ensure that off-site ground water users are not adversely impacted by the Site. The ground water plume will be restored by natural attenuation and degradation processes to cleanup standards that are protective of human health and the environment.

Compliance with ARARs

The selected remedy will comply with all ARARs identified for the Site. Chemical-specific ARARs for the air stripper at the Test Station are the Federal Safe Drinking Water Act MCLs (40 CFR §141.11-141.16) or, if more stringent, the New York State Department of Health Public Water Systems MCLs (10 NYCRR Part 5, Subpart 5-1). Specifically, these ARARs are as follows:

Federal MCLs:		NYSDOH MCLs:	
carbon tet	5 ppb	chloromethane	5 ppb
TCE	5 ppb	1,1,1,-trichloroethane	5 ppb
PCE	5 ppb	total trihalomethanes	100 ppb

Chemical-specific ARARs for restoration of the ground water are the Federal Safe Drinking Water Act MCLs (40 CFR §141.11-141.16) or, if more stringent, the NYSDEC Quality Standards for Groundwater for Class GA ground water (6 NYCRR Part 703). Specifically, these ARARs are as follows:

Federal MCLs		NYSDEC Standards:	
carbon tet	5 ppb	chloromethane	5 ppb
TCE	5 ppb	1,1,1,-trichloroethane	5 ppb
PCE	5 ppb	chloroform	7 ppb

There are no chemical-specific ARARs for the soil cleanup. However, the remedy will comply with cleanup levels for PCBs set forth in EPA policy (Guidance on Remedial Actions for Superfund Sites with PCB Contamination, OSWER Directive No. 9355.4-01, dated August 1990) and will meet a generally accepted cleanup level for lead in soil for commercial/industrial land use. In addition, the soil cleanup will meet a cleanup level for mercury obtained from Site-specific ecological risk assessment calculations. Specifically, the remedy will meet the following cleanup levels in soil:

Muggett's Pond Drainage Ditch Intersection		Bulding 23P	
mercury	2 ppm	PCBs, top foot:	10 ppm
		PCBs, below top foot:	25 ppm
		lead	1000 ppm

Action-specific ARARs for operation of the air stripper are the New York State Air Emission Requirements [VOC Emissions for Air Strippers and Process Vents, General Air Quality], (6 NYCRR Part 200-212). The existing air stripper is subject to the terms and conditions of the permit issued by NYSDEC. Action-specific ARARs for handling, transporting, and disposing of the Site soils are the Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR §§1904, 1910, and 1926); the Department of Transportation Rules for Hazardous Materials Transport (49 CFR Parts 107 and 171-177), and the Resource Conservation and Recovery Act standards for transporters and hazardous waste facilities (40 CFR Parts 263 and 264), respectively.

There are no location-specific ARARs for the selected remedy. However, the remedy will comply with EPA's policy regarding land use (Land Use in the CERCLA Remedy Selection Process, OSWER Directive No. 9355.7-04, dated May 25, 1995).

Cost-Effectiveness

The remedy is cost-effective because it provides overall effectiveness that is proportional to its cost. The ground water component of the remedy is the least expensive alternative that meets the ground water remedial

objectives, and the soil component provides the greatest reduction in risk at an intermediate cost. In addition, the remedy uses existing remedial actions where possible. The present worth cost of the remedy is $295,000.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy addresses all of the media of concern and utilizes permanent solutions and treatment technologies to the maximum extent practicable. In addition, the selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

The selected remedy will reduce the toxicity and, to a lesser extent, the mobility and volume of contaminants in the ground water through treatment by air stripping. Natural attenuation and degradation of VOCs will eventually result in permanent restoration of the ground water plume. Excavation and off-site disposal of the contaminated soil willsignificantly reduce the toxicity and volume of PCBs, lead, and mercury at the Site and will offer a permanent solution to the risks posed by these wastes.

Preference for Treatment as a Principal Element

The selected remedy requires natural attenuation rather than treatment to restore the ground water. This is consistent with the ground water policy set forth in the NCP, because ground water restoration by active pumping and treatment is not warranted when the restoration time periods to reach MCLs and the costs of all alternatives are compared. Moreover, the selected remedy is consistent with EPA policy (A Guide to Principal Threat and Low Level Threat Waste, OSWER Directive No. 9380.3-06FS, dated November 1991), because ground water at the Site is a low level threat rather than a principal threat. The selected remedy does, however, require treatment of the Test Station water supply by air stripping to prevent ingestion of contaminated ground water. The remedy does not require on-site treatment of the contaminated soil because of the small volume involved (6-8 yd3).

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan. The ROD clarifies one of the three goals of the institutional controls (to restrict the Test Station to its current commercial/industrial land use rather than to restrict access), and clarifies that the pumping rate of the Test Station wells is determined by the demand for water, which may result in a higher or lower pumping rate than the current estimated rate of 0.6 gpm.

APPENDIX I

FIGURES

Figures 1-3

Figure 1: Malta Rocket Fuel Area Site

Figure 2: Schematic Illustrating Conceptualized Unconsolidated Aquifer Systems in the Vicinity of the MRFA Site

Figure 3: Areas Proposed for Soil Remediation

APPENDIX II

TABLES

Tables 1-18

TABLE 1
MALTA ROCKET FUEL AREA SITE
SURFACE WATER SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte	Conc.	MRFA Comparative Criteria
Bldg. 3	SW-B3-O2	Iron	10700	300
		Manganese	569	300
		Aldrin	0.041J	0.001
		Heptachlor Expoxide	0.087	0.001
Bldg. 4	SW-B4-02	Antimony	28J	3!
		Iron	2550J	300
	SW-PTI-01	Iron	1890	300
Bldg. 25	SW-B25-02	Antimony	22J	3!
		Iron	9310	300
Muggett's Pond D-3 (Ravine 1b)	SWMUG01	Iron	1340	300
		Manganese	0101J	300
	SWD301 headwater	Aluminum	307	47.0
		Calcium	98000	57900
		Iron	31500	300
		Manganese	4080J	300
		Potassium	3490	845
Ravine 1b	SW-1B-01 headwater	Aluminum	171	47.0
		Calcium	116000	57900
		Iron	8340J	300
		Manganese	2120	300
		Potassium	3910	845
		Sodium	5740	4840
Ravine 1b	SW-1B-02 midstream	Aluminum	71.5	47.0
		Potassium	932	845
		Sodium	5530	4840
Ravine 1b	SW-1B-03 downstream	Aluminum	113	47.0
		Iron	344J	300
		Sodium	4930	4840

Notes:
1. All results and entena are in ug/l(ppb).
2. **!** = Guidance value.
3. J = Semi-quantitive value due to QA/QC data validation requirements.

TABLE 2
MALTA ROCKET FUEL AREA SITE
SEDIMENT SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte	Conc.	MRFA Comparative Criteria
Bldg. 3		Cadmium	2.8BJ	0.8
		Copper	294J	19
		Lead	46.2J	27
		Zinc	1430J	85
		Archlor-1260	1200	0.08
	SD-PTI	Arsenic	20.3J	5.0
		Cadmium	38.4J	0.8
		Chromium	101J	26
		Copper	642J	19
		Iron	307000J	24000
		Lead	5701J	27
		Manganese	987J	428
		Mercury	0.27BJ	0.11
		Nickel	141J	22
		Zinc	6490J	85
		Methoxychlor	85J	6
		Aroclor-1254	7400	0.08
		Aroclor-1260	13000	0.08

Muggett's Pond	SD-MP1	Cadmium	1.2	0.8
		Copper	61.0	19
		Lead	71.7	27
		Mercury	1.1J	0.11
		Nickel	32.8	22
		Zinc	219	85
		Benzo (b) Flouranthene	64J	13
		Benzo (k) Flouranthene	51J	13
		Benzo (a) Pyrene	70J	13
		Indeno (1.2.3.-cd) Pyrene	75J	13
		Phenol (total unchlorinated)	210J	5
		gamma- Chlordane	1.9J	8x10E-7
		Aroclor-1260	280	0.08
Muggett's Pond	SD-MP2	Cadmium	1.4B	0.8
		Copper	56.1	19
		Lead	57.7	27
		Mercury	4.0J	0.11
		Nickel	26.5	22
		Zinc	261	85
		Benzo (a) Anthracene	700J	13
		Benzo (b) Flouranthene	740J	13
		Benzo (k) Flouranthene	390J	13
		Benzo (a) Pyrene	560J	13
		Chrysene	480J	13
		Indeno (1.2.3.-cd) Pyrene	320J	13
		Aroclor-1260	1300	0.08
Muggett's Pond	SD-DD1	Mercury	124	8.1**!**
Drainage Ditch		PCBs (Aroclor-1254, 1260)	1280	1000**!**

TABLE 2 (Cont'd)
MALTA ROCKET FUEL AREA SITE
SEDIMENT SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte	Conc.	MFRA Comparative Criteria
D-3	SD-D3	Barium	51.7J	35.6
Ravine 1b		Lead	50.1J	27
		Manganese	2410	428
Ravine 1b	SD-1B01	Aluminum	4960	2890
		Barium	85.70	35.6
		Beryllium	0.22B	0.14
		Cobalt	3.4B	2.8
		Copper	31.7J	19
		Magnesium	1720	1550
		Manganese	3210	428
		Potassium	528B	297
		Vanadium	14.5J	13.2
Ravine 1b	SD-1B03	Aluminum	3120	2890
		Potassium	437B	297
Ravine 6a	SD-6A01	Arsenic	5.5	5.0

Notes:
1. Inorganics are in mg/kg (ppm), organics are in ug/kg (ppb).
2. **!** = Surface soil MFRA Comparative Criteria.
3. J = Semi-quantitive value due to QA-QC data validation requirements.
4. B = Value is above the Instrument Detection Limit (IDL) but below the Contract Required Detection Limit (CRDL).

TABLE 3
MALTA ROCKET FUEL AREA SITE
SUBSURFACE SOIL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MFRA Comparative Criteria
S-1	SS-S1	Aroclor-1260	1200P	1000
Bldg. 6	SS-6	Benzo (a) Pyrene	91J	61
Bldg. 20	SS-20/1	Mercury	24.4J	8.1
Bldg. 21	SS-21	Mercury	45.5J	8.1
		Aroclor-1260	1600PDCJ	1000
Bldg. 23P	SS-23P	Aroclor-1260	4100PDCJ	1000
Bldg. 23P	SS-23P/03	Aroclor-1262	2600	1000
Bldg. 23P	SS-23P/04	Lead	1090	500
		Aroclor-1262	16000	1000
		Aroclor-1268	4300	1000
Bldg. 24	SS-24	Benzo (a) Anthracene	2100	220
		Benzo (a) Pyrene	1800	61
		Benzo (b) Flouranthene	2800	1100
		Chrysene	1900	400
		Dibenzo (a.h) Anthracene	400	14
Bdlg. 25	SS-25	Antimony	11.4	10.8
		Copper	1000	999
		Lead	897J	500
Bldg. 25S	SS-25S	Lead	764	500
Bldg. 27B	SS-27B	Dibenzo (a.h) Anthracene	45J	14
Bldg. 27C	SS-27C	Benzo (a) Anthracene	380J	220
		Benzo (a) Pyrene	33OJ	61
		Dibenzo (a.h) Anthracene	93J	14
Muggett's Pond Drainage Ditch	SS-DTINT	Mercury	13	3.1

Notes:
1. Inorganics are in mg/kg (ppm), organics are in ug/kg (pph).
2. J = Semi-quantative value due to QA/QC data violation requirements.
3. P = >25% difference for detected concentrates between the two GC columns. The lower value is reported.
4. C = Compound indentification was confirmed by GC/MS.
5. D = Analysis performed at a higher dilution factor.

TABLE 4
MALTA ROCKET FUEL AREA SITE
SUBSURFACE SOIL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MFRA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MFRA Comparative Criteria
S-2	S-84 0-2'	Acetone	300BJ	200
Bldg. 6	S-19 2'-4'	Tetrachloroethene	1400EJ	1400
Bldg. 11	S-85 4'-6'	Acetone	580BJD	200
Bldg. 14	S-39 0-2'	Total VOCS	12680J	10000
		Dodecane	8700JN	50000
		Eicosane	6100JN	50000
		Heptadecane	13000JN	50000
		Hexadecane	13000JN	50000
		Nonadecane	85000JN	50000
		Octadecane	110000JN	50000
		Pentadecane	130000JN	50000
		Pentadecane, 2,6,10, 14-Tetramethyl	66000JN	50000
		Tetradecane	140000JN	50000
		Tridecane	96000JN	50000
		Undecane	80000JN	50000
		Unknown Alkanes	172000J	50000
		Total SVOCs	1287000	500000
Bldg. 24	S-81 2'-4'	Acetone	710BJDE	200
Bldg. 25	S-75 2'-4'	Phenol	140J	30
Bldg. 26	S-80 0-2'	Phenol	46J	30

Notes
1. Inorganics are in mg/kg (ppm), organics are in ug/kg (ppb).
2. J = Semi-quantitative value due to QA-QC data validation requirements.
3. B = Compound was detected in associated method blank.
4. N = Compound was identified with a Chemical Abstract Services (CAS) number.
5. D = Result is from a secondary dilution analysis.
6. E = Value reported is higher than the linear calibration range.

TABLE 5
MALTA ROCKET FUEL AREA SITE
TEST PIT SUBSURFACE SOIL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MRFA Comparative Criteria
D-1	P-78 2'-4'	Tetrechloroethene	2200EDJ	1400
		Diphenyl Ether	96000J	50000
		Total VOCs	15962J	10000
D-2	P.19 2'-4'	Vanadium	914	189
		Benzo (a) Pyrene	160J	61
D-5	P.20 2'-4'	Cadmium	60.8	13.5
D-6	p.11 2'-4'	Arsenic	9.1	8.1

Notes
1. Inorganics are in mg/kg (ppm), organics are used in ug/kg (ppb).
2. J = Semi-quantitive value due to QA-QC data validation requirements.
3. E = Result is above instrument calibration range.
4. D = Result is from secondary dilution analysis.

TABLE 6
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MFRA Comparative Criteria	June 1992 Conc.	November 1992 Conc.	March 1994 Conc.
MW-1	Aluminum	5900	11300	19200	
	Antimony	3	19.0B	ND	
	Calcium	66200	175000	140000	
	Cobalt	7	24.9	21.1B	
	Iron	300	35000	38600	
	Lead	15	24.6	20.2J	
	Manganese	300	2770	2090	
	Potassium	2280	ND	5850	
	Vanadium	13	27.9	43.3B	
14D	Iron	300	2370	2420	
MW-2	Aluminum	5900	10200	12800	
	Antimony	3	ND	45.6BJ	
	Calcium	66200	143000	88200	
	Cobalt	7	17.0B	9.7B	
	Iron	300	30700	23500	
	Lead	15	20.5	!	
	Manganese	300	1600	765	
	Potassium	5850	ND	4110B	
	Vanadium	13	26.0B	27.5b	
MW-3	Antimony	3	18.2B	ND	
	Iron	300	6120	12500	
	Manganese	300	365	509	

MW-4	Aluminum	5900	42900	18700	ND
	Antimony	3	22.6B	ND	ND
	Beryllium	3	3.2B	!	ND
	Calcium	66200	465000	235000	!
	Chromium	50	53.7	!	ND
	Cobalt	7	50.2	21.2B	ND
	Iron	300	86900	39800	!
	Lead	15	56.5	22.61	ND
	Manganese	300	6220	2590	!
	Potassium	2280	12800	5910	!
	Vanadium	13	97.5	47.9B	ND
1D	Iron	300	1340	4130	ND
	Zinc	300	!	342	
	Carbon Tetrachloride	5	11	16	
	Trichloroethene	5	11	7	
	bis (2-Ethylhexyl) Phthalate	5	89B	ND	

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MFRA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
M-23	Aluminum	5900	36300	22700
	Calcium	66200	241000	166000
	Chromium	50	81.0	!
	Cobalt	7	27.1B	12.1B
	Copper	200	972	!
	Iron	300	60800	35100
	Lead	15	273	!
	Magnesium	35000	67700	39700
	Manganese	300	1930	1130
	Potassium	2280	11100	7450
	Vanadium	13	67.1	42.6B
	Zinc	300	647	!
	Carbon Tetrachloride	5	16	14
2S	Aluminum	5900	43000	39500
	Calcium	66200	364000	355000
	Chromium	50	62.0	58.3
	Cobalt	7	37.1B	29.5B
	Iron	300	87500	76200
	Lead	15	47.9	37.3
	Magnesium	35000	35500	35200
	Manganese	300	3320	2980
	Potassium	2280	11100	11200
	Vanadium	13	93.1	84.0
	Carbon Tetrachloride	5	140	67
	Chloroform	7	ND	8
	Trichloroethene	5	21	18

2D	Iron	300	4020	2040
	Zinc	300	596	!
	Carbon Tetrachloride	5	90J	44
	Chloroform	7	ND	7
	Trichloroethene	5	68J	49
3S	Aluminum	5900	13400	!
	Calcium	66200	180000	176000
	Cobalt	7	13.3B	8.5B
	Iron	300	26200	9710
	Manganese	300	1130	1080
	Potassium	2280	3960B	!
	Vanadium	13	28.0B	!
	Carbon Tetrachloride	5	22	24
3D	Trichloroethene	5	44	59
	Calcium	66200	71400	69200
	Iron	300	19700	20000
	Lead	15	61	17.2
	Zinc	300	1560	815
	Carbon Tetrachloride	5	7.01	10
	Trichloroethene	5	16	24

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
4S	Aluminum	5900	40700	45800
	Calcium	66200	323000	285000
	Chromium	50	60.2	63.9
	Cobalt	7	38.9B	34.2B
	Iron	300	86300	77100
	Lead	15	44.5	33.1
	Manganese	300	3480	2870
	Potassium	2280	10100	14100
	Vanadium	13	87.1	94.7
4D	Aluminum	5900	!	8390
	Chromium	50	!	153.0
	Iron	300	51500	135000
	Lead	15	!	17.8
	Manganese	300	1240	2780
	Potassium	2280	2520B	3270B
	Vanadium	13	!	18.0B
	Zinc	300	884	1130J
	bis(2-Ethylhexyl)Phthalate	5	ND	320B
10S	Aluminum	5900	6320	14600
	Calcium	66200	109000	147000
	Cobalt	7	ND	12.5B
	Iron	300	11700	28700
	Manganese	300	450	974
	Potassium	2280	2670B	5760
	Vanadium	13	13.4B	34.9B
10D	Iron	300	521	953
11S	Aluminum	5900	8320	7200
	Calcium	66200	205000	252000
	Cobalt	7	17.3B	19.8B
	Iron	300	28000	25300
	Lead	15	31.6	27.9
	Manganese	300	2070	2560
	Vanadium	13	20.6B	21.1B
	Trichloroethene	5	14	17
11D	Calcium	66200	!	76500
	Iron	300	1980	1350
	Zinc	300	!	322J
	Carbon Tetrachloride	5	ND	6
	Trichloroethene	5	9J	7
13S	Aluminum	5900	7040	10100
	Antimony	3	25.0BJ	ND
	Calcium	66200	111000	133000
	Chromium	50	504	748J
	Cobalt	7	7.2B	7.3B
	Iron	300	14300	19800
	Manganese	300	495	598
	Potassium	2280	7530	5640
	Vanadium	13	16.0B	21.7B
	Carbon Tetrachloride	5	6J	18

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
M-18	Aluminum	5900	14000	!
	Calcium	66200	151000	67400
	Iron	300	38300	4220
	Lead	15	34.1	!
	Magnesium	35000	37700	!
	Manganese	300	7440	2530
	Potassium	2280	!	2940B
	Tetrachloroethene	5	9J	6
M-19	Aluminum	5900	227000	92100
	Antimony	3	64.7	40.9B
	Arsenic	25	!	27.1
	Barium	1000	3440	!
	Beryllium	3	20.7	6.5
	Calcium	66200	1150000	216000
	Chromium	50	263	199
	Cobalt	7	243	83
	Copper	200	942	311J
	Iron	300	416000	167000
	Lead	15	187	94.2
	Magnesium	35000	114000	41000
	Manganese	300	48100	13700
	Nickel	100	506	237
	Potassium	2280	37200	21900
	Vanadium	13	400	182
	Zinc	300	1350	538
	Carbon Tetrachloride	5	140	220
	Chloroform	7	ND	32
	Trichloroethene	5	140	280
M-20	Aluminum	5900	93800	21700
	Antimony	3	ND	59.8
	Beryllium	3	6.3	!
	Calcium	66200	656000	298000
	Chromium	50	273.0	!
	Cobalt	7	98.6J	44.0B
	Copper	203	715J	!
	Iron	300	213000	50200
	Lead	15	123	57.9
	Magnesium	35000	81500	!
	Manganese	300	8440	4330
	Nickel	100	303J	!
	Potassium	2280	16700	3410B
	Vanadium	13	208.0	41.8B
	Zinc	300	638	!

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.	
M-21	Aluminum	5900	87200	36000	
	Antimony	3	31.2B	ND	
	Arsenic	25	27.4J	!	
	Beryllium	3	5.6	!	
	Calcium	66200	550000	185000	
	Chromium	50	330.0	120J	
	Cobalt	7	89.2J	33.1B	
	Copper	200	331J	!	
	Iron	300	193000	73400	
	Lead	15	89.1	32.5J	
	Magnesium	35000	94000	!	
	Manganese	300	8220	2560	
	Nickel	100	322J	126J	
	Potassium	2280	15500	8770	
	Sodium	20000	22600	!	
	Vanadium	13	185	74.8	
	Zinc	300	590	402J	
M-22	Aluminum	5900	61800	35100	
	Beryllium	3	4.6B	!	
	Calcium	66200	547000	280000	
	Chromium	50	94.9	156J	
	Cobalt	7	72.1J	36.1B	
	Copper	200	266J	!	
	Iron	300	138000	79100	
	Lead	15	84.4	41.9J	
	Magnesium	35000	50900	!	
	Manganese	300	6480	3080	
	Nickel	100	147J	111J	
	Potassium	2280	12100	9030	
	Vanadium	13	139	78.2	
	Zinc	300	402	379.J	
M-24S	Aluminum	5900	88100	23300	
	Beryllium	3	5.4	!	88100
	Calcium	66200	348000	124000	
	Chromium	50	121	137J	
	Cobalt	7	68.7	19.8B	
	Copper	200	278	!	
	Iron	300	181000	45500	
	Lead	15	92.4	23.15	
	Magnesium	35000	68900	!	
	Manganese	300	6170	1460	
	Nickel	100	156	114J	
	Potassium	2280	19300	5970	
	Vanadium	13	186	52.9	
	Zinc	300	468	!	

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
M-24D	Iron	300	662	423
	Potassium	2280	2320B	!
	Zinc	300	724	795J
	Carbon Tetrachloride	5	10	!
M-25S	Aluminum	5900	28100	25900
	Antimony	3	35.0B	ND
	Calcium	66200	176000	165000
	Chromium	50	!	55.7
	Cobalt	7	23.0B	17.4B
	Iron	300	60300	48900
	Lead	15	34	23.6
	Manganese	300	2050	1660
	Potassium	2280	7250	8000
	Sodium	20000	21700	!
	Vanadium	13	59.2	55.1
	Carbon Tetrachloride	5	ND	22J
	Trichloroethene	5	6J	13J
M-25D	Sodium	20000	!	20800
	Zinc	300	568	536
	Carbon Tetrachloride	5	48	R
M-26S	Aluminum	5900	80300	6410
	Beryllium	3	5.8	!
	Calcium	66200	665000	397000
	Chromium	50	121	!
	Cobalt	7	91.3	30.8B
	Copper	200	308	!
	Iron	300	170000	21400
	Lead	15	82.6	63
	Magnesium	35000	47200	!
	Manganese	300	9430	3870
	Nickel	100	178	!
	Potassium	2280	20900	!
	Vanadium	13	181	18.2B
	Zinc	300	472	!
M-26D	Iron	300	342	!
	Zinc	300	518	939J
M-27S	Aluminum	5900	!	38000
	Antimony	3	ND	37.4B
	Calcium	66200	87800	156000
	Chromium	50	!	57.4
	Cobalt	7	28.7B	28.7B
	Iron	300	13700	72100
	Lead	15	!	31.2
	Manganese	300	1220	2920
	Potassium	2280	ND	10100
	Vanadium	13	!	83.4
	Chloromethane	5	40	ND

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
M-27D	Iron	300	!	461
	Zinc	300	544	913
	Carbon Tetrachloride	5	75	23
	Chloromethane	5	28	ND
M-28S	Aluminum	5900	20600	12800
	Antimony	3	16.7B	ND
	Cadmium	5	127	211
	Calcium	66200	181000	392000
	Cobalt	7	21.7B	38.8B
	Iron	300	44400	53200
	Lead	15	30.1	1340
	Magnesium	35000	!	36300
	Manganese	300	2110	5050
	Potassium	2280	6170	2690B
	Vanadium	13	46.2B	33.9B
	Zinc	300	!	534J
	Carbon Tetrachloride	5	46	33
	Trichloroethene	5	47	49
M-28D	Zinc	300	625	456J
	Carbon Tetrachoride	5	31	42
	1,1,1-Trichloromethane	5	37	51
M-29S	Aluminum	5900	49600	11100
	Antimony	3	19.8BJ	ND
	Beryllium	3	3.2B	!
	Calcium	66200	284000	195000
	Chromium	50	169	!
	Cobalt	7	47.5B	22.0B
	Iron	300	114000	22900
	Lead	15	49.8	27.6
	Magnesium	35000	51900	!
	Manganese	300	4730	2630
	Nickel	100	166	!
	Potassium	2280	12500	!
	Vanadium	13	111	24.8B
	Zinc	300	306	!
	Carbon Tetrachloride	5	32	43
	Trichloroethene	5	24	28
M-29D	Antimony	3	17.5BJ	ND
	Iron	300	388	!
	Zinc	300	831	1430J
	Carbon Tetrachloride	5	79	84
	Chloroform	7	ND	14
	Trichloroethene	5	19	24

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.
M-30	Aluminum	5900	77400	28500
	Beryllium	3	5	!
	Calcium	66200	261000	96800
	Chromium	50	111	!
	Cobalt	7	61.8J	17.8B
	Copper	200	256J	!
	Iron	300	128000	38200
	Lead	15	73.6	17.2
	Magnesium	35000	67400	!
	Manganese	300	6080	1610
	Nickel	100	144J	!
	Potassium	2280	17900	9240
	Vanadium	13	143	49.1B
	Zinc	300	316	!
	Carbon Tetrachloride	5	12J	14
	Trichloroethene	5	8J	11
M-315	Aluminum	5900	49500	22100
	Beryllium	3	4.0B	!
	Cadmium	5	ND	9.6
	Calcium	66200	142000	!
	Chromium	50	78.6	!
	Cobalt	7	29.8B	8.8B
	Copper	200	240	!
	Iron	300	81000	35500
	Lead	15	60.2	!
	Manganese	300	1780	739
	Potassium	2280	9450	7420
	Vanadium	13	170	69.3
M-31D	Iron	300	2190	607
	Zinc	300	!	446J
M-32	Aluminum	5900	32200	6850
	Antimony	3	17.7B	ND
	Calcium	66200	200000	102000
	Cobalt	7	23.1B	ND
	Iron	300	52900	9490
	Lead	15	21.6	!
	Magnesium	35000	45000	!
	Manganese	300	1950	349
	Potassium	2280	9340	2560
	Vanadium	13	60	!
	Carbon Tetrachloride	5	56	63
	Tetrachloroethene	5	8J	18
	Trichloromethene	5	76	95

TABLE 6 (Cont'd)
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH UNFILTERED
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Wells	Analyte/ Compound	MRFA Comparative Criteria	March 1994 Conc.
M-33S	Iron	300	909
M-331	Calcium	66200	93600
	Iron	300	1730
	Potassium	2280	12900
	Sodium	20000	27400
M-34	Aluminum	5900	16300
	Calcium	66200	132000
	Chromium	50	76.4
	Cobalt	7	9.7B
	Iron	300	27000
	Lead	15	18.1
	Manganese	300	876
	Potassium	2280	6030
	Vanadium	13	33.2B
	Carbon Tetrachloride	5	8J
M-35S	Calcium	66200	94800
	Iron	300	3760J
	Manganese	300	531
	Carbon Tetrachloride	5	44
	Chloroform	7	8J
	Tetrachloroethene	5	57
	Trichloroethene	5	58
M-35D	Iron	300	1920

Notes:
1. All concentrations are in ug/l (ppb).
2. ND = analyte/compound was not detected.
3. **!** = analyte/compound was detected below the MRFA comparative Criteria.
4. R = analyte/compound was detected above the MRFA comparative criteria but was rejected.
5. J = Semi-quantitative value due to QA/QC data validation requirements.
6. B (inorganics) = Value is above the Instrument Detection Limit (IDL) but below the Contract Required Detection Limit (CRDL).
7. B(organics) = Compound was detected in associated method blank.

TABLE 7
MALTA ROCKET FUEL AREA SITE
GROUND WATER SAMPLE LOCATIONS WITH FILTERED
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Monitoring Well	Analyte/ Compound	MRFA Comparative Criteria	June 1992 Conc.	November 1992 Conc.	March 1994 Conc.
2S	Calcium	66200	70800	82900	
3S	Calcium	66200	79500	68200	
3D	Calcium	66200	69700	66600	
10S	Calcium	66200	69100	**!**	
13S	Antimony	3	22.4B	R	
	Calcium	66200	70700	80800	
	Chromium	50	512	834J	
	Potassium	2280	444OB	3660B	
M-16	Calcium	66200	99800	98900	
M-17	Calcium	66200	95700	88600	
	Zinc	300	**!**	355	
M-19	Calcium	66200	67600	**!**	
	Iron	300	546	**!**	
M-21	Calcium	66200	99000	75800	
	Sodium	20000	20900	**!**	
M-22	Calcium	66200	103000	101000	
M-24D	Zinc	300	537J	731J	
M-25	Sodium	20000	21400	**!**	
M-25D	Sodium	20000	**!**	20100	
	Zinc	300	589	492	
M-26S	Calcium	66200	74400	**!**	
M-26D	Zinc	300	365J	778J	
M-27D	Zinc	300	531J	817	
M-28S	Antimony	3	17.7	ND	
	Calcium	5	19	ND	
	Iron	300	379	**!**	
M-28D	Zinc	300	549	608J	
M-29S	Antimony	3	ND	48.5BJ	
	Calcium	66200	70500	73000	
M-29D	Potassium	2280	2610B	ND	
	Zinc	300	727J	1660J	
M-31S	Iron	300	1480	4170	
	Manganese	300	313	394	
M-31D	Zinc	300	**!**	393J	
M-32	Calcium	66200	70500	75700	
M-331	Potassium	2280			12400
:	12400				
	Sodium	20000			27500
M-35S	Calcium	66200			74000
M-35D	Potassium	2280			2840
	Sodium	20000			20900

Notes:
1. All concentrations are in ug/l (ppb).
2. ND = analyte/compound was not detected.
3. **!** = analyte/compound was detected below the MRFA Comparative Criteria.
4. R = analyte/compound was detected above the MRFA Comparative criteria but was rejected
5. J = Semi-quantitative value due to QA/QC data validation requirements.
6. B = Value is above the Instrument Detection Limit (IDL) but below the Contract Required Detection Limit (CDRL).

TABLE 8
MALTA ROCKET FUEL AREA SITE
DRY WELL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MRFA Comparative Criteria
Bldg. 1	DW-1A-1*	Mercury	40.7J	8.1
		Benzo(a)Anthracene	1100	220
		Benzo(a)Pyrene	550	61
		Benzo(b)Fluoranthene	1300	1100
		Chrysene	660	400
		Dibenzo(a,h)Anthracene	160J	14
		Aroclors-1254, 1260	23400	10000
Bldg. 1	DW-1A-2**	Cadmium	2.3	0.8
		Chromium	26.6J	26
		Copper	131J	19
		Iron	28200	24000
		Lead	254J	27
		Mercury	0.99J	0.11
		Zinc	719J	85
		Aroclor-1260	430	0.08
Bldg. 2	DW-2-3*	Arsenic	9.8	8.1
		Mercury	207J	8.1
		Benzo(a)Anthracene	8105	61
		Benzo(a)Pyrene	890J	61
		Benzo(b)Fluoranthene	1200J	1100
		Chrysene	1100J	400
		Dibenzo(a,h)Anthracene	350J	14
		4,4'-DDE	5700C	2100
		4,4'-DDD	25000BCD	2900
		4,4'-DDT	48000BCD	2100
Bldg. 3	DW-3-1***	Arsenic	13	8.1
		Aroclor-1260	15000JNCD	1000
Bldg. 3	SS-B3DW***	Aroclor-1262	9200J	1000
		Aroclor-1268	9300J	1000
Bldg. 3	DW-3-2***	Aroclor-1260	10000J	1000
Bldg. 4	DW-4-2*	Total VOCs	12830J	10000
		Unknown C13-Alkane	96000J	50000
		Unknown C14-Alkanes	176000J	50000
		Unknown C15-Alkanes	115000J	50000
		Unknown C16-Alkane	73000J	50000
		SVOCs	772000J	500000
Bldg. 5	DW-5-1**	Arsenic	5.1J	5.0
		Cadmium	2.2J	0.8
		Copper	41.0J	19
		Lead	56.6J	27
		Mercury	3.0J	0.11
		Zinc	171J	85
		4,4'-DDE	7	0.1
		4,4'-DDT	7.5	0.1
		Aroclor-1254	110	0.08
		Aroclor-1260	170J	0.08

TABLE 8 (Cont'd)
MALTA ROCKET FUEL AREA SITE
DRY WELL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MRFA Comparative Criteria
Bldg. 5	DW-5-2**	Cadmium	12.6J	0.8
		Copper	85.2J	19
		Lead	85.9J	27
		Mercury	5.2J	0.11
		Nickel	27.1	22
		Zinc	95.9J	85
		4,4'-DDE	23J	0.1
		4,4'-DDT	70J	0.1
		Aroclor-1260	210J	0.8
Bldg. 15	DW-15**	Arsenic	22.3J	5
		Cadmium	10.1J	0.8
		Chromium	38.0J	26
		Copper	540J	19
		Iron	91900	24000
		Lead	938J	27
		Manganese	679J	428
		Mercury	1130J	0.11
		Nickel	39.1	22
		Zinc	1410J	85
		4,4'-DDE	5.4J	0.1
		4,4'-DDT	99	0.1
		Arochlor-1254	350J	0.08
		Arochlor-1260	1700	0.08
Bldg. 20	DW-20H**	Lead	34.5J	27
		Mercury	0.16J	13
		Benzo(a)Anthracene	38J	13
		Benzo(b)Fluoranthene	29J	13
		Benzo(k)Fluoranthene	41J	13
		Benzo(a)Pyrene	32J	13
		Chrysene	38J	13
Bldg. 24	DW-24-1**	Arsenic	8.3	5.0
		Copper	38.7	19
		Lead	44.4	27
		Manganese	554	428
		Mercury	0.11J	0.11
		Zinc	288	85
		Benzo(a)Anthracene	79J	13
		Benzo(b)Fluoranthene	97J	13
		Benzo(k)Fluoranthene	45J	13
		Benzo(a)Pyrene	54J	13
		Chrysene	64J	13
		Indeno(1,2,3-cd)Pyrene	36J	13
		Phenol (total unchlorinated)	110J	5
		4,4'-DDT	4.3J	0.1
		Arochlor-1260	110	0.08

TABLE 8 (Con't)
MALTA ROCKET FUEL AREA SITE
DRY WELL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MRFA Comparative Criteria
Bldg. 24	DW-24-2**	Arsenic	9.1	5.0
		Cadmium	0.97B	0.8
		Copper	38.9	19
		Lead	43.2	27
		Manganese	570	0.11
		Mercury	0.11J	22
		Nickel	23.1	22
		Zinc	375	85
		Benzo(a)Anthracene	84J	13
		Chrysene	80J	13
		Phenol (total unchlorinated)	550J	5
		Arochlor-1260	160	0.08
former GE/Exxon Building	DW-GE/EX-2*	Benzo(a)Anthracene	900	220
		Benzo(a)Pyrene	1000	61
		Chrysene	980	400
		Dibenzo(a,h)Anthracene	180J	14

Notes:
1. Inorganics are in mg/kg (ppm), organics are in ug/kg (ppb).
2. * = Subsurface soil MRFA Comparative Criteria used.
3. ** = Sediment MRFA Comparative criteria used.
4. *** = Surface soil MRFA Comparative Criteria used.
5. J = Semi-quantitive value due to QA/QC data validation requirements.
6. N = >50% difference for detected concentrations between the two GC columns. The lower value is reported.
7. B (inorganics) = Value is above the Instrument Detection Limit (IDL) but below the Contract Required Detection Limit (CDRL).
8. B (organics) = Compound was detected in associated method blank.
9. C = Compound identification was confirmed by GC/MS.
10. D = Analysis performed at a higher dilution factor.

TABLE 9
MALTA ROCKET FUEL AREA SITE
DRY WELL SAMPLE LOCATIONS WITH
ANALYTES ABOVE MRFA COMPARATIVE CRITERIA

Area	Sample No.	Analyte/ Compound	Conc.	MRFA Comparative Criteria
Bldg. 13	SL1301	Aluminum	6010	2000
		Cadmium	60.1	20
		Chromium	174	100
		Copper	2250	1000
		Iron	36400	600
		Lead	327J	50
		Mercury	5.9	4
		Zinc	7330	5000
		Iron + Manganese	36642	1000
		Acetone	90	50
		1,2-Dicloroethene	160	5
		1,4-Dichlorobenzene	35	4.7
		Total Phenols	20	2
		Toluene	5J	5
		Total PCBs	0.7PJ	0.1
Bldg. 17	SL1701	Sodium	81200	40000 (g)
		Acetone	89	50
		Total Phenols	610D	2
Bldg. 20	SL20-N-01	Iron	1250	600
		Iron + Manganese	1291.4	1000
		Toluene	37	5
		Total Phenols	30J	2
Bldg. 20	SL-20-O-01	Aluminum	2130	2000
		Iron	4460	600
		Sodium	76300	40000 (g)
		Iron + Manganese	4591	1000
Bldg. 25	SL2501	Aluminum	2610	2000
		Cadmium	45.7	20
		Iron	27200J	600
		Lead	257J	50
		Silver	212J	100
		Iron + Manganese	27345J	1000
		1,2-Dichlorethene	4000	5
		Toluene	41J	5
		1,4-Dichlorobenzene	44J	4.7
		Total PCBs	1.71JP	0.1
former GE/Exxon Bldg	SLGEX01	Sodium	53300	40000 (g)
		Acetone	150	50
		Toluene	90	5
		Xylene	36	5
		Total Phenols	850	2

Notes:
1. All results and criteria are in ug/l (ppb).
2. (g) = Guidance value from NYSGWS.
3. J = Semi-quantitive value due to QA/QC data validation requirements.
4. D = Reported values are from secondary dilution analysis
5 P =>25% difference for detected concentrations between the two GC columns. The lower value is reported.

TABLE 10
Constituents of Concern for Each Medium at the MRFA Site

	Dry Wells	Ground Water Former GE/Exxon Building	Ground Water Malta Test Station	Sediment Muggett's Pond	Sediment Ravine 1b	Surface Soil	Surface and Subsurface Soil	Surface Water Muggett's Pond	Surface Water Ravine 1b
VOC'S									
Acetone	x								
Carbon Tetrachloride		x	x						
Chloroform			x			x			
Chloromethane			x						
Tetrachloroethene	x		x				x		
Toluene						x	x		
Trichloroethene			x				x		
SVOCs									
Acenaphthene	x								
Anthracene	x			x					
Benzo(a)anthracene	x			x		x			
Benzo(a)pyrene	x			x		x			
Benzo(b)fluoranthene	x			x					
Benzo(g,h,i)perylene	x			x		x			
Benzo(k)fluoranthrene	x			x					
Butylbenzlphthalate	x			x					
Carbazole	x			x					
Chrysene	x			x		x			
Dibenz(a,h)anthracene	x			x		x			

TABLE 10
Constituents of Concern for Each Medium at the MRFA Site

	Dry Wells	Ground Water Former GE/Exxon Building	Ground Water Malta Test Station	Sediment Muggett's Pond	Sediment Ravine 1b	Surface Soil	Surface and Subsurface Soil	Surface Water Muggett's Pond	Surface Water Ravine 1b
Diethylphthalate	x		x						
Di-n-Butylphthalate	x	x	x	x		x	x		
Dinitrolouene 2,4-						x			
Fluoranthene	x			x					
Fluorene	x								
Hexachlorobutadiene	x								
Indeno(1,2,3-cd)pyrene	x			x		x			
Methylnaphalene 2-	x								
Methylphenol 4-	x			x					
Naphthalene	x								
Phenanthrene	x			x		x			
Pyrene	x			x		x			
Pesticides/PCBs									
Aroclor-1254	x			x					
Arochlor-1260	x			x		x	x		
Aroclor-1262	x					x	x		
Aroclor-1268	x					x	x		
Chlordane Alpha-	x								
Chlordane Gamma-	x			x					
DDD,4,4'-	x					x	x		

TABLE 10
Constituents of Concern for Each Medium at the MRFA Site

	Dry Wells	Ground Water Former GE/Exxon Building	Ground Water Malta Test Station	Sediment Muggett's Pond	Sediment Ravine 1b	Surface Soil	Surface and Subsurface Soil	Surface Water Muggett's Pond	Surface Water Ravine 1b
DDE, 4,4'-	x			x		x	x		
DDT, 4,4'-	x			x		x	x		
Inorganics									
Aluminum	x			x				x	x
Antimony	x								
Arsenic	x								
Barium	x			x					x
Beryllium	x			x				x	x
Boron									
Cadmium	x			x		x			
Chromium	x			x					
Cobalt	x			x					
Copper	x			x	x	x	x		
Cyanide (Total)					x		x		
Iron	x						x	x	x
Manganese	x				x			x	x
Mercury	x			x		x	x		x
Nickel	x			x	x				
Selenium									
Silver	x			x					

TABLE 10
Constituents of Concern for Each Medium at the MRFA Site

	Dry Wells	Ground Water Former GE/Exxon Building	Ground Water Malta Test Station	Sediment Muggett's Pond	Sediment Ravine 1b	Surface Soil	and Subsurface Soil	Surface Water Muggett's Pond	Surface Water Ravine 1b
Vanadium	x								
Zinc	x			x		x	x		

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Ground Water							
Ingestion of Ground Water	On-site Employee	Yes	NA	X		Two on-site production wells currently supply potable water to the Malta Site. However, ground water is treated via a settling tank and air stripper prior to distribution to the facility.	All post-treatment ground water results from on-site production wells
	On-site Resident	No	Yes	X		Future residential developement of Malta Site is unlikely but may theoretically occur. Future residents may elect to install a private well on this property. Existing public water supply is not hydraulically connected to the water-bearing unconsolidated materials beneath the Malta Site.	All filtered and unfiltered ground water results from RI and results from the past two years of monitoring of Early Warning Monitoring System and untreated production well data. Samples to be divided into two groups based on a ground water divide which separates the former GE/Exxon building from the Test Station. The use of untreated water will be assessed in the uncertainty section.
Inhalation of Ground Water Constituents During Showers	On-Site Employee	No	No			Shower facilities do not exist at the Malta Site so employees cannot become exposed via this pathway.	
	On-Site Resident	No	Yes	X		Future residential developement of Malta Site is unlikely, but may theoretically occur. Future residents may elect to install a private well on this property. Future residents may therefore be exposed during showers. Some of the detected ground water constituents exhibit Henry's Law Constants that are greater than 1 x 105 alm-m3/mole and molecular weights of less than 200 g/mole. These constituents could easily volatize from ground water, so future residents may be exposed during showers.	All filtered and unfiltered ground water results from RI and results from the past two years of monitoring of Early Warning Monitoring System. Samples to be divided into two groups based on a ground water divide which separates the former GE/Exxon building from the Test Station. The use of treated water will be assessed in the uncertainty section.

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Dermal Contact with Ground Water Constituents During Showers	On-site Employee	No	No			Shower facilities do not exist at the Malta site so employees cannot become exposed via this pathway.	All filtered and unfiltered ground water results from RI, untreated production well data and results from the past two years of monitoring of Early Warning Monitoring System. Samples divided into two groups based on a ground water divide which separates the former GE/Exxon building from the Test Station. The use of treated water will be assessed in
	On-site Resident	No	Yes	X		Future residential development of Malta Site is unlikely, but may theoretically occur. Future residents may elect to install a private well on this property. Future residents may therefore be exposed during showers.	

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Surface Soils							
Incidental Ingestion of On-site Surface Soils	Trespasser	No	No			Trespassing is not expected due to strict Site security and perimeter fence.	
	On-site Employee	Yes	NA	X		Current employees may be exposed during outdoor activities (e.g., lunch, maintenance).	All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.
	On-site Resident	No	Yes	X		Future residential development of Malta Site is unlikely but may theoretically occur.	All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.
	Excavation Worker	No	Yes	X		Future Residential Development of Malta Site is unlikely but may theoretically occur. Workers may be exposed to surface soils during excavation.	All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.
Dermal Contact with On-site surface soils	Trespassor	No	No			Trespassing is not expected due to strict Site security and perimeter fence.	
	On-site Employee	Yes	NA	X			All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.
	On-Site Resident	No	Yes	X		Future residential development of Malta Site is unlikely but may theoretically occur.	All surface soils (0-2') from RI. Possibility for separate specific area analysis.
	Excavation	No	Yes	X		Future residential development of Malta Site is unlikely but may theoretically occur.	All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Surface Soils							
Inhalation of On-site Surface Soils Released as Fugitive Dusts	On-Site Employee	No	NA			No inhalation exposures to particulate emissions are likely because vegetation, pavement and prevailing wind patterns in the area will limit releases to air.	
	On-site Resident	No	No			Future residential development of Malta Site is unlikely but may theoretically occur.	
	Excavation Worker	No	Yes	X		Workers may be exposed to volatile or particulate emissions during excavation activities.	All surface soil samples (0-2') from RI. Possibility for separate specific area analysis.
Subsurface Soils							
Incidental Ingestion of On-site Subsurface Soils	Excavation Worker	No	Yes	X		Future residential development of Malta Site is unlikely but may theoretically occur. Workers may be exposed to subsurface soils during excavation.	All soil samples between 2 and 16 feet below ground surface.
Dermal Contact with On-site Subsurface Soils(a)	Excavation Worker	No	Yes	X		Future residential development of Malta Site is unlikely but may theoretically occur. Workers may be exposed to subsurface soils during excavation.	All soil samples between 2 and 16 feet below ground surface.
Inhalation of Subsurface Soil	Excavation Worker	No	Yes		X	Future residential development of Malta Site is unlikely but may theoretically occur. Workers may be exposed to volatile or particulate emissions during excavation activities.	All soil samples between 2 and 16 feet below ground surface.

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Sediments							
Incidental Ingestion of Sediments from:							
Quench Pits	Utility Worker or On-site Employee	No	No			The quench pits are no longer in use, and are located 30 to 35 feet below ground surface.	
Dry Wells	Utility Worker	Yes	Yes	X		Periodic maintenance is required to maintain adequate flow.	All dry wall sediment samples from RI.
Muggett's Pond	On-site Employee	No	No			Facility operations do not involve activities at the pond.	
	On-site Resident	No	Yes	X		Wading may occur during warmer seasons if Malts Site is developed for residential. use.	All sediment samples collected from Muggett's Pond during RI.
Ravine 1b	Trespassor	Yes	Yes	X		Wading may occur during warmer seasons since access to easement is not restricted.	Ravine 1b sediment samples from RI.
	On-site Resident	No	Yes	X		Wading may occur during warmer seasons if Malta Site is developed for residential use.	Ravine 1b sediment samples from RI.

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Sediments							
Dermal Contact with Sediments from:							
Quench Pits	Utility Worker or On-site Employee	No	No			The quench pits are no longer in use, and are located 30 to 35 feet below ground surface.	
Dry Wells	Utility Worker	Yes	Yes	X		Periodic maintenance is required to maintain adequate flow.	All dry wll sediment samples from RI.
Muggett's Pond	On-site Employee	No	No			Facility operations do not involve activities at the pond.	
	On-site Resident	No	Yes	X		Future residential developement of Malta Site is unlikely but may theoretically occur. Wading may occur during warmer seasons if site is developed for residential use.	All sediment samples collected from Muggett's Pond during RI.
Ravine 1b	Trespassor	Yes	Yes	X		Wading may occur during warmer seasons since access to easement is not restricted.	Ravine 1b sediment samples from RI.
	On-site Resident	No	Yes	X		Future residential developement of Malta Site is unlikely but may theoretically occur. Wading may occur during warmer seasons if site is developed for residential use.	Ravine 1b sediment samples from RI.

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated		Degree of Assessment		Rationale for Selection or Exclusion	Data Grouping
		Present	Future	Quant.	Qual.		
Surface Water							
Incidental Ingestion of Surface Water from:							
Quench Pits	Utility Worker or On-site Employee	No	No			The quench pits are no longer in use, and are located 30 to 35 feet below ground surface.	
Dry Wells	Utility Worker	No	No			It is assumed that water is not typically present in these structures.	
Muggett's Pond	On-site Employee	No	No			Facility operations do not involve activities at the pond.	
	On-site Resident	No	No			Muggett's Pond is to shallow to support swimming (less than two feet deep). Although wading is possible, incidental ingestion is unlikely during wading.	
Ravine 1b	Trespasser	No	No			Ravine 1b is too shallow to support swimming (less than one foot deep).	
	On-site Resident	No	No			Although wading is possible, incidental ingestion is unlikely during wading.	

TABLE 11
MRFA Site: Summary of Exposure Pathways

Pathway	Receptor	Time-frame Evaluated: Present	Time-frame Evaluated: Future	Degree of Assessment: Quant.	Degree of Assessment: Qual.	Rationale for Selection or Exclusion	Data Grouping
Surface Water							
Dermal Contact with Surface Water from:							
Quench Pits	Utility Worker or On-site Employee	No	No			The quench pits are no longer in use, and are located 30 to 35 feet below ground surface.	
Dry Wells	Utility Worker	No	No			It is assumed that water is not typically present in these structures.	
Muggett's Pond	On-site Employee	No	No			Facility operations do not involve activities at the pond.	
	On-site Resident	No	Yes	X		Wading is possible if site is developed for residential use. However, Muggett's Pond is too shallow to support swimming (less than two feet deep).	All surface water samples collected from Muggett's Pond during RI.
Ravine 1b	Trespasser	Yes	Yes	X		Wading may occur since access to the ravine is not restricted.	Surface water sample collected from Ravine 1b.
	On-site Resident	No	Yes	X		Wading may occur if site is developed for residential use.	Surface water sample collected from Ravine 1b.
Air							
All inhalation pathways are addressed in ground water or surface soil discussions.							

NA = Not applicable; future site conditions are assumed to be identical to current site conditions for this specific pathway.

TABLE 12
Toxicity values for Constituents of Concern at the MRFA Site

	Carcinogenic				Noncarcinogenic			
Consituent	Weight of Evidence Classification	Oral Slope factor (mg/kg-day)-1	Ref	Inhalation Slope Factor (mg/kg-day)-1	Ref	Chronic Oral Rfd (mg/kg-day)	Ref	Chronic Inhallation Rfd (mg/kg-day)	Ref
VOLATILES									
Acetone	D					1.00e-01	(A)		
Carbon Tetrachloride	B2	1.30e-01	(A)	5.20e-02	(A,C)	7.00e-04	(A)	5.71e-04	(F,D)
Chloroform	B2	6.10e-03	(A)	8.10e-02	(A,C)	1.00e-02	(A)		
Chloromethane	C					4.00e-03	(I)		
Tetrachloroethene	C-B2	5.20e-02	(Q)	2.03e-03	(Q)	1.00e-02	(A)		
Toluene	D					2.00e-01	(A)	1.14e-01	(A)
Trichloroethane	C-B2	1.10e-02	(Q)	6.00e-03	(Q)	6.00e-03	(R)		
SVOCs									
Acenaphthene	D					6.00e-02	(A)		
Anthracene	D					3.00e-01	(A)		
Benzo(a)anthracene	B2	7.30e-01	(S)	6.10e+00	(S)				
Benzo(a)pyrene	B2	7.30+00	(A)	6.10e+00	(B)				
Benzo(b)fluoranthene	B2	7.30e-01	(S)	6.10e+00	(S)				
Benzo(g,h,i)perylene	D					3.00e-02	(W)		
Benzo(k)fluoranthene	B2	7.30e-02	(S)	6.10e+00	(S)				
Butylbenzlphthalate	C					2.00e-01	(A)		
Carbazole	B2	2.00e-02	(A)						
Chrysene	B2	7.30e-03	(S)	6.10e+00	(S)				
Dibenzo(a,b)anthracene	B2	7.30e+00	(S)	6.10e+00	(S)				
Diethylphthalate	D					8.00e-01	(A)		
Di-n-butylphthalate	D					1.00e-01	(A)		
Dinitrotoluene 2,4-						2.00e-03	(A)		
Fluoranthene	D					4.00e-02	(A)		
Fluorene	D	7.80e-02				4.00e-02	(A)		
Hexachlorobutadiene	C	7.8e-02	(A)	7.70e-02	(A)	2.00e-04	(B)		
Indeno(1,2,3-cd)pyrene	B2	7.30e-01	(S)	6.10e+00	(S)				
Methylnaphthalene 2-	D					4.00e-02	(X)		
Methylphenol 4-(*)	C								
Naphthalene	D					4.00e-02	(J)		
Phenanthrene	D					4.00e-02	(X)		
Pyrene	D					3.00e-02	(A)		

PESTICIDES/PCBs							
Aroclor-1254	B2	7.70e+00	(A)			2.00e-05	(A)
Aroclor-1260	B2	7.70e+00	(A)			2.00e-05	(K)
Aroclor-1262	B2	7.70e+00	(A)			2.00e-05	(K)
Aroclor-1268	B2	7.70e+00	(A)			2.00e-05	(K)
alpha-Chlordane	B2	1.30e+00	(A)	1.29e+00	(A)	6.00e-05	(A)

TABLE 12
Toxicity values for Constituents of Concern at the MRFA Site

	Carcinogenic				Noncarcinogenic			
Constituent	Weight of Evidence Classification	Oral Slope factor (mg/kg-day)-1	Ref	Inhalation Slope Factor (mg/kg-day)-1	Ref	Chronic Oral Rfd (mg/kg-day)	Ref	Chronic Inhallation Rfd (mg/kg-day)	Ref
gamma-Chlordane	B2	1.30e+00	(A)	1.29e+00	(A)	6.00e-05	(A)		
4,4'-DDD	B2	2.40e-01	(A)						
4,4'-DDE	B2	3.40e-01	(A)						
4,4'-DDT	B2	3.40e-01	(A)	3.40e-01	(A)	5.00e-04	(A)		
INORGANICS									
Aluminum	D					1.00e+00	(L)	1.43e-03	(M,D)
Antimony						4.00e-04	(A)		
Arsenic	A	1.75e+00	(A)	1.51e+01	(A)	3.00e-04	(A)		
Berium						7.00e-02	(A)	1.43e-06	(B,D)
Beryllium	B2	4.30e+00	(A)	8.40e+00	(A)	5.00e-03	(A)		
Boron						9.00e-02	(A)	2.00e-02	(B)
Cadmium (diet)	B1			6.30e+00	(A,C)	1.00e-03	(A)		
Cadmium (water)	B1			6.30e+00	(A,C)	5.00e-04	(A)		
Chromium III	D					1.00e+00	(A)		
Chromium VI	A			4.20e+01	(A)	5.00e-03	(A)		
Cobalt								5.71e-06	(O,D)
Copper	D					2.00e-02	(B)		
Cyanide (total)						2.00e-02	(A)	8.57e-04	(A,D)
Iron	D					3.00e-01	(P)		
Manganese	D					1.40e-01	(A,Y)	1.43e-05	(A,D)
Mercury	D					3.00e-04	(B)	8.57e-05	(B)
Nickel				8.40e-01	(B,V)	2.00e-02	(A)		
Selenium	D					5.00e-03	(A)		
Silver	D					5.00e-03	(A)		
Vanadium						7.00e-03	(B)		
Zinc	D					3.00e-01	(A)		

TABLE 12
Toxicity Values for Constituents of Concern at the MRFA Site

Notes:

(A) USEPA. 1995. Integrated Risk Information System (IRIS).
(B) USEPA. 1994. Health Effects Assessment Summary Tables (HEAST). Supplement No. 1 to the March Annual Update. EPA 540/R-94/059. July
(C) ENVIRON derived from unit risk value.
(D) ENVIRON derived from RfC.
(E) ENVIRON derived from chronic toxicity value.
(F) USEPA. ECAO. 1995. Derivation of a Provisional Inhalation RfC for Carbon Tetrachloride (CASRN 56-23-5). February 3.
(G) USEPA. ECAO. 1995. Derivation of a Provisional Subchronic RfC for Carbon Tetrachloride (CASRN 56-23-5). February 3.
(H) USEPA. ECAO. 1995. Derivation of a Privisional Subchronic Inhalation RfC for Cloroform (CASRN 67-66-3). February 3.
(I) USEPA. ECAO. 1995. Derivation of a Provisional RfD for Chloromethane (CASRN 74-87-3). February 3.
(J) USEPA. ECAO. 1995. Provisional Oral RfD for Naphthalene (CASRN 91-20-3). February 3.
(K) Based on Arochlor-1254
(L) USEPA. ECAO. 1995. Derivation of a Provisional Oral RfD for Aluminum (CASRN 7429-90-5). February 3.
(M) USEPA. ECAO. 1995. Provisional Inhalation RfC for Aluminum (CASRN) 7429-90-5). February 3.
(N) USEPA. ECAO. 1995. Derivation of a Subchronic RfC for Chromium (various CASRN). February 3.
(O) USEPA. ECAO. 1995. Derivation of a Provisional RfC for Cobalt (CASRN 7440-48-4). February 3.
(P) USEPA. ECAO. 1995. Derivation of a Provisional RfD for Iron (CASRN 7439-89-6). February 3.
(Q) USEPA. ECAO. 1993. Interim Criteria for PCE and TCE (facsimile). November.
(R) USEPA. ECAO. 1994. Risk-based Concentration Table. Fourth Quarter (Roy Smith).
(S) USEPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. EPA/600/2-93/089. July.
(T) USEPA. ECAO. 1994. Derivation of a Provisional Subchronic Oral RfD for Hexachlorobutadiene (CASRN 87-68-3). January 24.
(U) USEPA. ECAO. 1995. Derivation of a Provisional Subchronic Inhalation RfC for Chloromethane (CASRN 74-87-3). February 3.
(V) Inhalation Slope Factor for Nickel Refinery Dust.
(W) Based on pyrene.
(X) Mased on naphthalene.
(Y) Personal communication with Susan Velazquez (IRIS contact for manganese) indicated that the diet RfD for manganese should be used for both soil and water exposures.

(*) No toxicity values availiable from IRIS, HEAST or ECAO.

Table 13
Estimated Noncarcinogenic Health Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk
Current On-Site Employee	Ground Water	Ingestion	Malta Test Station (effluent)	6.7e-02
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	6.7E-02
			Malta Test Station (effluent)	6.7E-02
			Malta Test Station (unfiltered inorganics)	0.0E+00
			Total	6.7E-02
	Surface Soil (Excluding Building 23P)	Incidental Ingestion		4.7E-03
		Dermal Contact		3.5E-03
	Surface Soil (Including Building 23P)	Incidental Ingestion		1.9E-01
		Dermal Contact		2.3E-01
Current/Future Utility Worker	Dry Wall Sediment	Incidental Ingestion		1.5E-03
		Dermal Contact		1.1E-03
Current/Future Trespasser	Sediment	Incidental Ingestion	Ravine 1b	1.1E-03
		Dermal Contact	Ravine 1b	3.2E-04
	Surface Water	Dermal Contact	Ravine 1b	4.1E-07
Future Excavation Worker	Surface & Subsurface Soil (Excluding Building 23P)	Incidental Ingestion		1.5E-03
		Dermal Contact		1.1E-03
	Surface & Subsurface Soil (Including Building 23P)	Incidental Ingestion		1.9E-02
		Dermal Contact		2.4E-03

Table 13
Estimated Noncarcinogenic Health Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk	
Future Adult Resident	Ground Water	Ingestion	GE/Exxon (total organics)	5.1E-03	
			GE/Exxon (unfiltered inorganics)	0.0E+00	
			Total	5.1E-03	
			GE/Exxon (total organics)	5.1E-03	
			GE/Exxon (filtered inorganics)	0.0E+00	
			Total		5.1E-03
			Malta Test Station (total organics)	5.8E-01	
			Malta Test Station (unfiltered inorganics)	0.0E+00	
			Total	5.8E-10	
			Malta Test Station (total organics)	5.8E-01	
			Malta Test Station (filtered inorganics)	0.0E+00	
			Total	5.8E-01	
		Inhalation of Volatiles while showering	GE/Exxon	1.9E-04	
			Malta Test Station	1.8E-02	
		Dermal Contact	GE/Exxon (total organics)	2.8E-04	
			GE/Exxon (filtered inorganics)	0.0E+00	
			Total	2.8E-04	
			Malta Test Station (total organics)	3.0E-02	
			Malta Test Station (filtered inorganics)	0.0E+00	
			Total	3.0E-02	

Surface Soil (Excluding Building 23P)	Incidental Ingestion		1.6E-02
	Dermal Contact		5.9E-03
Surface Soil (Including Building 23P)	Incidental Ingestion		6.3E-01
	Dermal Contact		3.8E-01
Sediment	Incidental Ingestion	Muggett's Pond	1.2E-02
		Ravine 1b	8.2E-04
	Dermal Contact	Muggett's Pond	5.8E-03
		Ravine 1b	2.5E-04
Surface Water	Dermal Contact	Muggett's Pond	3.3E-05
		Ravine 1b	3.3E-07

Table 13
Estimated Noncarcinogenic Health Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk
Future Child Resident (1-6 yr)	Ground Water	Ingestion	GE/Exxon (total organics)	4.8E-03
			GE/Exxon (unfiltered inorganics)	0.0E+00
			Total	4.8E-03
			GE/Exxon (total organics)	4.8E-03
			GE/Exxon (filtered inorganics)	0.0E+00
			Total	4.8E-03
			Malta Test Station (total organics)	5.4E-01
			Malta Test Station (unfiltered inorganics)	0.0E+00
			Total	5.4E-01
			Malta Test Station (total organics)	5.4E-01
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	5.4E-01
		Inhalation of Volatiles while Showering	GE/Exxon	1.7E-04
			Malta Test Station	1.7E-02
		Dermal Contact	GE/Exxon (total organics)	9.4E-05
			GE/Exxon (filtered inorganics)	0.00E+00
			Total	9.4E-05
			Malta Test Station (total organics)	1.0E-02
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	1.0E-02

	Surface Soil (Excluding Building 23P)	Incidental Ingestion		3.0E-02
		Dermal Contact		2.2E-03
	Surface Soil (Including Building 23P)	Incidental Ingestion		1.2E+00
		Dermal Contact		1.5E-01
Future Child Resident (6-15yr)	Sediment	Incidental Ingestion	Muggett's Pond	5.3E-02
			Ravine 1b	3.6E-03
		Dermal Contact	Muggett's Pond	8.9E-03
			Ravine 1b	3.9E-04
	Surface Water	Dermal Contact	Muggett's Pond	5.1E-05
			Ravine 1b	5.0E-07

TABLE 14
Summary of Noncarcinogenic Risks (Hazard Indices)
to Hypothetical Receptors

Receptor	Former GE/Exxon Facility(1)		Malta Test Stations(2)		Site-wide(1)	
	Excluding Building 23P	Including Building 23P	Excluding Building 23P	Including Building 23P	Excluding Building 23P	Including Building 23P
Current On-Site Employee			8 x 10-2	5 x 10-3		
Current/Future Utility Worker					3 x 10-3	
Current/Future Trespasser					2 x 10-3	
Future Excavation Worker					3 x 10-3	2 x 10-2
Future Adult Resident	5 x 10-2	2 x 10°	7 x 10-1	2 x 10°		
Future Child Resident (1-6 years old)	4 x 10-2	1 x 10°	8 x 10-1	2 x 10°		
Future Child Resident (6-15 years old)					7 x 10-2	

Notes:

(1) Assumes the adult/child resides on property located at the former GE/Exxon facility.
(2) Assumes on-site worker is exposed to effluent from the on-site air stripper-treated Malta Test Station ground water or the adult/child resides on property located at the Malta Test Station.
(3) No exposure to ground water for the receptors indicated.

TABLE 15
Summary of Excess Lifetime Cancer Risks
to Hypothetical Receptors

Receptor	Former GE/Exxon Facility(1)		Malta Test Stations(2)		Site-wide(1)	
	Excluding Building 23P	Including Building 23P	Excluding Building 23P	Including Building 23P	Excluding Building 23P	Including Building 23P
Current On-Site Employee			4.5 x 10-6	6.8 x 10-5		
Current/Future Utility Worker					2.7 x 10-7	
Current/Future Trespasser					1.5 x 10-11	
Future Excavation Worker					1.6 x 10-8	3.2 x 10-6
Future Adult Resident	1.0 x 10-5	1.7 x 10-4	6.6 x 10-5	2.2 x 10-4		
Future Child Resident (1-6 years old)	1.2 x 10-5	2.1 x 10-4	1.3 x 10-4	2.7 x 10-4		
Future Child Resident (6-15 years old)					3.8 x 10-6	

Notes:

(1) Assumes the adult/child resides on property located at the former GE/Exxon Facility.
(2) Assumes on-site worker is exposed to effluent from the on-site air stripper-treated Malta Test Station ground water or the adult/child resides on property located at the Malta Test Station.
(3) No exposure to ground water for the receptors indicated.

Table 16
Estimated Excess Lifetime Cancer Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk
Current On-Site Employee	Ground Water	Ingestion	Malta Test Station (effluent)	8.9E-07
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	8.9E-07
			Malta Test Station (effluent)	8.9E-07
			Malta Test Station (unfiltered inorganics)	0.0E+00
			Total	8.9E-07
	Surface Soil (Excluding Building 23P)	Incidental Ingestion		1.6E-06
		Dermal Contact		2.0E-06
	Surface Soil (Including Building 23P)	Incidental Ingestion		3.0E-05
		Dermal Contact		3.7E-05
Current/Future Utility Worker	Dry Wall Sediment	Incidental Ingestion		1.3E-07
		Dermal Contact		1.4E-07
Current/Future Trespasser	Sediment	Incidental Ingestion	Ravine 1b	0.0E+00
		Dermal Contact	Ravine 1b	0.0E+00
	Surface Water	Dermal Contact	Ravine 1b	1.5E-11
Future Excavation Worker	Surface & Subsurface Soil (Excluding Building 23P)	Incidental Ingestion		1.4E-08
		Dermal Contact		1.8E-09
	Surface & Subsurface Soil (Including Building 23P)	Incidental Ingestion		2.8E-06
		Dermal Contact		3.6E-07

Table 16
Estimated Excess Lifetime Cancer Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk
Future Adult Resident	Ground Water	Ingestion	GE/Exxon (total organics)	4.6E-07
			GE/Exxon (unfiltered inorganics)	0.0E+00
			Total	4.6E-07
			GE/Exxon (total organics)	4.6E-07
			GE/Exxon (filtered organics)	0.0E+00
			Total	4.6E-07
			Malta Test Station (total organics)	5.2E-05
			Malta Test Station (unfiltered inorganics)	0.0E+00
			Total	5.2E-05
			Malta Test Station (total organics)	5.2E-05
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	5.2E-05
		Ingestion of Volatiles while Showering	GE/Exxon	5.5E-09
			Malta Test Station	7.6E-07
		Dermal Contact	GE/Exxon (total organics)	2.5E-08
			GE/Exxon (filtered inorganics)	0.0E+00
			Total	2.5E-08
			Malta Test Station (total organics)	3.0E-06
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	3.0E-06

Surface Soil (Excluding Building 23P)	Incidental Ingestion		5.3E-06
	Dermal Contact		3.3E-06
Surface Soil (Including Building 23P)	Incidental Ingestion		1.0E-04
	Dermal Contact		6.2E-05
Sediment	Incidental Ingestion	Muggett's Pond	6.2E-07
		Ravine 1b	0.0E+00
	Dermal Contact	Muggett's Pond	6.9E-07
		Ravine 1b	0.0E-00
Surface Water	Dermal Contact	Muggett's Pond	2.2E-08
		Ravine 1b	1.2E-11

Table 16
Estimated Excess Lifetime Cancer Risks from
Exposure to Constituents of Concern at the MRFA Site

Receptor	Media	Scenario	Location	Estimated Risk
Future Child Resident(1-6 yr)	Ground Water	Ingestion	GE/Exxon (total organics)	4.6E-07
			GE/Exxon (unfiltered inorganics)	0.0E+00
			Total	4.3E-07
			GE/Exxon (total organics)	4.3E-07
			GE/Exxon (filtered organics)	0.0E+00
			Total	4.3E-07
			Malta Test Station (total organics)	4.9E-05
			Malta Test Station (unfiltered inorganics)	0.0E+00
			Total	4.9E-05
			Malta Test Station (total organics)	4.9E-05
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	4.9E-05
		Ingestion of Volatiles while Showering	GE/Exxon	5.1E-09
			Malta Test Station	7.6E-07
		Dermal Contact	GE/Exxon (total organics)	8.6E-09
			GE/Exxon (filtered inorganics)	0.0E+00
			Total	8.6E-09
			Malta Test Station (total organics)	1.1E-05
			Malta Test Station (filtered inorganics)	0.0E+00
			Total	1.1E-05

	Surface Soil (Excluding Building 23P)	Incidental Ingestion		1.0E-05
		Dermal Contact		1.3E-06
	Surface Soil (Including Building 23P)	Incidental Ingestion		1.9E-04
		Dermal Contact		2.4E-05
Future Child Resistant(1-6 yr)	Sediment	Incidental Ingestion	Muggett's Pond	2.7E-06
			Ravine 1b	0.0E+00
		Dermal Contact	Muggett's Pond	1.0E-06
			Ravine 1b	0.0E+00
	Surface Water	Dermal Contact	Muggett's Pond	3.4E-08
			Ravine 1b	1.8E-11

TABLE 17
Surface Water Concentrations

	Muggett's Pond (:g/L)			Ravine 1b (:g/L)			Background (:g/L)a	
Constituent	Frequency of Detection	Maximum	Mean	Frequency of Detection	Maximum	Mean	Maximum	Mean
Aluminum	1/1	71.8	--	4/4	307	156	47	30.6
Arsenic	0/1	--	--	3/4	3.5	2.2	1.9	1.8
Barium	1/1	16.5	--	4/4	113	52	21.3	19.3
Beryllium	1/1	1.9	--	1/4	1.9	0.6	NDb (0.3)	--
Cadmium	1/1	3.7	--	1/4	5.7	2.7	ND (3.3)	--
Calcium	1/1	25,150	--	4/4	116,000	81,350	57,900	56,633
Copper	0/1	--	--	2/4	4.8	4.1	4.4	2.7
Iron	1/1	1,320	--	4/4	31,500	9,513	231	138
Lead	0/1	--	--	2/3	0.9	0.7	0.66	0.53
Magnesium	1/1	3,705	--	4/4	14,800	12,175	12,100	11,700
Manganese	1/1	992	--	4/4	4,080	1,543	260	106
Mercury	0/1	--	--	1/4	0.03	0.03	ND (0.07)	--
Potassium	1/1	564	--	3/4	3,520	2,076	845	644
Selenium	0/1	--	--	1/4	2.1	0.95	1.3	1.0
Silver	0/1	--	--	1/4	5.9	4.0	ND (6.7)	--
Sodium	1/1	663	--	3/3	5,700	5,387	4,840	3,857
Zinc	1/1	21.9	--	4/4	68	25	150	66

a Ravine 6a
b ND - Not Detected (Detection Limit).

TABLE 18
Sediment Concentrations

	Muggett's Pond (:g/L)			Ravine 1b (:g/L)			Background (:g/L)a	
Constituent	Frequency of Detection	Maximum	Mean	Frequency of Detection	Maximum	Mean	Maximum	Mean
Inorganics (mg/kg)								
Aluminum	2/2	14,850	14,075	4/4	4,375	3,054	2,890	2,567
Antimony	1/2	4.4	3.4	0/4	--	--	NDb (9.5)	--
Arsenic	2/2	3.1	2.7	4/4	3.9	2.2	5.5	2.9
Barium	2/2	67	64	4/4	74	38	36	24
Beryllium	2/2	0.77	0.73	4/4	0.2	0.13	0.14	0.11
Boron	0/2	--	--	1/4	17.9	11.8	ND (20)	--
Cadmium	2/2	1.4	1.2	0/4	--	--	ND (0.6)	--
Calcium	2/2	2,150	1,985	4/4	2,590	1,715	5,510	2,498
Chromium	2/2	22	20	4/4	7	5	8.3	5.6
Cobalt	2/2	9.3	8.5	4/4	3.4	2.2	2.8	2.2
Copper	2/2	56	55	4/4	28	11	5.2	3.7
Cyanide	0/2	--	--	2/4	1.4	0.4	ND (0.1)	--
Iron	2/2	20,600	18,800	4/4	14,350	9,803	9,520	8,647
Lead	2/2	61	59	4/4	5.9	3.1	1.8	1.5
Magnesium	2/2	3,565	3,565	4/4	1,565	1,154	1,550	1,106
Manganese	2/2	206	198	4/4	2,605	1,299	249	212
Mercury	2/2	4.0	2.5	2/4	0.07	0.04	ND (0.04)	--
Nickel	2/2	26.6	26.6	4/4	7.5	5.0	5.4	4.3
Potassium	2/2	1,140	1,079	3/4	447	369	297	278
Selenium	2/2	0.6	0.5	2/4	0.45	0.25	0.55	0.34
Silver	2/2	2.1	1.7	0/4	--	--	ND (1.2)	--
Sodium	1/2	35	25	0/4	--	--	ND (11.9)	--
Vanadium	2/2	47	40	4/4	12.4	8.2	13.2	12.2
Zinc	2/2	261	230	4/4	34	18	19	13.5

TABLE 18
Sediment Concentrations

	Muggett's Pond			Ravine 1b			Backgrounda	
Constituent	Frequency of Detection	Maximum	Mean	Frequency of Detection	Maximum	Mean	Maximum	Mean
Organics (:g/kg)								
Anthracene	1/2	120	**c	0/1	--	--	NAd	--
Benzo(a)anthracene	1/2	700	**	0/1	--	--	NA	--
Bezon(a)pyrene	2/2	560	315	0/1	--	--	NA	--
Benzo(b)fluoranthene	1/2	740	402	0/1	--	--	NA	--
Benzo (g,h,i)perylene	2/2	240	163	0/1	--	--	NA	--
Benzo(k)fluoranthene	2/2	390	221	0/1	--	--	NA	--
Carbazole	1/2	89	**	0/1	--	--	NA	--
Chrysene	1/2	480	**	0/1	--	--	NA	--
Di-n-butyphthalate	1/2	120	**	0/1	--	--	NA	--
Dibenz(a,h)anthracene	2/2	140	100	0/1	--	--	NA	--
Fluoranthene	2/2	1,100	578	0/1	--	--	NA	--
Gamma-chlordane	1/2	1.7	**	0/1	--	--	NA	--
Indeno (1,2,3-cd)pyrene	2/2	320	198	0/1	--	--	NA	--
4-methylphenol	1/2	210	**	0/1	--	--	NA	--
Phenanthrene	2/2	440	**	0/1	--	--	NA	--
PCB (Arochlor-1260)	2/2	1,300	780	0/1	--	--	NA	--
Pyrene	2/2	870	484	0/1	--	--	NA	--

a Ravine 6a.
b ND - Not Detected (Detection Limit).
c Calculated mean is greater than the maximum value.
d NA - Not Available.

TABLE 19
Surface Soil Concentrations

Constituent	Frequency of Detection	Maximum (mg/kg)	Mean (mg/kg)	Background (mg/kg) Maximum	Mean
Inorganics					
Aluminum	50/50	12,100	6,364	9,000	6,919
Antimony	4/50	11.4	4.9	13.2	5.7
Arsenic	50/50	7.3	2.9	3.1	2.2
Barium	50/50	78.7	29.7	49	27
Beryllium	50/50	0.64	0.41	0.38	0.28
Boron	1/50	192	12.7	NDa (19)	--
Cadmium	49/50	10.6	1.9	ND (0.63)	--
Calcium	50/50	67,600	5,806	622	377
Chromium	50/50	91.5	10.7	8	5.7
Cobalt	21/50	10.7	3.1	3.3	2.3
Copper	50/50	1,000	63.2	8.6	6.4
Cyanide	1/48	0.72	0.34	0.14	0.05
Iron	50/50	41,500	12,595	10,500	8,954
Lead	55/56	1,090	96.3	23.9	16.7
Magnesium	50/50	29,000	3,561	1,330	1,001
Manganese	50/50	608	27.1	1,180	416
Mercury	44/59	124	4.0	0.16	0.06
Nickel	50/50	54.1	12.3	8.1	5.8
Potassium	47/50	1,260	465	549	339
Selenium	18/50	0.91	0.19	0.38	0.19
Silver	11/50	3.2	0.54	ND (1.3)	--
Sodium	7/50	50	23.8	145	116
Vanadium	49/50	23.3	13.2	16.4	13.5
Zinc	50/50	2,390	169	32.8	21.5

TABLE 19
Surface Soil Concentrations

Constituent	Frequency of Detection	Maximum (mg/kg)	Mean (mg/kg)	Background (mg/kg) Maximum	Mean
Organics					
Acenapthene	1/50	0.096	**b	ND (0.370)	--
Anthracene	1/50	0.09	**	ND (0.370)	--
Axoclor- 1242	2/53	0.03	0.03	NAc	--
Aroclor-1254	2/53	0.370	0.04	NA	--
Aroclor- 1260	28/53	4.1	0.222	NA	--
Aroclor-1262	3/3	16	6.2	NA	--
Aroclor-1268	2/3	4.3	1.7	NA	--
Benzo(a)anthracene	8/50	2.1	0.29	ND (0.370)	--
Benozpyrene	7/50	1.8	0.28	ND (0.370)	--
Benzo(b)fluoranthene	9/50	2.8	0.30	ND (0.370)	--
Benzo(g,h,i)perylene	4/50	0.44	0.26	ND (0.370)	--
Benzo(k)fluoranthene	9/50	1	0.26	ND (0.370)	--
Bis(2-ethylhexyl)phthalate	2/50	0.95	0.32	1.4	0.39
Butylbenzyl phthalate	1/50	0.054	**	ND (0.370)	--
Carbazole	1/50	0.088	**	ND (0.370)	--
Chloroform	3/47	0.006	0.006	NA	--
Chrysene	10/50	1.9	0.27	0.019	0.15
4,4'-DDD	1/50	0.0042	**	NA	--
4,4'-DDE	10/50	0.022	0.003	NA	--
4,4'-DDT	12/50	0.28	0.012	NA	--
Delta-BHC	1/50	0.0063	**	NA	--
Di-n-butylphthalate	7/50	0.4	0.258	0.021	0.18
Dibenz(a,h)anthracene	3/47	0.4	0.26	ND (0.370)	--
Diethylphthalate	2/50	0.2	**	ND (0.370)	--

TABLE 19
Surface Soil Concentrations

Constituent	Frequency of Detection	Maximum (mg/kg)	Mean (mg/kg)	Background (mg/kg) Maximum	Mean
2,4-Dinitrotoluene	3/50	0.57	0.26	ND (0.370)	--
Endosulfan II	1/50	0.0031	**	NA	--
Endosulfan sulfate	1/50	0.0035	**	NA	--
Endrin aldehyde	1/50	0.046	**	NA	--
Endrin ketone	1/50	0.013	**	NA	--
Fluoranthene	14/50	1.9	0.28	0.034	0.055
Gamma-chlordane	1/50	0.0031	**	NA	--
Heptachlor epoxide	1/50	0.0011	**	NA	--
Indeno(1,2,3-cd)pyrene	5/50	0.74	0.26	ND (0.370)	--
Methoxychlor	1/50	0.0088	**	NA	--
2-Methylnaphthalene	1/50	0.038	**	ND (0.370)	--
N-Nitrosodiphenylamine	3/51	0.10	**	ND (0.370)	--
Phenanthrene	5/50	0.52	0.26	0.022	0.150
Pyrene	15/50	2.3	0.23	0.032	0.061
Tetrachloroethene	2/50	0.002	**	NA	--
Toluene	1/50	0.002	**	NA	--
Trichloroethene	1/50	0.006	**	NA	--

a ND - Not Detected (Detection Limit).
b Calculated mean is greater than the maximum value.
c NA - Not Available.

APPENDIX III
ADMINISTRATIVE RECORD INDEX

MALTA ROCKET FUEL AREA SUPERFUND SITE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.1 Background - RCRA and Other Information

P. 100001-100011 Quitclaim Deed, the indenture made between the People of the State of New York and the Wright-Malta Corporation, December 20, 1984.

1.2 Notification/Site Inspection Reports

P. 100012-100025 Report: Potential Hazardous Waste Site. Site Inspection Report, prepared by Chief Inspector Mr. Ray Cowen, Senior San. Eng., NYSDEC, June 18, 1985.

P. 100026-100044 Hazardous Waste Site Ranking System Review Form for Rocket Fuel Site, Malta, Saratoga County, NY, Reviewer Mr. William Schneider, July 12, 1985.

1.6 Correspondence

P. 100045-100045 Notice included in the Hazard Ranking System Package for the Malta Rocket Fuel Area Site, NYD980535124, prepared by U.S. EPA, Region II, July 31, 1995.

3.0 REMEDIAL INVESTIGATION

3.1 Sampling and Analysis Plan

P. 300001-300017 Standard Operating Procedure Summary Form, Selection of Well Construction Material, July 30, 1990. (Attached: (1) Standard Operating Procedure for Selecting Ground Water Well Construction Material at CERCLA Sites, SOP No. HW-6, prepared by Mr. William A. Coakley, Superfund QA Coordinator, Monitoring Management Branch, U.S. EPA Region II, December 5, 1986, approved by Mr. Vincent Pitruzzello, Chief, Program Support Branch, ERRD, U.S. EPA Region II, December 15, 1986 and Mr. Gerard F. McKenna, Chief, Monitoring Management Branch, ESD, U.S. EPA Region II, December 5, 1986; (2) Summary Table for Comparing Features of Various Ground Water Well Construction Materials; (3) Bibliography for Well Construction Material in Ground Water Monitoring.)

P. 300018-300241 Plan: Project Operations Plan, Malta Rocket Fuel Area Superfund Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume I, prepared by Geraghty & Miller Environmental Services, August 1991.

P. 300242-300440 Plan: Project Operations Plan, Malta Rocket Fuel Area Superfund Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume II, prepared by Geraghty & Miller Environmental Services, August 1991.

P. 300441-300581 Plan: Proposed Sampling Program to Establish the Extent of Contamination, Malta Rocket Fuel Area Site, prepared by ERM-Northeast, Inc., January 13, 1994.

P. 300582-300655 Plan: Sampling and Analysis Plan, Early Warning Monitoring System, Towns of Malta and Stillwater, Saratoga County, New York, prepared by ERM-Northeast, Inc., February 24, 1995.

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300656-300993 Report: Early Warning Groundwater Monitoring System Report, Luther Forest Well Field, Malta, New York, CERCLA II-90219, prepared for General Electric Company, prepared by Dunn Geoscience Corporation, August 1991.

P. 300994-301018 Letter to Ms. Jill Siebels, Facility Coordinator, General Electric Company, from Mr. William J. Miller, III, re: Malta Rocket Fuel Area Site. Report for Additional Environmental Sampling, ERM-Northeast Project No. 380.174.05, March 8, 1996. (Attachments: (1) Maps 8; Tables 3, (2) Attachment 1, Summary of Cesspool Soil Analytical Results, (3) Attachment 2, Summary of Ground Water Analytical Results, (4) Attachment 3, Data Validation Report.)

3.3 Work Plans

P. 301019-301167 Plan: Revised Remedial Investigation Work Plan for the Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume I, prepared by Geraghty & Miller, Inc., Environmental Services, February 1991.

P. 301168-301490 Plan: Revised Remedial Investigation Work Plan for the Malta Rocket Fue] Area Site. Towns of Malta and Stillwater. Saratoga County. New York, Volume II, Appendices, prepared by Geraghty & Miller, Inc., Environmental Services, February 1991.

P. 301491-301729 Plan: Enviroclean-Northeast Malta Rocket Fuel Area Site, Work, Safety, Health and Emergency Response Plan, prepared for Enviroclean-Northeast, prepared by Earth Resources Corporation, October 1994.

P. 301730-301806 Plan: Work Plan, Septic Tank, Catch Basin, and Dry Well Clean Outs, Malta Rocket Fuel Area Site, prepared by ERM-Northeast, Inc., June 30, 1995.

P. 301807-301839 Plan: Work Plan, Excavation and Removal of Crushed, Buried Drums, Malta Rocket Fuel Area Site, prepared by ERM-Northeast, Inc., June 1995.

P. 301840-301846 Letter to Ms. Alison Hess, Project Manager, U.S. EPA Region II, Ms. Virginia Capon, Esquire, U.S. EPA Region II, Mr. Victor Cardona, Project Manager, Bureau of Eastern Remedial Action, Division of Hazardous Waste Remediation, NYS Department of Environmental Conservation, from Ms. Jill Siebels, GE, Facility Coordinator, re: Malta Rocket Fuel Area Site, Work Plan for Additional Environmental Sampling, January 17, 1996. (Attachment: Letter to Ms. Jill Siebels, GE, Facility Coordinator, from Mr. William J. Miller, III, ERM-Northeast, re: Malta Rocket Fuel Area Site, Work Plan for Additional Environmental Sampling, January 17, 1996.)

P. 301847-301851 Letter to Ms. Alison Hess, Project Manager, U.S. EPA Region II, Ms. Virginia Capon, Esquire, U.S. EPA Region II, Mr. Victor Cardona, Project Manager, Bureau of Eastern Remedial Action, Division of Hazardous Waste Remediation, NYS Department of Environmental Conservation, from Ms. Jill Siebels, GE, Facility Coordinator, re: Malta Rocket Fuel Area Site, Addendum to the 17 January 1996 Work Plan for Additional Environmental Sampling, January 24, 1996. (Attachment: Letter to Ms. Jill Siebels, GE, Facility Coordinator, from Mr. William J. Miller, III, ERM-Northeast, re: Malta Rocket Fuel Area Site, Addendum to the 17 January 1996 Work Plan for Additional Environmental Sampling, January 24, 1996.)

3.4 Remedial investigation Reports

P. 301852-301869 Report: Site Analysis Malta Rocket Fuel, Malta, New York, Volume 1, prepared by Environmental Monitoring System Laboratory, Office of Research and Development, U.S. EPA, March 1989.

P. 301870-301879 Report: Site Analysis Malta Rocket Fuel, Malta, New York, Volume 2, prepared by Environmental Monitoring System Laboratory, Office of Research and Development, U.S. EPA, March 1989.

P. 301880-301970 Report: Tank Inspection Report Wright-Malta Corporation Property, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, prepared by Geraghty & Miller, Inc., Environmental Services, May 1991. (Appendix: A-E)

P. 301971-301987 Report: Site Security Survey for the Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, prepared by ERM-Northeast, Inc., October 14, 1991.

P. 301988-302227 Report: Literature Search for the Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume I, prepared by Geraghty & Miller Inc., Environmental Services, May 1992.

P. 302228-302435 Report: Literature Search for the Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume II, prepared by Geraghty & Miller Inc., Environmental Services, May 1992.

P. 302436-302490 Report: General Electric, Report for the Cleanup of the Building 1 Sump at the Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, prepared by ERM-Northeast, Inc., January 4, 1993.

P. 302491-302902 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume I, Sections 1-5, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 302903-303334 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume II, Sections 6-10, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 303335-303347 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume III, Plates 1-8, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 303348-303703 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume IV, Appendices A-C, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 303704-304035 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume V, Appendix D, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 304036-304458 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume VI, Appendix E, prepared by ERM-Northeast, Inc., February 14, 1995.

P. 304459-304665 Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume VII, Appendix F, prepared by ERM-Northeast, Inc., February 14, 1995.

P.	304666-304962	Report: Final Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Volume VIII, Appendices G-M, prepared by ERM-Northeast, Inc., February 14, 1995.
P.	304963-305487	Report: Correspondence Documenting Changes in Scope or Field Protocol, Remedial Investigation Report, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, prepared by ERM-Northeast, Inc., February 14, 1995.
P.	305488-305526	Report: Revised Pathway Analysis Report Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Risk Assessment, prepared by ENVIRON Corporation, March, 1995.
P.	305527-306221	Report: Final Revised Risk Assessment Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, Risk Assessment, prepared by ENVIRON Corporation, June 1995.
P.	306222-306329	Report: Final Report, Cylinder Decommissioning, Malta Rocket Fuel Area Site, Malta, New York, prepared by ERM-Northeast, Inc., October 1995.
P.	306330-306462	Report: Final Report, Excavation and Removal of Crushed, Buried Drums, Malta Rocket Fuel Area Site, Malta, New York, prepared by ERM-Northeast, Inc., December 1995.
P.	306463-306482	Letter to Ms. Jill Siebels, Facility Coordinator, General Electric Company, from Mr. William J. Miller, III, Project Director, ERM Northeast, re: Final Investigation Derived-Waste Report, Malta ~ Rocket Area Fuel Site, Malta, New York, April 17, 1996. (Attached: Table 1-6, Attachments A-C.)
P.	306483-306586	Report: Final Report, Septic Tank, Catch Basin and Dry Well Clean Outs, Malta Rocket Fuel Area Site, Malta, New York, prepared by ERM-Northeast, Inc., April 1996.

3.5 Correspondence

P. 306587-306600 Memorandum to Director, Waste Management Division Regions I, IV, V, VII; Director, Emergency and Remedial Response Division Region II; Director, Hazardous Waste Management Division, Regions III, VI, VIII, IX; Director, Hazardous Waste Division, Region X; Director, Environmental Services Division, Regions I, VI, VII, from Mr. Stephen D. Luftig, Acting Director, Office of Emergency and Remedial Response, U.S. EPA Region II, re: Distribution of the Land Use Directive, June 30, 1995. (Attachment: Memorandum, OSWER Directive No. 9355.7-04, to Director, Waste Management Division Regions I, IV, V, VII; Director, Emergency and Remedial Response Division Region II; Director, Hazardous Waste Management Division, Regions III, VI, VIII, IX; Director, Hazardous Waste Division, Region X; Director, Environmental Services Division, Regions I, VI, VII, from Mr. Elliott P. Laws, Assistant Administrator, Office of Solid Waste and Emergency Response, U.S. EPA Region II, re: Land Use in the CERCLA Remedy Selection Process, May 25, 1995.)

4.0 FEASIBILITY STUDY

4.1 Applicable or Relevant and Appropriate Requirements (ARARs) Determinations

P. 400001-400006 Fact Sheet: A Guide on Remedial Actions at Superfund Sites with PCB Contamination, U.S. EPA Region II, August 1990.

P. 400007-400009 Fact Sheet: A Guide to Principal Threat and Low Level Threat Wastes, U.S. EPA Region II, November 1991.

4.3 Feasibility Study Reports

P. 400010-400230 Report: Feasibility Study, Malta Rocket Fuel Area Site, Saratoga County, New York, prepared for Malta Participating Parties, Albany, New York, prepared by Rust Environment & Infrastructure, October 1995.

5.0 RECORD OF DECISION

5.1 Record of Decision

P. 500001-500133 Record of Decision, Malta Rocket Fuel Area Site, Towns of Malta and Stillwater, Saratoga County, New York, prepared by U.S. EPA Region II, July 18,1996.

7.0 ENFORCEMENT

7.3 Administrative Orders

P. 700001-700022 Letter to various PRPs, from Ms. Virginia Capon, Assistant Regional Counsel, New York/Caribbean Superfund Branch, U.S. EPA Region II, re: Malta Rocket Fuel Area Superfund Site, October 15, 1989. (Attachment: Administrative Order, In the Matter of : Advanced Nuclear Fuels, Inc., Curtiss-Wright Corporation, General Electric Company, Mechanical Technology Inc., New York State Energy Research and Development Authority, Olin Corporation, Power Technologies, Inc., Wright Malta Corporation, Index No. II CERCLA-90219, September 28, 1989.)

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

P. 800001-800033 Report: Site Review and Update, Malta Rocket Fuel Area, Towns of Malta and Stillwater, Saratoga County, New York, CERCLIS NO. NYD980535124, prepared by New York State Department of Health, Under Cooperative Agreement With U.S. Department of Health & Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, April 26, 1995, revised October 30, 1995.

8.3 Correspondence

P. 800034-800043 Memorandum, OSWER Directive No. 9835.15b, to Regional Administrators, U.S. EPA Regions I-X, from Mr. Richard J. Guimond, Assistant Surgeon General, USPHS, Acting Assistant Administrator, re: New Policy on Performance of Risk Assessments During Remedial Investigation Feasibility Studies (RI/FS), Conducted by Potentially Responsible Parties (PRPs), September 1, 1993. (Attached: Notice of Availability of the New Risk Assessment Policy for Risk Assessment During PRP-lead RI/FSs and Responses to Public Comments.)

P. 800044-800048 Letter to Mr. Henry L. Longest II, Director, office of Emergency and Remedial Response, U.S. EPA Region II, from Ms. Kathleen C. Callahan, Director, Emergency and Remedial Response Division, U.S. EPA Region II, re: PRP Performance of Risk Assessment During Remedial Investigation/ Feasibility Study at Malta Rocket Fuel Area Superfund Site, Saratoga County, New York, October 27, 1994. (Attached: Malta Rocket Fuel Area Superfund Site, Saratoga County, New York, Site Background.)

P. 800049-800049 Memorandum to Ms. Kathleen C. Callahan, Director, Emergency and Remedial Response Division, U.S. EPA Region II, from Mr. Henry L. Longest II, Director, Office of Emergency and Remedial Response, U.S. EPA Region II, re: Acknowledgment of Regional Documentation for Request to Allow PRP to Perform the Baseline Risk Assessment, November 8, 1994.

10.0 PUBLIC PARTICIPATION

10.2 Community Relations Plans

P. 1000001-1000021 Report: Community Relations Plan, Malta Rocket Fuel Area Site, Malta Site, prepared for U.S. EPA Region II, prepared by Alliance Technologies Corporation, December 9, 1991.

10.4 Public Meeting Transcripts

P. 1000022-1000057 Public Meeting Summary, Malta Rocket Fuel Area, prepared for U.S. EPA Region II, prepared by Alliance Technologies Corporation, December 9, 1991.

P. 1000058-1000112 The Stenographic Record in the Matter of a Public Meeting to Consider the Proposed Plan for the Malta Rocket Fuel Superfund Site in the Towns of Malta and Stillwater, New York, held by the U.S. EPA Region II, April 24, 1996.

10.6 Fact Sheets and Press Releases

P. 1000113-1000120 Fact Sheet: Malta Rocket Fuel Area Site, Malta and Stillwater, New York, U.S. EPA Region II, October 1991.

P. 1000121-1000126 Fact Sheet No.2: Malta Rocket Fuel Area Superfund Site, Malta/Stillwater, New York, U.S. EPA Region II, January 1992.

P. 1000127-1000130 Fact Sheet No.3 : Malta Rocket Fuel Area Site, Malta and Stillwater, New York, U.S. EPA Region II, February 1993.

P. 1000131-1000136 Fact Sheet No.4 : Malta Rocket Fuel Area, Towns of Malta and Stillwater, Saratoga County, New York, U.S. EPA Region II, September 1994.

APPENDIX IV

STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Michael O. Zagata
Commissioner

JUL -9 1996

Ms. Kathleen Callahan
Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Callahan:

Re: Record of Decision
Malta Rocket Fuel Area

The New York State: Department of Environmental Conservation concurs with the proposed record of decision for the Malta Rocket Fuel Area. We understand that the major components of the remedy for the site will involve the following:

1. Continued pump and treat of the groundwater via a water supply well;

2. Natural attenuation of volatile organic compounds in groundwater;

3. Continued monitoring of groundwater and surface water;

4. Excavation of PCB-contarninated soil;

5. Implementation of institutional controls on the use of groundwater

6. Evaluation of site conditions every five years.

Please contact Sal Ervolina, of my staff, at (518) 457-4349 if you have any questions.

Sincerely,

Michael J. O'Toole, Jr.
Director
Division of Environmental Remediation

bcc: M. Zagata
M. O'Toole (2)
S. Ervolina
M. Chen/File
V. Cardona

APPENDIX

RESPONSIVENESS SUMMARY

Malta Rocket Fuel Area Superfund Site

INTRODUCTION

A responsiveness summary is required by Superfund policy. It provides a summary of citizens' comments and concerns received during the public comment period, and EPA's responses to those comments and concerns. All comments summarized in this document have been considered in EPA's and NYSDEC's final decision for selection of a remedy for the Site.

RESPONSIVENESS SUMMARY OVERVIEW

The comments received were supportive of EPA's preferred remedy and, in particular, supported the continued use of the Early Warning Monitoring System (EWMS) to ensure that off-site ground water users are not impacted by the Site. A summary of the written and oral comments, as well as EPA's responses, appears below.

BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The major community concerns identified during preparation of the community relations plan were potential impacts of Site-related contamination on the residential water supply system and on the homeowners' property values. EPA addressed the water supply concern by requiring sampling and analysis of surface water and ground water between the Site and the public water supplies (i.e., the EWMS). In addition, in each of the four (4) fact sheets issued during the RI/FS, EPA informed residents of the latest EWMS sampling results, which indicated no adverse impact to off-site ground water users. With regard to a possible negative effect on property values, EPA believed that the best course of action was to allow current and future residents to make informed decisions based on Site data and information obtained during a comprehensive RI/FS and risk assessment. To that end, EPA mailed out the fact sheets described above to report on the progress of the RI, placed Site-related documents in the local informational repositories as they became available and, in 1993, EPA awarded a $50,000 Technical Assistance Grant to a local homeowners' association to provide funds for an independent evaluation of the Site documents. The TAG grant was not utilized during the RI/FS.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on April 17, 1996. These documents were made available to the public in the Administrative Record File at the EPA Docket Room in Region II, New York and the informational repositories at the Malta Town Hall and the Round Lake Library. The notice of availability for the above-referenced documents was published in the Saratogian on April 17, 1996. The public comment period on these documents was held from April 17, 1996 to May 16, 1996.

On April 24, 1996, EPA conducted a public meeting at the Malta Town Hall to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the Site, and to respond to any questions from area residents and other attendees.

SUMMARY OF COMMENTS AND RESPONSES

EPA received one (1) comment letter during the public comment period, which was submitted by two of the PRPs for the Site (see Attachment A). The following is a summary of the comments contained in the letter and EPA's response.

Letter dated May 15, 1996 from G.E. and NYSERDA: In their letter, G.E. and NYSERDA supported EPA's preferred alternative recommended in the Proposed Plan, for both the ground water and the soil components. In addition, G.E. and NYSERDA stated their support for the continued use of the EWMS to ensure that off-site

ground water users are not impacted by contamination from the Site. A specific request was made to refer to the G.E./Exxon Nuclear building as the former G.E./Exxon Nuclear building, because G.E. has not used the building since 1974 and Exxon has not used it since 1979.

EPA's Response: EPA agrees that the building is properly referred to as the former G.E./Exxon Nuclear building and uses that term in the ROD.

Three (3) comments were made at the April 24, 1996 public meeting. The following is a summary of these comments and EPA's responses.

1) Statement from Malta Town Supervisor: The Malta Town Supervisor, David Meager, read a prepared statement submitted on behalf of himself and four of the five members of the Town Board (the fifth member was out of town). In the statement, Mr. Meager stated that he and the Town Board members were grateful to learn that the level of risk posed by the Site is acceptable and that they endorsed EPA's preferred cleanup alternative. In particular, they supported continued use of the EWMS monitoring to ensure that users of the Luther Forest public water supply wells are not impacted. Mr Meager concluded by stating that EPA's reassuring conclusions are welcome news to present and future Malta citizens.

2) Question from Peter Renders: Mr. Renders asked about the difference between the no action ground water alternative (G1) and the preferred alternative (G2b), since both would remediate contaminated ground water in the same time period, but the preferred alternative would cost $290,000 more than the no action alternative.

EPA's Response: There are two differences between the no action remedy for ground water and EPA's selected remedy. The first is that EPA's remedy requires air stripping to provide the on-site employees with acceptable drinking water. The second is that EPA's remedy requires continued monitoring of the EWMS to protect off-site ground water users. The 30-year present cost of these differences between the two alternatives is approximately $270,000. Ground water modeling predictions show no difference in the cleanup time frames for the two alternatives because, with EPA's remedy, the Test Station wells are expected to be pumped at an estimated rate of only 0.6 gallons per minute. Therefore, for both the no action remedy and EPA's remedy, ground water restoration is expected to be achieved primarily by natural attenuation and degradation processes in approximately 110 years.

3) Question from Stephen Williams, Daily Gazette: Mr. Williams asked about the timetable for EPA's next steps.

EPA Response: After the close of the public comment period on May 16, 1996, EPA will carefully consider all comments received before preparing a responsiveness summary and issuing a ROD for the Site. Following issuance of the ROD, EPA will negotiate with the PRPs for performance of the remedy. We hope to conclude these negotiations and start the remedy sometime later this year.

APPENDIX V

RESPONSIVENESS SUMMARY
ATTACHMENT V-1

PROPOSED PLAN

Superfund Proposed Plan

Malta Rocket Fuel Area

<IMG SRC 0296274F> Towns of Malta and Stillwater
Saratoga County, New York

EPA
Region 2 April 1996

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the Malta Rocket Fuel Area Superfund Site (Site), and identifies the preferred remedial alternative with the rationale for this preference. The Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) as lead agency, with support from the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Contingency Plan (NCP). The alternatives summarized here are described in the Feasibility Study (FS) report, which should be consulted for a more detailed description of all the alternatives.

This Proposed Plan is being provided following completion of the remedial investigation and feasibility study (RI/FS) for the Site to inform the public of EPA's and NYSDEC's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternative.

The remedy described in this Proposed Plan is the preferred remedy for the Site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. We are soliciting public comment on all of the alternatives considered in the detailed analysis of the FS because EPA and NYSDEC may select a remedy other than the preferred remedy.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports, this Proposed Plan, and supporting documentation have been made available to the public for a public comment period,

which begins on April 17, 1996 and concludes on May 16, 1996. A public meeting will be held during the public comment period at the Malta Town Hall on April 24, 1996 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

All written comments should be addressed to:

Alison A. Hess

Project Manager
U.S. EPA (2ERRD-NYCSBII)
290 Broadway, 20th Floor
New York, NY 10007-1866

Dates to remember:
MARK YOUR CALENDAR

April 17 to May 16, 1996
Public comment period on RIFFS report, Proposed Plan, and remedies considered

April 24, 1996
Public meeting at the Malta Town Hall, Route 9 in Malta, 7:00 p.m.

Copies of the RI/FS report, the Proposed Plan, and supporting documentation are available at the following information repositories:

Malta Town Hall
2540 Route 9
Ballston Spa, NY 12020
(515) 899-2552
Contact: Flo E. Sickels, Town Clerk

Round Lake Library
Round Lake, NY 12151
(518) 899-2285
Contact: Jo-Ann Paternaude, Head Librarian

U.S. Environmental Protection Agency
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-3959
Contact: Alison A. Hess, Project Manager

SCOPE AND ROLE OF ACTION

This Proposed Plan describes the overall cleanup plan for the Site, including treatment of the on-site water supply system by air stripping, remediation of the ground water plume by natural attenuation and degradation processes, and remediation of contaminated soil by excavation and off-site disposal. The preferred remedy described in this plan is consistent with several response actions that have already been performed in accordance with EPA-approved work plans submitted as part of the RI/FS and which are described in detail in the RI Summary section of this Proposed Plan, including 1) decommissioning and removal of two compressed gas cylinders, 2) excavation and recycling of 560 empty, buried crushed drums; 3) cleanouts of several septic tanks, catch basins, and dry wells; 4) cleanout of a sump; and 5) disposal of waste generated during the R.I, called investigation-derived waste or IDW. By having these response actions performed during the RI/FS rather than at a later date, EPA substantially reduced the remaining scope of work for the final cleanup remedy. The preferred remedy utilizes the existing air stripper installed at the Test Station water supply system to provide acceptable drinking water for the Test Station employees, the ongoing monitoring system to protect users of the downgradient public water supply wells, and the existing fencing and restrictive easement to control access and ground water withdrawal. As part of the final cleanup plan, the preferred remedy requires that the selected remedy be reviewed at least once every 5 years to ensure that it remains protective of human health and the environment.

SITE BACKGROUND

The Malta Rocket Fuel Area Superfund Site, also known as the Saratoga Research and Development Center, is located on Plains Road in the Towns of Malta and Stillwater, Saratoga County, New York. The Site consists of a square parcel of approximately 165 areas of developed land, known as the Malta Test Station (the Test Station), and additional acreage in the predominantly undeveloped woodlands surrounding the Test Station (see Figure 1). The Test Station has thirty-three (33) buildings, numerous concrete quench pits, leach fields/septic tanks, dry wells, storage areas, disposal areas, and a small artificial pond known as Muggen's Pond. A fence surrounds the majority of the Test Station.

The U.S. Government established the Test Station in 1945. Since then, all or parts of the Test Station have been leased to G.E., Wright-Malta Corporation, Exxon Nuclear Company, Olin Corporation, Iso-Nuclear Corporation, Mechanical Technology, Inc., and Power Technologies, Inc. and used for a wide range of rocket and weapons testing programs and for space and other research. Detailed information regarding the history of the Site can be found in the Literature Search Report which is available in the information repositories identified above.

In 1955, the U.S. Government established a perpetual restrictive easement area surrounding the Test Station. The easement area covered approximately 1,800 acres in a circular area of one-mile radius from the approximate geographic center of the Test Station (see Figure 1). The holder of the interest in the easement has the right to prohibit hunting and human habitation, remove buildings being used for human habitation, post signs, and enter the easement area to exercise these rights.

In 1964, the New York State Atomic and Space Development Authority (now the Energy Research and Development Authority, NYSERDA) purchased the 165-acre Test Station and the interest in the surrounding easement. In 1968, NYSERDA purchased an additional 280 acres within the easement area. Because NYSERDA then held both the easement interest and a parcel of property located within the easement area, the restrictions on that parcel were extinguished by merger. In 1984, NYSERDA sold 81 acres of the original Test Station property, and its interest in the remaining easement area (approximately 1,500 acres) to Wright-Malta Corporation. The easement interest held by Wright-Malta Corporation provides the right to restrict activity on the 1,500 acres of the remaining easement, but not on the Site itself.

In addition to the Test Station, the Site includes portions of the predominantly undeveloped woodlands that surround the Test Station, including a) the G.E./Exxon Nuclear Building area; b) Area D-3; c) the Triangular Parcel; and d) areas adjacent to the Test Station that have been impacted by Site-related constituents in ground water. The G.E./Exxon Nuclear Building was built between 1968 and 1970 by NYSERDA and used for experiments on low-level radiation of medical equipment and food preservation and for a gas centrifuge uranium enrichment research project conducted by G.E. and the Exxon Nuclear Company (now Advanced Nuclear Fuels, Inc.). NYSERDA currently leases the G.E./Exxon Nuclear Building to Optimum Air Corporation, which manufactures equipment to dry industrial coatings. Area D-3, also owned by NYSERDA, consists of a ravine (Ravine 1b) partially filled with debris and covered with vegetated soil, which reportedly was used by the New York State Department of Transportation for disposal of construction and demolition debris during the construction of Interstate 87. The Triangular Parcel, owned by Wright-Malta Corporation, is an area of forest adjacent to the southeast corner of the Test Station that was evaluated, but never used, for research and development testing. The portion of the Site beyond the Test Station boundary that has been impacted by contaminated ground water is owned by the Luther Forest Corporation, which built the Luther Forest residential development to the northwest of the Site (see Figure 1).

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In 1985 and 1986, ground water at the Site was sampled and found to contain carbon tetrachloride (carbon tet), trichloroethylene (TCE), and chloroform, along with several metals. In January 1987, an air stripper was permitted by NYSDEC and installed on the Test Station water supply wells by Wright-Malta Corporation to treat ground water prior to its use by employees at the Test Station. The purveyor of water is responsible for ensuring that the on-site water supply is in compliance with Part 5 of the New York State Sanitary Code. The New York State Department of Health reviews monitoring data collected from the on-site water supply. In June 1987, the Early Warning Monitoring System (EWMS) of ground water monitoring wells and surface water sampling locations was established between the Test Station and the Luther Forest Well Field to detect any contamination emanating from the Site before it impacted the water supply for the Luther Forest residential

development. To date, the EWMS results have indicated that the Site has not impacted the water quality of the Luther Forest residential development.

The Site was placed on the National Priorities List in July 1987. In September 1989, EPA unilaterally issued an Administrative Order to 8 potentially responsible parties (PRPs) for performance of the RI/FS. These parties are Advanced Nuclear Fuels, Inc.; Curtiss-Wright Corporation; G.E.; Mechanical Technology, Inc.; NYSERDA; Olin Corporation; Power Technologies, Inc.; and Wright-Malta Corporation. In March 1990, G.E., NYSERDA, and the U.S. Department of Defense entered into a participation agreement among themselves and undertook performance of the RI/FS.

HYDROGEOLOGIC SETTING

The Site is situated on a topographic drainage divide. Streams in Ravines 6a, 6b, 7, and 8 north of the Site flow northward toward Saratoga Lake. Screams in Ravines 1a, 1b, 2a, 2b, 2c, 3, 4, and 5 flow southward toward Round Lake (see Figure 1).

The Site is underlain by the unconsolidated aeolian sand, Lake Albany sand, and Lake Albany silty sand units, which have a combined thickness of up to 250 feet. The depth to ground water is approximately 15 to 55 feet below land surface. Below these sand layers is an approximately 100-foot layer of clay and silt that hydraulically separates the Lake Albany sand/silty, sand aquifer above from the bedrock, below. Muggett's Pond was created on the Test Station by excavating a small area (0.07 acre) down to the ground water table.

Ground water at the Site is influenced by the topographic divide and by the geologic layering. In general, ground water flows from the Triangular Parcel across the Test Station and discharges northward to Ravines 6a, 6b, .7, and 8 and southward to Ravines 1a, 1b, 2a, 2b, 2c, and 3. The water supply system for the Site consists of 2 active production wells located at the Test Station.

The Luther Forest Well Field is located approximately 1 mile southwest of the Site. These wells tap the Knapp Road sand and gravel aquifer to provide water for the Luther Forest residential development. The Cold Springs Well is located approximately 1 mile northeast of the Site and also provides water to the Luther Forest residential development. The Cold Springs Well and 2 others located nearby (the Saratoga Hollow Well and the Saratoga Ridge Well) tap unnamed sand and gravel aquifer near Saratoga Lake. The Luther Forest Well Field and the Cold Springs Well are not likely to be affected by Site contamination because these wells tap different aquifers than the Lake Albany aquifer at the Site and the contaminants in the ravine streams volatilize before recharging the aquifers that serve the public water supply. Nevertheless, the EWMS sampling is performed to verify that these public water supplies are not impacted by contamination emanating from the Site.

REMEDIAL INVESTIGATION SUMMARY

The purpose of the RI was to determine the nature and extent of contamination at the Site and to obtain sufficient information to conduct a risk assessment and evaluate cleanup alternatives. Field work began in October 1991 and was completed in May 1994. A total of 48 distinct areas of the Site were investigated.

Analytical results from the RI samples of surface water, sediment, ground water, surface soil, subsurface soil, and septic tank liquid were compared to screening levels established for the Site, also known as the comparative criteria. The comparative criteria for ground water, surface water, and sediment were a combination of their respective maximum measured background concentrations and available federal and state regulatory standards, guidance values, and criteria. The comparative criteria for surface and subsurface soil were a combination of the maximum statistical background concentrations; available federal and state regulatory standards, guidance values, and criteria; and health-based comparative criteria (for 25 inorganic analytes including essential nutrients). Septic tank liquid samples were compared to the ground water effluent standards for discharge to class GA (drinking) waters established in the NYSDEC Water Quality Regulations for Surface Waters and Ground Waters. In general, detections below the comparative criteria indicated no concern and were not investigated further, while detections above the comparative criteria indicated a potential for concern and were investigated further. All of the RI sample results were evaluated in the risk assessment. Key activities conducted during the RI and their results are as follows:

Radiation Survey: A radiation survey was conducted with a geiger counter to assess the potential presence of residual radiation in the ambient air at the G.E./Exxon Nuclear building, where radioactive materials reportedly had been used in the past. The survey revealed no radiation above background levels.

Geophysical Surveys: Geophysical surveys were conducted at 19 areas to identify locations of possible buried metal. A total of 82 anomalies in 13 areas were interpreted as areas of possible buried metal. Subsurface investigations (81 test pits and 9 soil borings) revealed that most of the buried metal at the Site is construction-related scrap metal debris or scrap artillery projectiles. Two areas of empty, buried crushed drums and an unlabeled compressed gas cylinder were found in Area S-1, a burn pit structure and a third area of empty, buried crushed drums were found at Area D-1, and a compressed gas cylinder labeled pentaborane was found at Area D-4. At Area D-5, 4 five-gallon pails of sodium hydroxide and 3 thirty-five gallon stainless steel drums, 1 approximately half-full with a black, oily caustic liquid (pH>13) were found. During the RI, the compressed gas cylinders were decommissioned and disposed off-site. In October 1995, the stainless steel drums and 560 empty, crushed drums were excavated and taken off-site for recycling. The chemicals (the sodium hydroxide and the black caustic liquid) were stored in overpack drums and removed from the Site in February 1996. All these response actions were performed in accordance with EPA-approved work plans.

Soil Gas Surveys: Soil gas surveys were performed at 46 areas of the Site, with a total of 844 soil gas points installed and sampled. These surveys were used as a screening-level tool to provide a semi-quantitative evaluation of the extent of volatile organic compounds (VOCs) in shallow soil. The soil gas analytical results were used to select locations for soil borings and monitoring wells.

Ground Water Investigation: Thirty (30) wells were installed at the Site to supplement the existing network of 18 monitoring wells and water supply wells. Ground water samples were collected and analyzed in June 1992, November 1992, and March 1994. These sample results confirm the presence of VOCs in ground water above Federal drinking water standards (Maximum Contaminant Levels, or MCLs) and were used to prepare a map of the ground water plume (see Figure 1). As can be seen in Figure 1, the 5-ppb limit of ground water plume is well within the easement area. Carbon tet and TCE were detected near the center of the Test Station at maximum concentrations of 220 parts per billion (ppb) and 280 ppb, respectively, compared to their MCLs of 5 ppb. The EWMS and RI ground water and surface water samples show that VOC concentrations are generally steady or decreasing, suggesting that the plume is not migrating in the subsurface into uncontaminated areas under current ground water flow conditions. Three additional ground water samples taken from within the plume in January 1996 were consistent with the RI results.

Surface Water Investigation: Fourteen (14) surface water samples were collected from 6 surface water bodies (quench pits at Buildings 3, 4, and 25; Muggett's Pond; and Ravines 1b and 6a). EWMS and surface water data from other sampling events were used to evaluate Ravines 1a, 2a, 2b, 2c, 3, 4, 5, 6b, 7, and 8. Analytical results from samples collected in Ravine 6a were interpreted to be representative of background conditions. Samples from Ravine 1b at Area D-3 showed concentrations of several inorganics (aluminum, calcium, iron, manganese, potassium, and sodium) above the comparative criteria. The 3 quench pits showed iron, manganese, and antimony above the comparative criteria and the Building 3 quench pit also showed two (2) pesticides (aldrin and heptachlor epoxide) above the comparative criteria. Surface water samples from Muggett's Pond showed only iron and manganese above the comparative criteria. The data from the EWMS and other historical sampling events indicate that low levels of carbon tet and TCE are present in the headwaters of Ravine 2b where the ground water plume discharges to surface water, and that they volatilize before reaching midstream or downstream sampling locations (see Appendix F of risk assessment report).

Sediment Investigation: Sediment samples were collected from Muggett's Pond and the ravines at the same locations where the RI surface water samples were taken. Because Muggen's Pond Drainage Ditch rarely contains water, the results from samples taken there are reported in the following section on surface soil investigation. Sediment samples from Ravine 6a were interpreted as representative of background conditions. Samples from Ravine 1b showed only inorganic analytes above the comparative criteria, such as aluminum, barium, manganese, and potassium. Sediment samples from the 3 quench pits and Muggett's Pond showed detections above the comparative criteria for organic and inorganic analytes, including polychlorinated biphenyis (PCBs), cadmium, lead, manganese, mercury, nickel, and zinc. Additional sampling indicated that the exceedences were localized.

Surface Soil Investigation: Twenty-one (21) surface soil samples were collected and analyzed for a background soil quality, investigation, which was used in developing the comparative criteria for surface soil. In addition, 67 surface soil samples were analyzed from 60 locations at the Site. The results showed localized exceedences of semivolatile organic compounds (SVOCs) at Buildings 6, 24, and 27 that are likely attributable to nearby asphalt paving. PCBs were found at concentrations from 720 ppb to 20.3 parts per million (ppm) and lead from 102 to 1090 ppm at Building 23P, and mercury was found at concentrations of 0.02 to 124 ppm at Muggett's Pond Drainage Ditch Intersection, where a spur joins the main ditch (see Figure 2).

Subsurface Soil Investigation: Thirty-three (33) subsurface soil samples were collected and analyzed as part of the background soil quality investigation. in addition, 254 shallow subsurface soil samples and 3 deep subsurface soil samples were collected and analyzed from 172 shallow borings, 3 deep borings (now monitoring wells), and 23 test pit locations at the Test Station, Area D-3, and the G.E./Exxon Nuclear Building. The soil samples showed detections of inorganics and various VOCs and SVOCs above the comparative criteria in small areas at several locations on the Test Station.

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Dry Well Investigation: Thirty-one (31) soil and sediment samples were collected and analyzed from 23 dry well features (dry wells, catch basins, floor drains, a swale, and an open sump) at the Site. Thirteen (13) of the dry wells (12 on the Test Station and 1 at G.E./Exxon Nuclear) showed detections of inorganic and organic analytes above the comparative criteria. Additional sampling below and adjacent to these dry wells confirmed that the exceedences were localized. The sump at Building 1A was cleaned out in October 1992 and 4 catch basins and 1 dry well were cleaned out in October and November 1995 in accordance with an EPA-approved work plan.

Septic Tank Investigation: Seven (7) liquid samples and 2 sludge samples were collected from septic tanks on the Site. The analytical results showed detections above the comparative criteria, including inorganics, VOCs and PCBs. These septic tanks were cleaned out from October 1995 to February 1996 in accordance with an EPA-approved work plan. Additional soil sampling confirmed that these constituents do not contaminate soil outside the septic tanks or beneath the cesspools.

SUMMARY OF SITE RISK

The RI, EWMS, and historical Site data were evaluated in a baseline risk assessment to estimate the risks associated with current and future Site conditions. The baseline risk assessment estimates the human health and ecological risk that could result from the contamination at the Site if no remedial action were taken.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The baseline risk assessment began with selecting contaminants of concern which would be representative of Site risks. These contaminants included VOCs, SVOCs, PCBs, and inorganics. Several of the contaminants, including carbon tet and TCE, are known to cause cancer in laboratory animals and are suspected to be human carcinogens.

The baseline risk assessment evaluated the health effects that could result from exposure to contamination as a result of ingestion, inhalation, and dermal contact with ground water; ingestion and dermal contact with

surface and subsurface soils; and ingestion and dermal contact with surface water and sediments. The current land use of the Test Station and G.E./Exxon Nuclear Building area is industrial and much of the land surrounding the Site is subject to easement restrictions that prohibit human habitation and hunting. Therefore, the potential current receptors identified were an on-site employee, a utility worker, and a youth trespasser. Other potential receptors identified were future on-site residents (adult and child), who could be present at the Site if the current Test Station land use was changed to residential or if the easement restrictions were discontinued, and a future excavation worker.

Current regulations under CERCLA establish acceptable exposures that equate to an excess carcinogenic risk for an individual lifetime in the range of 10-4 to 10-6 (i.e., an excess cancer risk of 1 in 10,000 to 1 in 1,000,000) or less and a maximum health Hazard Index, which reflects noncarcinogenic effects for a human receptor, equal to 1.0. A Hazard Index greater than 1.0 indicates a potential for noncarcinogenic health effects.

The baseline risk assessment indicated that the carcinogenic risk and the Hazard Index for noncarcinogenic effects associated with ground water at the Site are acceptable for all current and future human receptors. For example, the carcinogenic risk for current Test Station employees who ingest ground water treated by the existing air stripper is 9 x 10-7; (9 in 10 million), which is acceptable. If the existing air stripper were discontinued, the carcinogenic risk for Test Station employees drinking untreated ground water would be 4 x 10-5 (4 in 100,000), which is higher but still within the acceptable risk range. The carcinogenic risk calculated for exposure of a future child resident, a sensitive subpopulation, is 1 x 10-5 (1 in 100,000), which is also within the acceptable risk range. Although the risk due to ground water contamination falls within the acceptable risk range, EPA's preferred remedy requires treatment of the Test Station water supply to MCLs and monitoring of natural attenuation and degradation processes until the ground water plume attains MCLs, consistent with the NCP.

The risk assessment indicated that the carcinogenic risk and the Hazard Index for noncarcinogenic effects may be unacceptable under a future resident scenario due to the concentration of PCBs in soil at the Building 23P area. For example, the carcinogenic risk with the contaminated soil is 2 x 10-4 (2 in 10,000) for a future child resident, a sensitive subpopulation. Assuming the top foot of contaminated soil is cleaned up to 10 ppm of PCBs and contaminated soil below a depth of one foot is cleaned up to 25 ppm of PCBs, based on EPA policy, the risk is reduced by half to 1 x 10-4 (1 in 10,000), which is within EPA's acceptable risk range. Assuming the same cleanup levels, the Hazard Index is reduced from 1.2 to 0.8, indicating that health effects from noncarcinogenic constituents would not be expected following remediation. All calculations in the risk assessment are conservatively protective of human health; therefore, any actual risk posed by exposure is likely to be overestimated.

The risks calculated for exposure to Site soil for the other receptors (utility worker, excavation worker, and trespasser) were within EPA's acceptable risk range. The risk assessment also indicated that risks posed by exposure to sediment and surface water at the Site were acceptable for all current and future receptors.

The baseline risk assessment did not include a calculation of the risk associated with lead in soil because appropriate toxicity factors do not exist, and therefore the calculation could nor be performed. However, the maximum detection of lead in soil (1090 ppm at Building 23P) was determined to be unacceptable because it is slightly above 1000 ppm, which is a generally accepted cleanup level used by EPA for commercial/industrial land use. For comparison, EPA's cleanup level for residential land use is 400 ppm. Other detections of lead in soil at the Site were less than 1000 ppm and determined to be acceptable.

Ecological Risk Assessment

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: Problem Formulation - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. Exposure Assessment--a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. Ecological Effects

Assessment--literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. Risk Characterization--measurement or estimation of both current and future adverse effects.

The ecological risk assessment began with evaluating the contaminants associated with the Site in conjunction with the Site-specific biological species and habitat information. The contaminants of concern and their respective ecological receptors (plant or animal species or habitat) are: PCBs in Muggen's Pond sediment for benthic invertebrates and aquatic plants; and lead, mercury, zinc, and PCBs for terrestrial plants, soil invertebrates such as the earth-worm, and terrestrial vertebrates such as the meadow vole, short-tailed shrew, red-tailed hawk, barn swallow, and red fox.

The ecological risk assessment indicated that the soil contaminated with mercury at the Muggett's Pond Drainage Ditch Intersection may pose an ecological risk to terrestrial species. A cleanup goal of 2 ppm of mercury was established for these soils based on ecological risk calculations. The potential risk posed to Muggett's Pond itself was determined to be minimal based on its small size (0.07 acre) and limited habitat for aquatic receptors.

Based on the results of the RI and the conclusions of the risk assessment discussed above, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. They specify the contaminants of concern, the receptors, and acceptable contaminant levels for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The following remedial action objectives were established for the Site:

Ground Water

! Prevent ingestion of ground water with concentrations of Site-related constituents (primarily the VOCs carbon tet and TCE) above current Federal drinking water standards or, if more stringent, New York State drinking water standards.

! Prevent ingestion of ground water with concentrations of Site-related VOCs that pose an unacceptable risk to human health (total carcinogenic risk greater than 1 in 10,000 or a noncarcinogenic Hazard Index greater than 1).

! Prevent further migration of the ground water plume containing Site-related VOCs above current Federal drinking water standards or, if more stringent, New York State ground water standards, into areas with concentrations of contaminants in ground water below such standards.

! Restore ground water so that concentrations of Site-related VOCs in the water bearing zone are reduced to current Federal drinking water standards or, if more stringent, New York State ground water standards.

Soil

! Prevent human exposure to soil at the Building 23P area containing concentrations of PCBs that pose an unacceptable risk to human health (i.e., an excess cancer risk greater than 1 in 10,000) and concentrations of lead in excess of generally accepted cleanup levels for commercial/industrial land use. Specifically, prevent human exposure to PCBs in soil at concentrations greater than 10 ppm from the surface to a depth of 1 foot and in soil at concentrations greater than 25 ppm for soil below a depth of 1 foot, and prevent human exposure to lead in soil at the Building 23P area at concentrations greater than 1000 ppm.

!Prevent unacceptable ecological risk attributable to mercury in soil at the Muggett's Pond Drainage Ditch Intersection. The cleanup level established is 2 ppm of mercury.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The FS report evaluates in detail 5 remedial alternatives that address ground water contamination and 4 remedial alternativesthat address soil contamination at the Site. The construction time listed for each alternative includes only the time to actually construct or implement the remedy and does not include any time required for design of the remedy, or for negotiating with the PRPs or procuring contracts for design and construction of the remedy. The estimated ground water restoration time for each ground water alternative is based on contaminant fate and transport modeling performed during the FS. These time periods are provided for comparative purposes only and should not be construed as representing actual cleanup time frames, which may be shorter or longer than estimated. The alternatives are described below:

GROUND WATER ALTERNATIVES

Alternative G1: No Action
CERCLA requires that the "no action" alternative be considered as a baseline for comparison with other alternatives. Under Alternative G1, no action would be taken to remediate, control or monitor the contaminated ground water. The existing air stripper would be disconnected and would no longer treat the Test Station water supply to acceptable drinking water levels. The EWMS would be discontinued and there would be no monitoring of contaminants in surface water or ground water. The easement restrictions would not be enforced to restrict human habitation within the vicinity of the plume. The concentrations of VOCs in ground water would be reduced to acceptable levels in an estimated 110 years by natural attenuation and degradation processes such as dilution, dispersion, adsorption, and possibly biological and chemical degradation. Ground water would continue to discharge naturally to the ravines, where concentrations of VOCs are reduced to acceptable levels in surface water through volatilization. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years.

Capital Cost:	$ 0
O & M Cost:	$ 0/yr
Present Worth Cost:	$ 0
Construction Time:	None

Alternative G2b: Continue Existing System (Pump Water Supply Well(s) and Treat by Air Stripper) and Institutional Controls
Under Alternative G2b, the Test Station water supply well(s) would continue to pump contaminated ground water and the existing air stripper would continue to treat the Test Station water supply system to acceptable drinking water levels. The concentrations of VOCs in ground water would be reduced to acceptable levels by natural attenuation and degradation processes, and to a lesser extent by the pumping and treating, in an estimated 110 years. Ground water and surface water would continue to be monitored to ensure that downgradient water supply wells are not impacted, that the ground water plume does not migrate into uncontaminated areas, and that natural attenuation and degradation processes are restoring the ground water to cleanup standards. The minimum average pumping rate would be the estimated current demand, which is 0.6 gallons per minute (gpm). Ground water would continue to discharge naturally to the ravines, where concentrations of VOCs are currently reduced to acceptable levels through volatilization. The air stripper influent and effluent would continue to be monitored. New deed restrictions and continued maintenance of the easement restrictions would be used to restrict withdrawal of ground water that could adversely impact the restoration of the ground water, and the existing fencing would continue to control access to the Test Station. Because this alternative would result in contaminants remaining on-site,

CERCLA would require that Site conditions be reviewed at least once every 5 years to ensure that the remedy is protective of human health and the environment. If justified by the review, EPA may require implementation of additional remedial actions.

Capital Cost:	$ 7,000
O & M Cost:	$ 17,100/yr
Present Worth Cost:	$ 269,900
Construction Time:	None

Alternative G3: Pump Water Supply Well(s), Treat at Maximum Capacity of Existing Air Stripper, and Institutional Controls
Alternative G3 incorporates the provisions of Alternative G2b (pumping Test Station water supply wells, treatment of the water using the existing air stripper, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls), except that the Test Station water supply system would be operated to maximize the capacity of the air stripper (approximately 25 gpm). Water pumped and treated in excess of the water supply needs of the Site would be discharged on-site in a manner that enhances the ground water remediation and in compliance with applicable regulations. Various discharge options, such as an outfall discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 90 years. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Capital Cost:	$ 247,000
O & M Cost:	$ 46,200/yr
Present Worth Cost:	$ 957,400
Construction Time:	1 to 2 months

Alternative G4a: Pump Existing Water Supply Wells, New Air Stripper, and Institutional Controls
Alternative G4a incorporates many of the provisions of Alternative G3 (pumping the Test Station water supply wells, treatment by air stripping, discharge of water in excess of on-site demand, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls). However, Alternative G4a would require that the 2 on-site water supply wells be pumped at a combined pumping rate of approximately 75 gpm to capture most of the ground water with concentrations of individual VOCs greater than 50 ppb. A new air stripper would be required to treat this volume of pumped water. As with Alternative G3, treated water in excess of the water supply needs of the Site would be discharged on-site in a manner that enhances ground water remediation and in compliance with applicable regulations. Various discharge options, such as a discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 80 years. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years. Justified by the review, EPA may require implementation of additional remedial actions.

Capital Cost:	$ 348,700
O & M Cost:	$ 47,600/yr
Present Worth Cost:	$1,080,400
Construction Time:	4 to 6 months

Alternative G4b: Pump Two Existing Water Supply Wells and Two New Wells, New Air Stripper, and Institutional Controls Alternative G4b incorporates many of the provisions of Alternative G4a (pumping of the existing water supply wells, treatment by a new air shipper, discharge of water in excess of on-site demand, natural attenuation and degradation of ground water, surface water and ground water monitoring, and institutional controls). In Alternative G4b, however, water would be pumped from 4 wells (2 new wells and 2 existing water

supply wells) at a combined pumping rate of approximately 140 gpm, to capture all of the ground water with concentrations of individual VOCs greater than 50 ppb. A new air stripper would be required to treat the increased volume of pumped water. Treated water in excess of the water supply needs of the Site would be discharged on-site in a manner that enhances ground water remediation and in compliance with applicable regulations. As in Alternatives G3 and G4a, various discharge options, such as a discharge structure at the head of Ravine 2a, reinjection wells, or a surface infiltration trench or bed, would be evaluated during remedial design (reinjection wells were assumed for cost estimating purposes). Under this alternative, the concentrations of VOCs in ground water would be reduced to acceptable levels within an estimated 60 years. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years. If justified by the review, CERCLA may require implementation of additional remedial actions.

Capital Cost:	$ 649,600
O & M Cost:	$ 51,800/yr
Present Worth Cost:	$ 1,445,900
Construction Time:	4 to 6 months

SOIL ALTERNATIVES

Alternative S1: No Action
CERCLA requires that the "no action" alternative be considered as a baseline for comparison with other alternatives. Under Alternative S1, no action would be taken to remediate or control the contaminated soil. The contaminated soil at the Building 23P area and at the Muggett's Pond Drainage Ditch Intersection would be left in place. No action would be taken to control access to the contaminated soil, such as maintaining the existing fence around the Test Station or enforcing the easement restrictions. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years.

Capital Cost:	$ 0
O & M Cost:	$ 0/yr
Present Worth Cost:	$ 0
Construction Time:	None

Alternative S2: Institutional Controls
Under Alternative S2, deed restrictions such as prohibiting all property use except for commercial/ industrial use or prohibiting future development of selected areas would be implemented to minimize exposure to contaminated soil and to eliminate a future resident exposure scenario. These restrictions would be specific to and would be incorporated into the property deeds for the Building 23P area and the Muggett's Pond Drainage Ditch Intersection, which are currently owned by Wright-Malta Corporation. The existing fence would continue to restrict access and the existing easement restrictions would continue to prohibit human habitation within the easement area. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Capital Cost:	$ 16,800
O & M Cost:	$ 0/yr
Present Worth Cost:	$ 16,800
Construction Time:	None

Alternative S3b: Asphalt Caps and Institutional Controls
Under Alternative S3b, asphalt caps would be placed over the contaminated soil at the Building 23P area (estimated area 15 ft x 5 ft) and the Muggett's Pond Drainage Ditch Intersection (estimated area 3 ft x 30 ft), in addition to the institutional controls outlined in Alternative S2 (deed restrictions, easement restrictions, and fencing). Placement of the cap in the drainage ditch would require altering the ditch to maintain flow and prevent erosion. Because this alternative would result in contaminants remaining on-site, CERCLA would require that Site conditions be reviewed at least once every 5 years. If justified by the review, EPA may require implementation of additional remedial actions.

Capital Cost:	$ 27,000
O & M Cost:	$ 1,000/yr
Present Worth Cost:	$ 42,400
Construction Time:	1 week

Alternative S4: Excavation and Off-Site Disposal
Alternative S4 involves excavation of the contaminated soil at Building 23P (estimated volume 3 to 5 cubic yards [yd3]) and at the Muggett's Pond Drainage Ditch Intersection (estimated volume 3 yd3). Excavated areas would be backfilled with clean fill material, graded to blend with the surrounding areas, and revegetated. The excavated soil would be transported to an appropriate off-site facility for final disposal.

Capital Cost:	$ 25,100
O & M Cost:	$ 0/yr
Present Worth Cost:	$ 25,100
Construction Time:	1 week

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume, short term effectiveness, implementability, cost, and state and community acceptance. The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or will provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies a remedy may employ.

- Short-term effectiveness addresses the period or time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs, and net present worth costs.

- State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State concurs, opposes, or has no comment on the preferred alternative at the present time.

- Community acceptance is assessed in the Record of Decision (ROD) following a review of the public comments received on the RI/FS reports and the Proposed Plan.

The following is a comparative analysis of the alternatives for the Site based upon the evaluation criteria noted above.

- Overall Protection of Human Health and the Environment

Ground Water Alternatives
Alternative G1: No Action is not protective of human health and the environment, because it does not prevent ingestion of contaminated ground water or require monitoring to ensure that the ground water plume does not migrate into uncontaminated areas. Alternatives G2b, G3, G4a, and G4b would be protective of human health and the environment, because ingestion of contaminated ground water and plume migration would be prevented through on-site ground water pumping and treatment, institutional controls, and surface water and ground water monitoring. Although Alternative G4b would be the most protective of the environment because it would restore the ground water in the shortest period of time, all the ground water alternatives are expected to restore the contaminated ground water to acceptable levels within similar relative time frames (i.e, from 60 to 110 years). Alternative G2b would be somewhat more protective of the ravine habitat than Alternatives G3, G4a, and G4b because there would be no potential impact to the streams due to discharge of large volumes of treated water in excess of the Test Station demand; this impact could be reduced by using reinjection wells or infiltration trenches upgradient of the streams rather than through a discharge structure at the head of Ravine 2a.

Soil Alternatives
Alterative S1: No Action is not protective of human health and the environment because it does not prevent human exposure to contaminated soil at Building 23P or reduce ecological risks associated with contaminated soil at Muggett's Pond Drainage Ditch Intersection. Of the remaining alternatives, S2 is least protective of human health and the environment because it relies on institutional controls. Alternative S3b is more protective of human health and the environment, because exposure to contaminated soil would be reduced through capping and institutional controls. Alternative S4 is the most protective of human health and the environment because exposure to contaminated soil would be eliminated through excavation and off-site disposal.

- Compliance with ARARs

Ground Water Alternatives
Chemical-specific ARARs identified for ground water are the Federal MCLs for drinking water or, if more stringent, New York State ground water standards. Examples of these levels are 5 ppb for carbon tet and 5 ppb for TCE. All the ground water alternatives are expected to attain these standards, with estimated restoration time periods ranging from 60 to 110 years. The estimated time to attain MCLs is 110 years for Alternatives G1 and G2b, 90 years for Alternative G3, 80 years for Alternative G4a, and 60 years for Alternative G4b. As noted above, actual time frames for ground water restoration may be shorter or longer than these time periods, which are estimated based on ground water fate and transport modeling.
Chemical-specific ARARs for the air stripper effluent are the Federal MCLs or, if more stringent, New York State drinking water standards, which would include the 5 ppb for carbon tet and 5 ppb for TCE. These standards would be met for each ground water alternative utilizing an air stripper (i.e., all but Alternative G1: No Action).

There are no location-specific or action-specific ARARs associated with Alternative G1, which requires no action. Alternative G2b and G3 utilize the existing air stripper, which was permitted by NYSDEC and has met the New York State Air Emissions Requirements (VOC Emissions for Air Strippers and Process Vents, General Air Quality). Alternatives G4a and G4b require new air strippers, which also could be designed to meet these requirements. Alternatives G3, G4a, and G4b, which involve discharge of treated water in excess of on-site demand, would have additional ARARs depending on the method of discharge selected in remedial design. For example, discharge to Ravine 2a through an outfall structure would require compliance with the Federal and New York State Pollutant Discharge Elimination System Programs (NPDES and SPDES, respectively), the Federal Fish and Wildlife Coordination Act, and the Federal Clean Water Act (Part 404(b) Army Corps of Engineers Nationwide Permit Program). Discharge through reinjection wells
or infiltration trenches would require compliance with the Federal Underground Injection Control (FUIC) Program of the Safe Drinking Water Act and SPDES.

Soil Alternatives
The ARARs associated with the soil alternatives would be attained. There are no location-specific or action-specific ARARs associated with Alternatives S1 or S2. Alternative S3b would comply with Resource

Conservation and Recovery Act (RCRA) requirements for detection monitoring. Alternative S4 would comply with RCRA requirements for transport of the excavated soil and disposal at an EPA-approved landfill. There are no chemical-specific ARARs that establish the cleanup level for the PCB-contaminated soil at Building 23P, since the concentrations are below 50 ppm and therefore are not regulated by the Toxic Substances Control Act (TSCA). Similarly, there are no ARARs for the cleanup level of mercury in soil at the Muggett's Pond Drainage Ditch Intersection or the lead in soil at Building 23P. However, Alternative S4 would comply with EPA's "Guidance on Remedial Actions for Superfund Sites with PCB Contamination," OSWER Directive No. 9355.4-01, dated August 1990, which utilizes the TSCA PCB spill policy to establish cleanup levels for PCBs at restricted access (industrial) sites. Alternative S4 would also meet the Site-specific cleanup levels for lead and mercury, which are 1000 ppm and 2 ppm, respectively.

- Long-Term Effectiveness and Permanence

Ground Water Alternatives
Alternative G1 is neither effective nor permanent because it would not prevent ingestion of contaminated ground water and does nor provide a means for monitoring the ground water plume. Alternatives G2b, G3, G4a, and G4b all would be effective and permanent in the long-term, because each prevents ingestion of contaminated ground water, eventually restores ground water to acceptable levels, and includes provisions for monitoring the ground water over time.

Soil Alternatives
Alternative S1 is neither effective nor permanent because it would not address the long-term risks due to exposure to contaminated soils at Building 23P and Muggett's Pond Drainage Ditch Intersection. Of the remaining alternatives, S2 is the least effective means of reducing long-term risk because it relies on institutional controls. Alternative S3b uses capping, which is somewhat more effective in the long-term. Alternative S4 would have the greatest long-term effectiveness and permanence, because the risks would be eliminated through excavation and off-site disposal.

- Reduction in Toxicity, Mobility, or Volume

Ground Water Alternatives
Alternative G1: No Action would not employ treatment to reduce the toxicity, mobility or volume of VOCs in ground water. Of the remaining alternatives, G2b has the lowest pumping rate and would offer the least reduction in toxicity, mobility, and volume through treatment. Alternative G3 would require a higher pumping rate than Alternative G2b and would therefore offer greater reduction through treatment. Alternative G4b would require the highest pumping rate and would utilize treatment to the greatest extent to reduce toxicity, mobility, and volume of contaminants. Alternatives G2b, G3, and G4b would rely upon natural attenuation and degradation processes in addition to treatment to reduce the toxicity, mobility, and volume of VOCs in the ground water.

Soil Alternatives
Alternatives S1 and S2 require no action and institutional controls, respectively, and therefore would not reduce the toxicity, mobility, or volume of contaminated soil at Building 23P or Muggett's Pond Drainage Ditch Intersection. The asphalt caps required by Alternative S3b would reduce the mobility of the contaminated soil from wind and waler erosion, but would not reduce its toxicity or volume. Alternative S4 provides the greatest reduction in toxicity, mobility, and volume by excavation of the contaminated soil and off-site disposal in an EPA-approved landfill. None of the soil alternatives utilizes a treatment technology to reduce the toxicity, mobility or volume of contaminants in soil.

- Short-Term Effectiveness

Ground Water Alternatives
Alternatives G1, G2b, and G3 do not pose any short-term risk during construction because they rely on either no action or existing systems. Alternatives G4a and G4b include installation of a new air stripper and disassembly of the existing one, which may pose short-term risks if workers come into direct contact with contaminated ground water. Alternatives G4a and G4b are equivalent with respect to this potential risk, which is expected to be easily controlled through proper construction and health and safety practices.

Alternative G4b is the most effective during implementation, because cleanup goals would be expected to be met in the shortest period of time compared to the other alternatives.

Soil Alternatives
Alternatives S1 and S2 do not pose any short-term risk because they rely on either no action or institutional controls. Alternative S3b would pose minimal short-term risk to workers and the environment during asphalt capping of the contaminated soil. Alternative S4 would pose minimal short-term risk for a short period of time when the contaminated soil is excavated and disposed off-site. However, this risk is expected to be easily controlled through standard health and safety practices.

- Implementability

Ground Water Alternatives
Alternative G1 would not require any construction, operation, or monitoring; therefore it is easily implementable. Alternatives G2b, G3, and G4a would make use of the existing wells, and Alternatives G2b and G3 would also use the existing air stripper treatment system, making these alternatives easy to implement. Installation of new pumping wells (G4b), installation of a new air stripper (G4a and G4b) and construction of a discharge system for excess treated water (G3, G4a, and G4b) would require no specialty equipment or contractors and could be implemented using common construction practices.

Soil Alternatives
Alternatives S1 and S2 require no action and institutional controls, respectively, and are readily implementable. The routine asphalt caps of Alternative S3b and the excavation and off-site disposal required of Alternative S4 could be easily implemented using readily available materials, equipment, and construction practices.

- Cost

Ground Water Alternatives
Costs for the ground water alternatives G1 to G4b are as follows:

	Capital	O&M/yr	Present Worth
G1	$0	$0	$0
G2b	7,000	17,100	269,900
G3	247,200	46,200	957,400
G4a	348,700	47,600	1,080,400
G4b	649,600	51,800	1,445,900

The capital and present worth costs for Alternatives G1 and G2b are relatively low or zero. Alternatives G3 and G4a are intermediate with present worth costs of approximately $1 million, and Alternative G4b is the most expensive at approximately $1.5 million.

Soil Alternatives
Costs for the soil alternatives S1 to S4 are as follows:

	Capital	O&M/yr	Present Worth
S1	$0	$0	$0
S2	16,800	0	16,800
S3b	27,000	1,000	42,400
S4	25,100	0	25,100

The present worth cost for Alternative S1 is zero. Of the remaining alternatives, S2 is the least expensive at $16,800, S4 is intermediate at $25,100, and S3b is the most expensive at $42,400.

- State Acceptance

The State of New York concurs with the preferred alternative.

- Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the RI/FS report and the Proposed Plan.

PREFERRED ALTERNATIVE

Based upon the results of the RI/FS and after careful consideration of the alternatives, EPA and NYSDEC recommend Alternative G2b: Existing System (Pump Water Supply Well(s) and Treat by Air Stripper) and Institutional Controls for ground water and Alternative S4: Excavation and Off-Site Disposal for soil, as the preliminary choice for the Site remedy. The capital cost of the preferred remedy is $32,100 and the present worth cost is $295,000.

Specifically, the preferred alternative involves the following:

1) Continued pumping of the on-site water supply well(s) and treatment of the water using the existing air stripper. Continued monitoring of the influent and effluent of the air stripper in accordance with NYS requirements to ensure that it effectively treats the on-site water supply to acceptable drinking water levels. The average pumping rate of the system shall be at least 0.6 gpm, which is the estimated pumping rate for the current demand at the Site.

2) Natural attenuation and degradation of VOCs in ground water that are not captured by the pumping well(s) to Federal MCLs, or if more stringent, New York State ground water standards.

3) Monitoring of surface water and ground water to ensure that downgradient water supplies are not impacted, that contaminated ground water does not migrate into uncontaminated areas (i.e., plume containment), and that the natural attenuation and degradation processes are restoring the ground water to the cleanup standards. The existing surface water and ground water sample locations of the EWMS may be modified as necessary to meet the objectives of this monitoring program.

4) Implementation of institutional controls, which may include new deed restrictions and maintenance of the existing easement restrictions and fencing, to prevent ingestion of contaminated ground water, to restrict withdrawal of ground water that could adversely impact the remediation of the ground water, and to control access.

5) Excavation of contaminated soil at the Building 23P area at a depth of 1 foot or less having a concentration of more than 10 ppm of PCBs, soil at a depth below 1 foot having a concentration of more than 25 ppm of PCBs, and soil at any depth with a concentration of lead of more than 1000 ppm.

6) Excavation of contaminated soil at the Mugget's Pond Drainage Ditch Intersection with a concentration of more than 2 ppm of mercury.

7) Backfilling of excavations in the Building 25P area and at Muggett's Pond Drainage Ditch Intersection with clean fill material, grading to blend with the surrounding areas, and revegetation.

8) 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 landfill, consistent with RCRA and all other ARARs.

9) Evaluation of Site conditions at least once every 5 years to ensure that the remedy is protective of human health and the environment. If justified by the review, additional remedial actions may be implemented.

The preferred alternative, G2b and S4, will provide the best balance of trade-offs among alternatives with respect to the evaluation criteria. Alternative G2b is the most cost-effective ground water remedy that meets all the remedial action objectives, and Alternative S4 provides the greatest reduction in risk at an intermediate cost. EPA and the NYSDEC believe that the preferred alternative will be protective of human health and the environment, comply with ARARs, be cost effective, and utilize permanent solutions and

alternative treatment technologies or resource recovery technologies to the maximum extent practicable. With regard to the statutory preference for the use of treatment as a principal element of the remedy, the preferred alternative requires treatment by air stripping to prevent ingestion of contaminated ground water. The preferred alternative requires natural attenuation rather than treatment as a principal element for ground water restoration, which is consistent with the ground water policy set forth in the NCP, because ground water restoration through pumping and treatment is not cost-effective or warranted based on the estimated time periods to reach MCLs.

SUMMARY OF SITE-RELATED COMMUNITY ACTIVITIES

In October 1991, EPA held a public meeting and issued a fact sheet to announce the beginning of the RI field work. Following that meeting, EPA issued fact sheets in January 1992, February 1993, and September 1994 to report progress on the RI and mailed them to all persons on EPA's mailing list for the Site. This Proposed Plan announces a public meeting and the opportunity to submit comments during the public comment period on the RI and FS reports, the Proposed Plan, and the remedies considered.

If you have any questions about the Site or would like more information, please contact Alison A. Hess, Project Manager, at the address and telephone number listed above or:

Cecilia Echols
Community Relations Coordinator
U.S. Environmental Protection Agency
290 Broadway, 26th Floor
New York, New York 10007-1866
(212) 637-3678

NEXT STEPS

After EPA has presented the preferred alternative at the public meeting and has received comments and questions during the public comment period, EPA will summarize and respond to these questions and comments in a Responsiveness Summary. The Responsiveness Summary will then become part of the ROD.

In addition to the Responsiveness Summary, the ROD will include a description of the final alternative selected by EPA, the rationale for selecting it, a discussion of the alternatives that were considered but rejected, and the reasons for rejecting those alternatives.

EPA will place the ROD in the Administrative Record file, which will be located at EPA's offices and at the local information repositories. The Administrative Record file includes all Site findings and reports that were instrumental in the Agency's decision regarding a remedy. If the selected remedy differs significantly from preferred alternative presented in this Proposed Plan, EPA will inform the public of the change. Upon issuance of the ROD, EPA will give the PRPs an opportunity to implement the selected remedy.

GLOSSARY
Of Terms Used In the Proposed Plan

This glossary defines the technical terms used in this Proposed Plan. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management, and apply specifically to work performed under the Superfund program. Therefore, these terms may have other meanings when used in a different context.

Administrative Order: A legally binding document issued by EPA directing the potentially responsible parties to perform site cleanups or studies.

Air stripping: A process whereby volatile organic chemicals are removed from contaminated material by forcing a stream of air through it in a pressurized vessel. The contaminants are evaporated into the air stream. The air may be further treated before it is released into the atmosphere.

Backfill: To refill an excavated area with removed earth; or the material itself that is used to refill an excavated area.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap is generally mounded or sloped so water will drain off.

Decommission: To render inoperable and/or take out of service.

Downgradient/downslope: A downward hydrologic slope that causes groundwater to move toward lower elevations. Therefore, wells downgradient of a contaminated groundwater source are prone to receiving pollutants.

Effluent: Wastewater, treated or untreated, that flows out of a treatment system.

Infiltration trench or bed: A crushed rock drain system constructed of perforated pipes, which is used to drain and disperse wastewater.

Influent: Water or other liquid flowing into a treatment system.

Landfill: A disposal facility, where waste is placed in or on land.

Migration: The movement of contaminants, water, or other liquids through porous and permeable rock.

Outfall: The place where wastewater is discharged into receiving waters.

Overpacking: Process used for isolating volumes of waste by jacketing or encapsulating waste to prevent further spread or leakage of contaminating materials. Leaking drums may be contained within oversized barrels as an interim measure prior to removal and final disposal.

Plume: A body of contaminated ground water flowing from a specific source. The movement of the ground water is influenced by such factors as local ground water flow patterns, the character of the aquifer in which ground water is contained, and local pumping wells.

Polychlorinated Biphenyls (PCBs): A group of toxic chemicals used for a variety of purposes including electrical applications, carbonless copy paper, adhesives, hydraulic fluids, microscope emersion oils, and caulking compounds. PCBs are also produced in certain combustion processes. PCBs are extremely persistent in the environment because they are very stable, non-reactive, and highly heat resistant. Burning them produces even more toxins. Chronic exposure to PCBs is believed to cause liver damage. It is also known to bioaccumulate in fatty tissues. PCB use and sale was banned in 1979 with the passage of the Toxic Substances Control Act.

Potentially Responsible Parties (PRPs): Parties, including owners or operators, who may have contributed to

the contamination at a Superfund site and may be liable for costs of response actions. Parties are considered PRPs until they admit liability or a court makes a determination of liability. A PRP may participate in site investigation and cleanup activity without admitting liability.

Remedial: A course of study combined with actions to correct site contamination problems through identifying the nature and extent of cleanup strategies under the Superfund program.

Sediment: The layer of soil, and minerals at the bottom of surface waters, such as streams, lakes, and rivers that absorb contaminants.
Sludge: Semi-solid residue from industrial or water treatment processes that may be contaminated with hazardous materials.

Stripping: A process used to remove volatile organic compounds from a substance (see Air Stripping).

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Trichloroethylene (TCE): A stable, colorless liquid with a low boiling point. TCE has many industrial applications, including use as a solvent and as a metal degreasing agent. TCE may be toxic to people when inhaled, ingested, or through skin contact and can damage vital organs, especially the liver (see also Volatile Organic Compounds).

Unilateral Order: A legally binding document issued by EPA directing the potentially responsible parties to perform site cleanups or studies.

Upgradient/Upslope: Upstream; an upward slope. Demarks areas that are higher than contaminated areas and, therefore, are not prone to contamination by the movement of polluted groundwater.

Volatile Organic Compounds (VOCs): VOCs are made as secondary petrochemicals. They include light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasers, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air. Due to their low water solubility, environmental persistence, and wide-spread industrial use, they are common contaminants found in soil and ground water.

APPENDIX V

RESPONSIVENESS SUMMARY
ATTACHMENT V-2

PUBLIC NOTICE PUBLISHED IN THE SARATOGIAN ON APRIL 17, 1996

PUBLIC NOTICE
U.S. Environmental Protection Agency
Announces Public Meeting and Comment Period on the Proposed Plan for the
MALTA ROCKET FUEL SUPERFUND SITE
Towns of Malta and Stillwater, New York

The U.S. EPA recently completed a Remedial Investigation/Feasibility Study (RI/FS) which determined the nature and extent of contamination and evaluated cleanup alternatives for the Malta Rocket Fuel Area Superfund Site, Towns of Malta and Stillwater, Saratoga County; New York. Based on the RI and FS Reports, EPA has prepared a Proposed Plan for the Site that summarizes various cleanup alternatives and identifies EPA's preferred alternative. Before selecting a final remedy, EPA will hold an informational public meeting and will consider written and oral comments on all the alternatives.

The public comment period will be from Wednesday, April 17 to May 16, 1996. During the comment period, the public is invited to review the Proposed Plan and the RI and FS Reports, which are available at the information repositories listed below, and to offer written or oral comments on these documents. EPA's public meeting will be held on Wednesday, April 24, 1996 at 7:00 p.m. at the Malta Town Hall. The meeting will be transcribed and a copy of the transcript will be available at the information repositories listed below.

EPA evaluated the following alternatives for the Site:

Ground Water Remedial Alternatives:
G1: No Action
G2b: Continue Existing System (Pump Water Supply Well(s) and Treat by Air Stripper) and Institutional Controls
G3: Pump Existing Water Supply Well(s), Treat at Maximum Capacity of Existing Air Stripper, and Institutional Controls
G4a: Pump Existing Water Supply Wells, New Air Stripper, and Institutional Controls
G4b: Pump Two Existing Water Supply Wells and Two New Wells, New Air Stripper, and Institutional Controls

Soil Alternatives
S1: No Action
S2: Institutional Controls
S3b: Asphalt Caps and Institutional Controls
S4: Excavation and Off-Site Disposal

EPA's preferred alternative is G2b for ground water and S4 for soil. This alternative involves: 1) continued pumping of the on-site water supply wells for the Malta Test Station and treatment of the water using the existing air stripper; 2) natural attenuation and degradation of contaminants in ground water that is not captured by the pumping wells; 3) monitoring of surface water and ground water; 4) implementation of institutional controls; 5) excavation and off-site disposal of contaminated soil at the Test Station; 6) backfilling of the excavated soil locations with clean fill material, grading to blend with the surrounding areas, and revegetation; 7) evaluation of site conditions at least once every five (5) years to ensure that the remedy is protective of human health and the environment. If justified by the review, additional remedial actions may be implemented.

The Proposed Plan, the RI and FS Reports, and other documents used by EPA in the decision-making process for the Site are available for public review during the public comment period at the following locations:

Malta Town Hall
2540 Route 9
Ballston Spa, NY 12020
Contact: Flo E. Sickels, Town Clerk
(518) 899-2552

Round Lake Library
Round Lake, NY 12151
W, Th, F 10-8, Sat 10-2
Contact: Jo-Ann Patenaude
(518) 899-2285

If you would like to comment in writing on the RI/FS or Proposed Plan, please mail your comments (postmarked no later than Thursday, May 16, 1996) to:

Alison A. Hess, Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10007-1866
(212) 637-3959

APPENDIX V

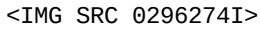
RESPONSIVENESS SUMMARY
ATTACHMENT V-3

SIGN-IN SHEET FROM APRIL 24, 1996 PUBLIC MEETING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
Malta Rocket Fuel Superfund Site
Malta, NY

Wednesday, April 24, 1996
ATTENDEES

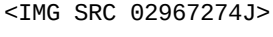
(Please Print Clearly)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
Malta Rocket Fuel Superfund Site
Malta, NY

Wednesday, April 24, 1996
ATTENDEES

(Please Print Clearly)



APPENDIX V

RESPONSIVENESS SUMMARY
ATTACHMENT V-4

LETTER SUBMITTED DURING THE PUBLIC COMMENT PERIOD

<IMG SRC 0296274L>
Jill Siebels
Corporate En vl ronmL'n tt~ ! Pro~ rusn.~
Remedial Project Manager

Corporate Environmental Programs
General Electric Company
1 Computer Drive South, Albany NY 12205

518 458-6623 Dial Comm: S!920-9623

Fax: 518 458-9247 Dial Comm: S!920-9200

May 15, 1996

Ms. Alison A. Hess
Project Manager
U.S. EPA (2ERRD-NYCSBII)
290 Broadway, 20th Floor
New York, New York 10007-1866

Subject: Comments on Superfund Proposed Plan
Malta Rocket Fuel Area
Malta, New York

Dear Ms. Hess:

The General Electric Company (GE) and New York State Energy and Research Development Authority (NYSERDA) have reviewed the recently issued Superfund Proposed Plan for the Malta Rocket Fuel Area (MRFA) Site. GE and NYSERDA appreciate the opportunity to submit these comments to the United States Environmental Protection Agency (USEPA) for consideration.

GENERAL COMMENTS

In general, we believe the preferred alternative recommended in the Superfund Proposed Plan more than adequately addresses conditions of concern at the MRFA Site. As you are aware, based on the results of the Risk Assessment (RA) two areas were identified as contributing to an overall unacceptable risk at the site. These two areas were the soil adjacent to Building 23P due to slightly elevated levels of PCBs and a portion of the Muggett's Pond Drainage Ditch due to concentrations of mercury. Assuming that these two areas are remediated, the remaining soil at the Site does not pose an unacceptable ask. Therefore, it is both appropriate and effective to remove the soil at the above areas Although the specific remedy selected for this soil is slightly more costly than some of the other alternatives, it does provide the most benefit under EPA's evaluation criteria.

The proposed groundwater remedy is consistent with the Remedial Action Objectives developed in the Feasibility Study. Specifically, although the groundwater does not pose an unacceptable risk, the continued treatment of potable water for the existing on-site users would prevent any ingestion of groundwater with constituents above the Federal MCLs or, New York State drinking water standards. In addition, the continued use of the Early Warning Monitoring System will ensure that off-site groundwater users continue to be unimpacted.

SPECIFIC COMMENTS

GE and NYSERDA offer the following specific comments on the Superfund Proposed Plan. These comments are intended to clarify portions of the Plan, prior to issuance of a Record of Decision (ROD). However, none of our comments necessitate any fundamental changes to the preferred alternative.

The former GE/Exxon Nuclear Building

The former GE/Exxon Nuclear Building is simply referred to as the GE/Exxon Nuclear Building throughout the Proposed Plan. In light of the references utilized in previous documents, including the Remedial Investigation and Feasibility Study Reports, the citations regarding this building should be proceeded by the word "former". This is also consistent with the fact that the building has not been utilized by either GE or Exxon since 1974 and 1979, respectively.

Please feel free to contact me if you have any questions regarding these comments.

Respectfully,

<IMG SRC 0296274M>

Jill Siebels, GE
Facility Coordinator

cc: Leslie Hulse, Esq., GE
Hal Brodie, Esq, NYSERDA
Phil Gitlen, Esq., Whiteman, Osterman and Hanna

<IMG SRC 0296274 N>