RETEC

REVISED
REMEDIAL ACTION REPORT
DOCUMENTATION FOR OPERABLE UNIT COMPLETION
SHORE REALTY SUPERFUND SITE

Glenwood Landing, New York

• 130006 •

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
New York, New York

Prepared on Behalf of:

THE PERFORMING PARTIES GROUP

Prepared by:

REMEDIATION TECHNOLOGIES, INC.
9 Pond Lane - Suite 3A
Concord, Massachusetts 01742-2851

RETEC Project # 1-2265-100

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1.0 INTRODUCTION

The Applied Environmental Services Site (a.k.a. Shore Realty Site) is a former petroleum terminal and waste solvent storage and recycling facility located in Glenwood Landing, New York on Long Island. Primary contaminants at the site are volatile (VOCs) and semi-volatile hydrocarbons, with some chlorinated VOCs present as well. The Record of Decision (June 1991) selected a remedy that included several integrated *in situ* technologies. The Glenwood Landing Superfund Site Performing Parties Group (PPG) contracted Remediation Technologies, Inc. (RETEC) of Concord, Massachusetts to perform Remedial Design and Remedial Action (RD/RA) construction activities. Construction of the selected remedy for the site was recently completed, and the treatment system is fully operational. This report documents the closure of Remedial Action Construction activities at the site.

1.1 Site Description

The Shore Realty Site, located at One Shore Road, Glenwood Landing, New York, is approximately 3.2 acres in size, and surrounded on three sides by water: Motts Cove to the east and south, and Hempstead Harbor to the west (Figures 1-1 and 1-2). Both water bodies and associated intertidal areas are designated tidal wetlands by the State of New York (the State). The site is at an elevation of approximately 5 to 30 feet above mean sea level (MSL).

Industrial, commercial and residential areas surround the site. Directly north of the Site on Hempstead Harbor is the Harbor Fuels oil terminal, and 200 feet to the north is an inactive hazardous waste disposal site (the Penetrex Site) which is a former dry cleaner. Approximately 600 feet farther north on Hempstead Harbor, along Shore Road, is the Long Island Lighting Company (LILCO) power station. Directly east of the site, on Motts Cove, is a private marina, Burtis Boat Works. Approximately 200 feet northeast, upgradient of the site, is a residential area.

Prior to RA activities, the site contained three brick buildings: a pump house/storage building, a warehouse, and an office/garage. There were seven fixed above-ground storage tanks ranging in size from approximately 56,200 gallons to 740,500 gallons. A canopied truck loading rack was located on-site along with the associated piping infrastructure. There were several other surface structures including a burned trailer, six unmounted storage tanks, a tank trailer, van, boat, and truck. There was a series of underground storage tanks that were used for storing fuel

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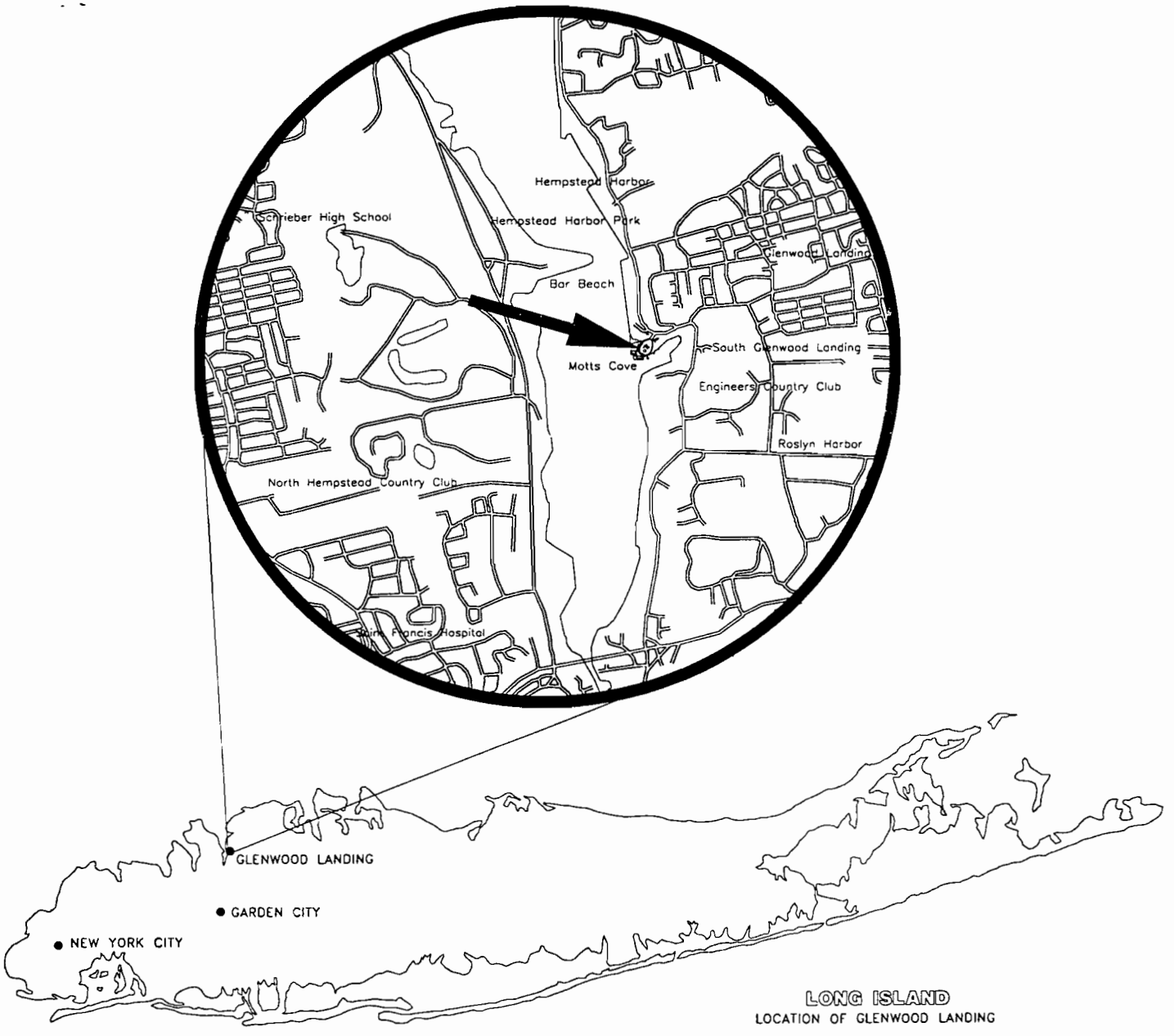
LOCATION OF SHORE REALTY SITE AT GLENWOOD LANDING



VICINITY MAP

FIGURE 1-1

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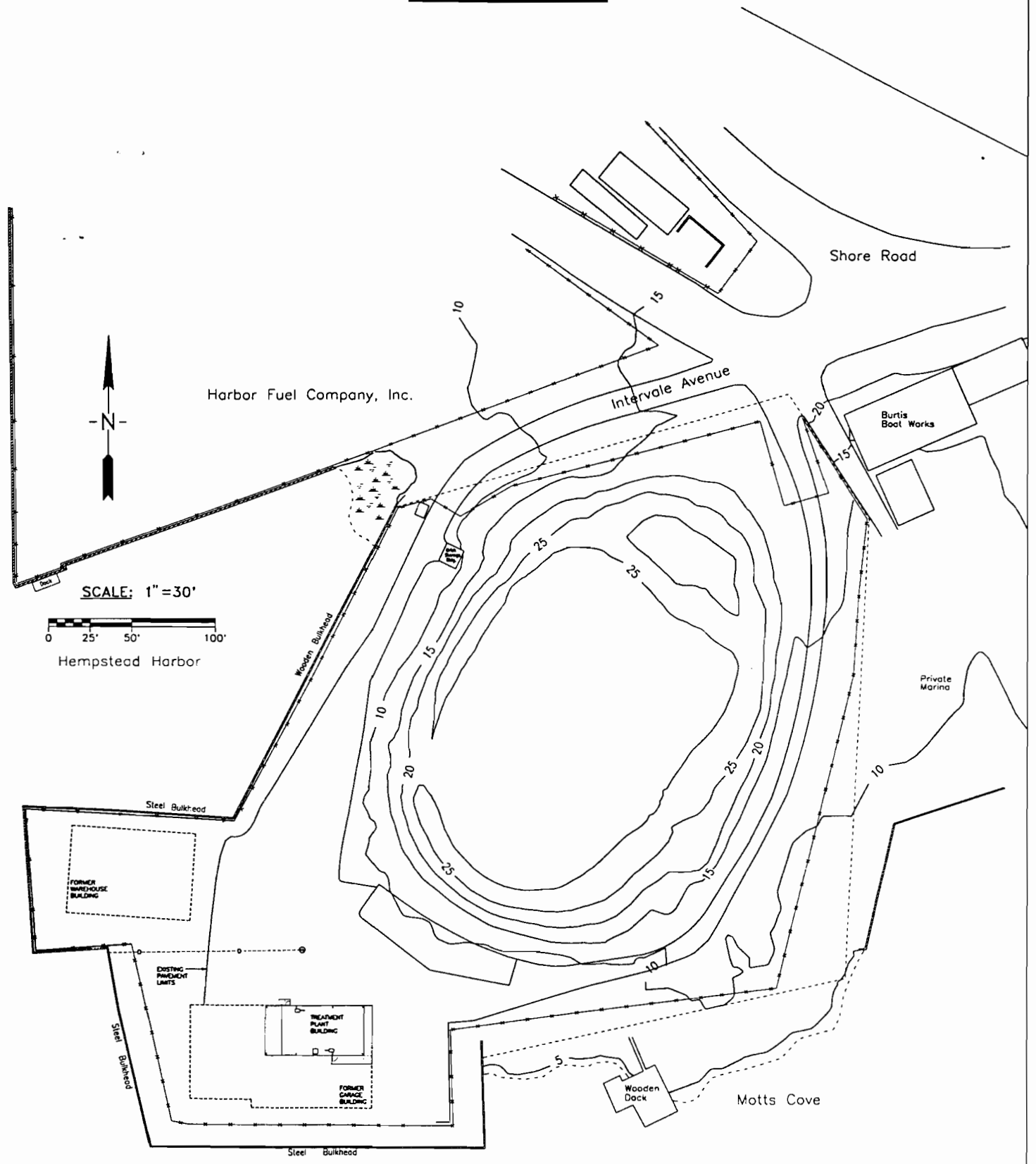

SITE MAP
PERFORMING PARTIES GROUP SHORE REALTY SITE

FIGURE
1-2
1677S002

oils, diesel fuels, and other liquids for on-site activities, (i.e., building furnaces, site vehicles, etc.). Photographs of initial site conditions are provided in Figure 1-3.

1.2 Site History

The Shore Realty property was first used for fuel storage purposes in 1939. In 1974, the Site changed hands and was used for the storage and distribution of chemical solvents. Numerous spills of organic chemicals reportedly occurred during this period. In October 1980, the owner installed monitoring wells and a recovery trench. In 1980, the property was leased to Applied Environmental Services (AES). AES operated the facility for the blending of various chemical waste materials that had heat value to provide alternate fuel sources. AES also operated a hazardous waste storage facility.

AES continued the monitoring and recovery efforts undertaken, and installed product recovery equipment. The trench containing the product recovery equipment reportedly recovered approximately 500 gallons of liquid chemical per month during 1981 and 1982. Groundwater samples in 1982 were found to contain dissolved concentrations of volatile halogenated and non-halogenated hydrocarbons.

Shore Realty Corporation purchased the Site in October 1983, and evicted AES in January 1984. The State filed suit against Shore Realty and its owner, Donald Leogrande, in February 1984. As a result of that suit, Shore Realty and Leogrande were ordered by the court to undertake remedial actions at the Site. Subsequent thereto, Shore Realty and Leogrande commenced a third party action suit against defendants, including prior landowners, prior on-site operators, and a number of companies that had allegedly sent chemicals to the Site while it was operated by AES.

In March 1984, the state inventoried and sampled chemicals contained on-site and collected surface water samples from Hempstead Harbor. From 1985 to 1986, a state contractor removed more than 700,000 gallons of chemicals stored in the above-ground tanks. Shore Realty, under state supervision, removed all of the 55-gallon drums stored in the drum storage warehouse.

In February 1987, a group of third party defendants retained Roux Associates (Roux) to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the Site, which was completed in April 1991. Primary constituents of concern identified for the Site are presented in Table 1-1.

Initial Site Conditions

Tank Farm Area

Loading Rack, Warehouse

Table 1-1
Site Contaminants
Representative Contaminants
Maximum Concentration Detected by Media (ppb)

Contaminant	Soil	Groundwater	Sediments	Air
ethylbenzene	1,300,000	5,600	150	0.36
toluene	2,600,000	350,000	13	0.84
xylenes	8,400,000	45,000	1,400	-
benzene	5	270	-	1.00
tetrachloroethene	4	430	3	-
1,1,1-trichloroethene	7,600	11	-	-
naphthalene	12,000	40	60	-
benzo(b)fluoranthene	140	-	810	-
bis(2-ethylhexyl)phthalate	12,000	20	8,100	-
lead	83,000	639	140,000	-

Source: Record of Decision (June 1991)
Table 1 - Summary of Site Conditions

The Record of Decision (ROD) was prepared by the New York Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (USEPA) in June 1991. The Consent Judgement was lodged in June 1992, and entered on August 5, 1992.

In September 1992, Remediation Technologies, Inc. (RETEC), was hired by the Performing Parties Group (PPG) to perform Pre-Remedial Design activities, and design a remedy that implements the ROD-related remedial action at the Site. RETEC was also hired in 1994 for construction and commissioning of the remedy, and continues as manager of the operating treatment system.

1.3 Selected Remedy

Based upon the results of the RI/FS, the NYSDEC and USEPA selected an integrated subsurface treatment system to remediate the Site. The system components include *in situ* soil venting, groundwater extraction, air stripping, and *in situ* biodegradation. Biodegradation is enhanced by nutrient addition within an on-site groundwater re-injection system. All system effluent vapor streams are treated in a regenerative thermal oxidizer. A process flow diagram of the implemented remedy is presented in Figure 1-4.

1.4 Current Site Conditions

A decommissioning and demolition (demo) program was conducted in 1994 to prepare the Site for the remediation construction phase. The initial phase of the demo program included dismantling and offsite disposal (and/or recycling) of the former terminal's infrastructure, and any waste materials or debris on-site.

Two existing brick structures were candidates for housing the remediation equipment for the Site. Independent structural inspections, however, indicated that both units were unsafe. In a second phase of the demo program, both structures were leveled and their materials were removed from the Site. A new foundation was poured on the site of the former garage building, and a temporary pre-fabricated metal building has been erected to house the remediation hardware.

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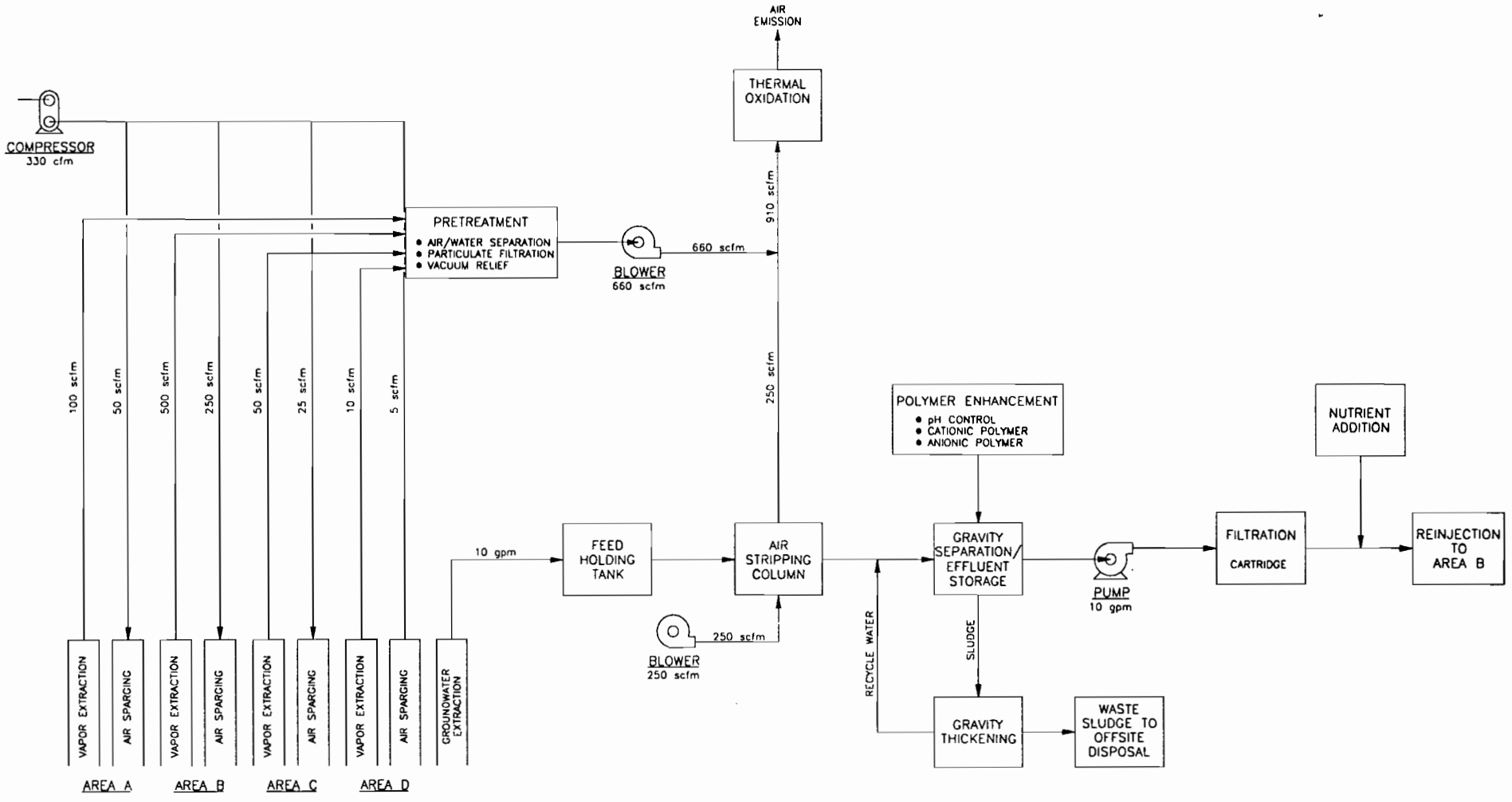

PROCESS FLOW DIAGRAM
PERFORMING PARTIES GROUP SHORE REALTY SITE

FIGURE
1-4
1033-P01

The Site perimeter is covered with an existing chain link fence that has been recently repaired and upgraded. The structure includes three strands of barbed wire to prevent unauthorized Site entry and vandalism. Much of the lower Site area is paved to prevent short circuiting of vapors in the shallow aeration well network.

2.0 CHRONOLOGY OF EVENTS

Following preparation of the ROD (June 1991), and subsequently the lodging of the Consent Judgement (June 1992), the PPG contracted RETEC to conduct a Pre-Remedial Design Investigation, and Remedial Design activities for the Site (September 1992). (Each major step in the RD/RA process is outlined in Table 2-1).

In the fall of 1992 and the spring of 1993, RETEC completed all necessary investigation programs and pilot studies required to support design of the full-scale remedy. Pre-Design and Remedial Design tasks were completed in approximately one and a half years. NYSDEC approved the 100% design package for construction in March 1994.

While negotiating a Remedy Construction contract with RETEC in the spring of 1994, the PPG initiated a site Decommissioning and Demolition Program (demo) in preparation for remedy installations. RETEC began construction activities in August 1994, while Phase II of the demo program removed two brick structures from the site. Once the subsurface network had been installed in the fall of 1994, RETEC temporarily demobilized while the treatment building was being constructed.

RETEC mobilized all plant hardware into the treatment building in late January 1995. Utility installations and plant construction were completed in April 1995. The treatment system was commissioned throughout April and May, and the system entered a 45-day Acceptance Period. The plant achieved the Operations Commencement Date as defined in the ROD on July 13, 1995.

As a result of Phase II of the demo program, two additional USTs were located at these newly accessible site perimeter zones. The zones were found to be contaminated with materials consistent with those found site-wide. The system was expanded into these areas in July and August 1995. Following a brief testing period, the final construction task of paving the lower area was completed in early September 1995. NYSDEC, USEPA, and the PPG completed their final inspection of the expanded remedy on September 20, 1995.

Table 2-1
Remedial Design and Remedial Action Timetable

Date	Event
June 1991	ROD Prepared by NYSDEC and USEPA
June 1992	Consent Judgement Lodged
September 1992	RETEC Starts Pre-Remedial & Remedial Design Activities
March 1994	Remedial Design Approved by NYSDEC
May 1994	Phase I - Decommission & Demolition of Site; ASTs, USTs, misc.
August 1994	RETEC Starts Remedial Action Construction Activities Phase II - Decommissioning & Demolition; Site Buildings
March 1995	Preliminary Plant Inspection
April 1995	Remedial Action Construction Completion
April & May 1995	Plant Equipment Commissioning
June 1995	Plant Acceptance Period Starts
July 1995	Operations Commencement, Start Expansion Construction
August 1995	Pre-Final Plant Inspection, Expansion Completion
September 1995	System Final Inspection; PPG, EPA, NYSDEC

3.0 PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

The PPG contracted Groundwater Technologies, Inc., (GTI), of Plainview, New York to act as construction oversite manager, and Quality Assurance/Quality Control supervisor. GTI used the NYSDEC approved 100% Construction and Equipment Specifications, and the approved Integrated Remedial Design Package as a basis for reviewing RETEC's construction and testing procedures.

GTI's project manager, Mr. Brock Lownes, was supported by a project staff of geologists, process engineers, and subsurface scientists. During much of the plant construction, and all of the subsurface installations, GTI maintained a daily presence at the site. Weekly reports were issued to the PPG to track RETEC's progress, identify any areas of concern, and update the project schedule. Field conditions that warranted minor changes to the approved design were dealt with in regular conference calls between the oversight contractor, the PPG, and RETEC's project manager. Items of greater impact to the project were negotiated with NYSDEC, and Nassau County as appropriate.

3.1 Subsurface Installations

The well drilling program involved the installation of five groundwater recovery wells, 16 vertical and two horizontal vapor extraction wells, and 37 sparge wells. Each well installation was witnessed by GTI personnel. All installations and well development procedures were documented on a daily basis, and were determined to be consistent with the Construction Specifications. Each subsurface pipe run was deadheaded and hydrotested for 24 hours at 200% of the expected service pressure. (Vacuum lines were tested at 65 psig.) Leaks detected were repaired and the lines were retested prior to backfilling the header trenches.

3.2 Treatment Plant Installations

Upon shipment to the site, GTI reviewed all plant hardware for consistency with the 100% Design Package and Division II Equipment and Construction Specifications. The oversite contractor conducted and documented a detailed review of each plant component, and issued a report to the PPG. GTI's report on Major Equipment, and RETEC's response are presented in Appendix A of this document. Following shipment of major hardware to the Site, the PPG

conducted their Initial Plant Inspection, and issued a list of recommendations for RETEC to address. (See Appendix A)

Once the treatment plant construction was complete, both the PPG and GTI conducted independent (secondary) plant inspections to review the installation for safety, accessibility of layout, and code compliance. Upon satisfying all additional recommendations, RETEC entered a 6-week plant commissioning phase.

3.3 Plant Commissioning

The commissioning program involved hydrotesting each process line within the plant, as was performed for the subsurface piping. Each vessel in the plant was subsequently filled with clean tap water, and all leaky fittings were identified and repaired. Next, all digital control devices were tested to ensure proper actuation and wiring to the control system. Each analog device and associated control loop were calibrated, and intermediate alarm points were set.

The Thermox system and its telemetry package underwent a comprehensive commissioning and startup program of its own, conducted by the manufacturer (Airex Corporation, Orange CA). Other major three phase components (vapor extraction blower, sparging compressor) were initially "bumped" to check for proper rotation, and rewired as appropriate. Each pump, blower, and mixer was then operated individually. Pump housing were flushed as appropriate to avoid cavitation, and all filter elements were replaced after the initial system flush. Each system component was checked for appropriate startup and operating amperage.

Once each plant component was checked and tuned individually, the plant control system was commissioned. A trial run of the entire plant was done with clean tap water. Each line of control logic was tested for proper performance. Particular attention was given to interlocks that manage upset conditions. Once appropriate logic modifications were performed, the plant autodialer was programmed and activated.

Upon completion of the above steps, the plant was taken online in a stepwise fashion with contaminated site media. The commissioning program was completed once the system had been fully operational for 24 hours without a shutdown event. RETEC was contractually obligated to ensure that the plant operation was consistent with the operating philosophy of:

- unmanned operation;

- weekly operator visits for data collection, maintenance; and
- occasional automated shutdowns with operator response.

To meet this obligation, the system was required to pass an Acceptance Period to achieve the Operations Commencement Date (OCD). The OCD was defined in the ROD as: "the date, as certified in writing by the contractor on which the remedial system contemplated by the ROD has operated for a period of 45 consecutive days." RETEC provided written notification of achieving the OCD on July 13, 1995. After achieving OCD, the PPG conducted a final inspection of the treatment facility during a site open house for the entire PPG and local, state, and federal officials.

4.0 CONSTRUCTION ACTIVITIES

The construction activities for the Shore Realty Site started in August of 1994. The final construction deliverable, paving the lower site area, was completed in September 1995. A discussion of the major components of the remedy installation is presented below.

4.1 Infrastructure Demolition

In May 1994 site infrastructure decommission and demolition activities started. The environmental contractor was O.H. Materials of Trenton, New Jersey. RETEC provided construction oversight for the duration of activities. The demolition activities were performed on:

- above-ground storage tanks (ASTs);
- buried underground storage tanks (USTs);
- a truck loading rack and associated piping; and
- miscellaneous site debris.

Decontaminated construction debris was disposed of in appropriate offsite disposal facilities, or was recycled for scrap value. Solid and liquid wastes collected during the program were disposed of in a permitted treatment facility. Demolition activities were completed in July 1994. Photographs of demolition activities are presented in Figure 4-1.

4.2 Building Inspections, Demolition

The 100% Design package based significant mechanical details on the assumption that the existing warehouse building was appropriate for occupation. Much of the lower site area piping network, and all of the treatment plant layout were affected by this basis. Due to recent storm tides and years of vacancy, the support structure for the elevated building had deteriorated. Two independent structural surveys concluded that the unit was unfit for occupancy, particularly in light of the heavy equipment loading expected.

The garage building was the only other site structure of significant size to support a treatment plant. This ground level building was subject to frequent flooding, and was also found

Tank Demolition - Scrap Pile

Decontamination Pad

to be structurally unstable. The structural surveys and subsequent demolitions conducted by the PPG for the two units were ongoing during RETEC's initial subsurface construction activities.

The PPG hired Barteld Construction Company of Deer Park, New York, to build a raised concrete foundation on the pad of the former garage building. Above the foundation, a 30-foot by 60-foot metal building was erected to house the treatment plant. Erection of the sidewall sheeting was problematic due to weeks of steady winds. Construction began in October 1994, and the building was not ready for occupation until January 1995.

Due to relocation of the building, RETEC modified the design of the plant and subsurface components, and stubbed all services at the new building foundation. RETEC completed subsurface installation in early November, and further remedy construction activities were suspended until building completion.

4.3 Unforeseen Subsurface Structures

Following demolition of the two buildings, two additional underground storage vessels and two concrete vaults (of unknown purpose) were found beneath and adjacent to the former buildings' foundations. The USTs were excavated and decontaminated upon discovery under NYSDEC and Nassau County supervision. The concrete vaults were removed at a later time.

Site materials associated with the USTs and concrete vaults were determined to be contaminated with constituents consistent with previous site investigations. A plan for managing these newly accessible areas was negotiated with the Nassau County UST/Spills group, and NYSDEC. The plan involved dismantling the concrete vaults in place, and removing and steam cleaning the debris.

It was determined that the aquifer aeration and soil vapor extraction components of the remediation system would be expanded into the impacted areas. RETEC designed the system expansion and installed the required components following the 45-day Acceptance Period and Operations Commencement Date (July and August 1995). Paving activities were delayed until the expansion was installed and tested (September 1995).

4.4 Subsurface Drilling Program

An initial site survey was performed by Storch Associates of Hicksville, New York, prior to kicking off the well installation program. The coordinates for each well location presented in the 100% Design drawings were field located and flagged. The flagging was color coded according to the service to be installed, and marked with the well location ID number. Silt fencing and haybales remaining from the site demolition were resecured prior to drilling.

The selected drilling contractor was New England Boring Contractors of Glastonbury, Connecticut. Drilling activities started in the upper area to accommodate ongoing demolition activities in the lower area. Two types of wells were installed in the upper area: air sparging wells and vapor extraction wells. The wells were constructed using 2 inch and 4 inch SCH 40 PVC, respectively. The air sparging wells were installed to roughly 30-feet in depth (about 10 feet below MSL). The vapor extraction wells averaged 18 feet depths, terminating several feet above the water table. Much of the upper site is sand, and installations went quite smoothly.

Ten foot deep, 4-inch PVC groundwater extraction wells were specified in the design for the lower area. The project manager altered the well specification diameter to 6 inches in the field. The dimensions allowed by a 4-inch shallow well may not have been sufficient to provide effective cooling for a continuous duty motor without the addition of a shroud. The well design was too narrow to retrofit each pump with a shroud, and only a limited end cap volume was available for sedimentation. The greater predicted yield for the larger well diameter supported the change.

Six inch PVC wells were installed in the lower site area to a depth approximately 10 feet. Two inch PVC sparge wells were installed in the lower area to depth of approximately 20 feet, which roughly matched a uniform sparge depth across the Site of 10 feet. Due to shallow groundwater in the lower area, the vapor extraction wells were constructed horizontally by trenching. The lower area is a heterogeneous fill mixture of sand, gravel, and crushed stone. Drilling in the lower area was more time consuming than the upper area, but went smoothly regardless. The survey and the drilling program were completed within four weeks.

4.5 Trenching and Piping Activities

As drilling activities were nearing completion, RETEC field service crews were mobilized for staging activities and equipment deliveries. Due to the building demolition, a temporary storage trailer was used as a workshop and storage area for subsurface construction materials. Without the use of the garage building loading dock, an all terrain high lift fork truck was rented to facilitate rigging of construction materials.

Following well installation, the lower area concrete well vaults and steel covers were mounted. Soils were removed from around each well, and the location was prepared for placement of the concrete well box. High water from tidal periods occasionally saturated excavated work areas. Dewatering was not required since water levels were minimal, or receded within a few hours. Quick-dry premixed cement grout effectively sealed all bulkheaded well box connections, even while curing in standing water. Photographs of subsurface installation activities are presented in Figure 4-2.

Sparge distribution panels and the horizontal vapor extraction wells were installed next. Then, working from the northern portion of the lower site, sections of header trenches, piping, and conduit were installed. Each well point was connected to the header network, and each header was pressure tested before backfilling the trenches. All backfilled lines were flagged for a post construction survey. While the trenching activities worked southward toward the treatment building area, the concrete vaults (described in Section 4.0). The above were discovered through direct contact with a backhoe shovel.

In the same timeframe, it was decided to locate the new treatment building at the garage building location rather than the site of the warehouse building as initially designed. The garage location was on higher ground, and could better support a raised foundation. Header trenches were field redirected to avoid the concrete vaults. A buried yard drain line that crossed the intended path was skirted as well to connect with the new building location. Anticipating a potential system expansion, piping and conduit tie points were installed at the turning point and marked for later use.

National Electric Code (NEC) specifies a maximum of 360 degrees of conduit turns between pull boxes. The redirected piping trenches would have compromised this configuration, and the procurement of a junction box and manway would have delayed the program. The NEC allows for 12-inch depths for conduit, as opposed to the 36-inch depth used for piping freeze protection.

Remedy Construction

Upper Site - Well Network

Lower Area Installations

Given this, the conduit runs could continue in a southerly fashion, branched from the piping runs into a separate shallow trench. The yard drain line was of sufficient depth to allow the conduit corridor to cross directly over it. In this manner, the piping and electrical services entered at opposite ends of the treatment building.

The upper site area is not used for vehicular traffic. This allowed for the use of lighter well box hardware designed for foot traffic and moderate loads only. There are no powered treatment component devices in the upper area, so there were no conduit runs installed. Much of the upper area is sand, which made well box installations and trenched piping go quite smoothly. Where the lower area installations were completed in approximately five weeks, the upper area was completed in two.

Once the upper and lower site vapor extraction piping were integrated, a low point pumpout station was installed to manage condensate and uptake. All piping and conduits were then routed to the edge of the treatment building and stubbed for subsequent connections to the treatment plant. At this time , RETEC's field crew was demobilized until the construction of the new treatment building was completed.

4.6 Plant Construction

To trim installation costs for the plant, the procurement phase of the project focussed on modularizing construction. Most plant components were specified and purchased in skid mounted modules. Each skid contained a group of complementary components such as a tank, pump, mixer, and associated process control instrumentation. Each skid was shipped to the Site preassemble with all piping completed and wiring terminated at tie point junction boxes. By reducing the field connection points for both piping and electrical, installation costs were reduced.

In January 1995, following completion of the treatment building, the major plant components and skids were delivered to the Site by a local rigging subcontractor, Allco of Farmingdale, New York. The rigger unloaded the equipment and positioned the skids according to a chalked out floor plan. After securing all plant components to the concrete floor, electrical and plumbing contractors were mobilized for plant construction. After the completion of plumbing and electrical services, the Programmable Logic Controller (PLC) was installed and programmed by WRC Industrial Sales, McKeesport, Pennsylvania.

During plant construction, new gas and electric services were brought on-site by LILCO. As with all subcontractors, LILCO employees were required to attend a kickoff safety meeting and subsequent daily safety briefings. Off-limit work zones were delineated on a circulated site map and were flagged off in the field. Continuous air monitoring was done in work zones, and close supervision were given to LILCO employees during their duties. An additional service pole had to be installed to reach the new building. A 700-foot gas line was installed to the building for heating purposes, and for the plant's Thermal Oxidizer. The gas line was trenched along the eastern boundary of the Site, an area where no contamination was detected during previous Site investigations.

4.7 Plant Commissioning and Acceptance

Following construction, an extensive commissioning program was conducted on all of the operating components of the system. Major highlights of this program are provided in Section 3.3 above. The commissioning program was considered complete once the plant operated without manual interface, at design conditions, for 24 consecutive hours.

There were a series of minor items that affected continuous operation following testing of the control system. These items were managed through simple piping changes, or rewiring. The major obstacle for achieving closure of the commissioning program was the effluent water discharge system. The cartridge filter system installed was undersized for the particulate loading seen during operations. The back pressure on the discharge pump caused high-level alarm conditions in the effluent collection tank.

Much of the effluent skid was rebuilt to accommodate a backwashable sand filter, which was installed on the effluent pump discharge. Followed by the sand filter, an expanded cartridge filter system was added (two filter sets in parallel). Backwashing sequences were automated through the use of solenoid valves. The valves are intermittently activated by the plant control system during the "off" cycles of the effluent pump.

The installation and tuning of the automated sand filter added two weeks to the commissioning period. This configuration effectively managed the particulate loading, and the plant could operate as designed on a continuous basis. Following closure of commissioning, the plant entered into a 45-day Acceptance Period. The system met the Operations Commencement Date (as defined in the ROD) by completing the Acceptance Period without a major alarm condition shutdown.

4.8 System Expansion

The PPG and RETEC negotiated a remedy for site materials impacted by the newly discovered USTs and vaults with NYSDEC and the Nassau County Spills Group. The remedy included removal and offsite disposal of the USTs and their contents. It also specified dismantling the concrete vaults in place, and excavating and steam cleaning the concrete rubble. Impacted site materials at the former tank sites would be managed through an expansion of the sparging/vapor extraction components of the existing remedy. The expansion components are shown shaded in Figures 4-3 and 4-4.

After the system achieved the Operation Commencement Date (July 13, 1995), RETEC remobilized the construction team, and kicked off the system expansion. Construction of the expansion was completed in approximately four weeks. A two-week expansion testing period was conducted to ensure the added components were operating properly, and not interfering with existing operations.

The expansion area of the former warehouse building was approximately three feet lower in elevation to the rest of the lower site area, and is subject to frequent flooding. Vapor extraction components in this zone required the addition of flood detection and prevention instrumentation. A level switch station and an automated isolation valve were added to this area. The plant's control system shuts down the lower area component (sparge and vapor extraction) when water levels rise.

4.9 Site Paving

The last phase of construction was paving of the lower treatment area. This activity was delayed until the system expansion was installed and tested. The pavement acts as a vapor seal to prevent short circuiting of vapors from the atmosphere and further extend the radius of influence of the horizontal vapor extraction lines.

The approved design plans called for patching much of the existing paving at the Site. Much of the lower area paving, however, was damaged during demolition activities, or was removed during lower area trenching. The paving specification was modified such that the entire lower area was paved (not merely repaired). The paving area was prepared by regrading the site, and adjusting well box heights where necessary. Final uniform grading was achieved by covering

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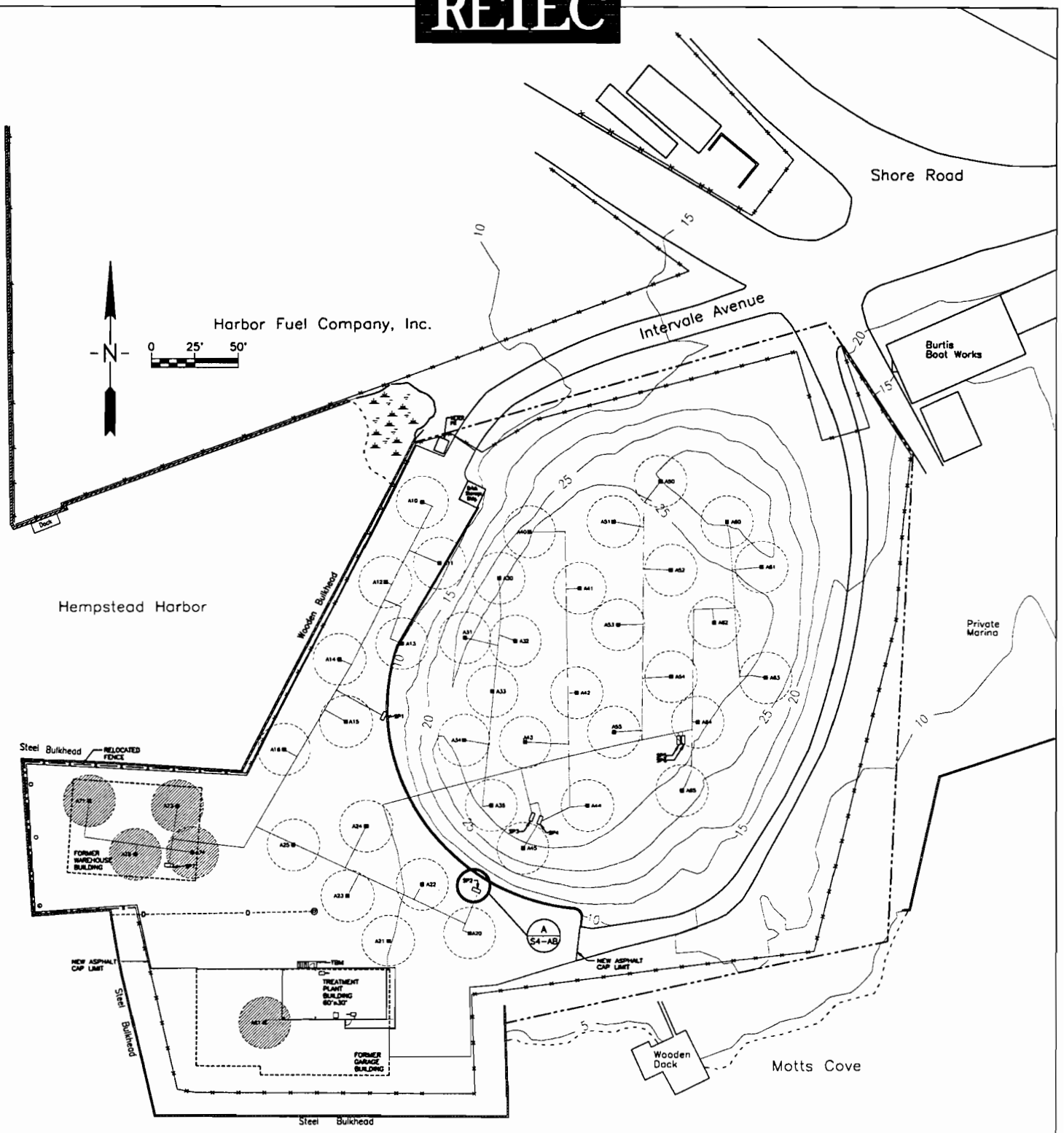

EXPANDED SPARGING SYSTEM

FIGURE
4-3
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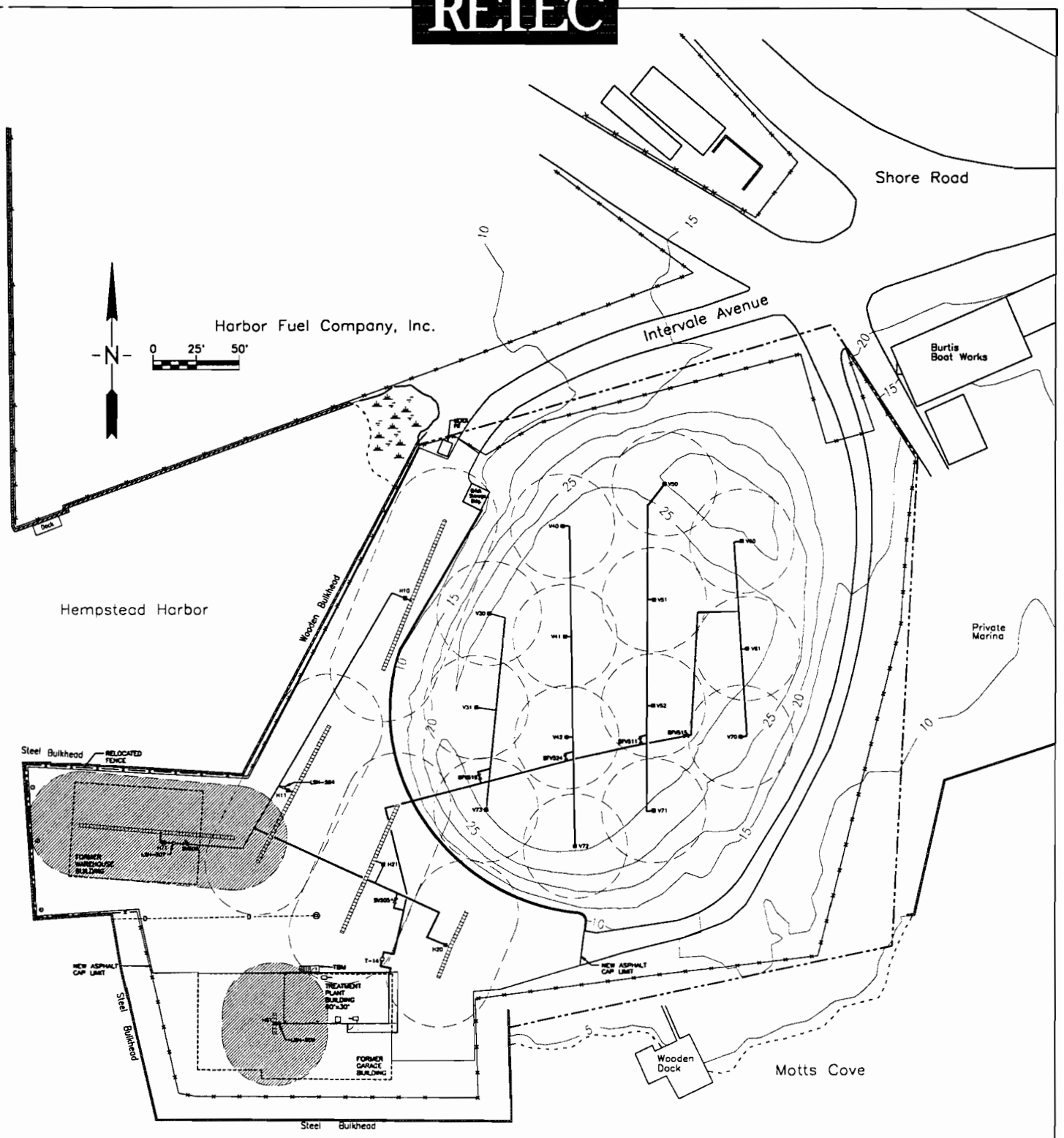


EXPANDED VAPOR EXTRACTION SYSTEM

FIGURE
4-4
1677AB01

the entire lower area with an RCA stone base material (both unpaved areas and patches of old asphalt). The installed asphalt was a Type 1A New York State road mix at a thickness of three inches. Photographs of the completed treatment plant and Site aerial are presented in Figure 4-5.

Post Construction - Operations

Treatment Plant Overview

Site Aerial

5.0 PROJECT INSPECTIONS

The construction contract between RETEC and the PPG specified three inspection milestones:

- Preliminary Equipment Inspection;
- Pre-Final Construction Inspection; and
- Final Construction Inspection.

Each of these inspection items is discussed below.

5.1 Preliminary Equipment Inspection

The PPG's Construction oversite coordinator (GTI) conducted a Preliminary Equipment Inspection of all major treatment plant components at the start of plant construction. Each component was reviewed for consistency with the 100% Design Plans and Division II Equipment Specifications. A written report was issued to the PPG on February 27, 1994 summarizing their findings.

The majority of the discrepancies identified during the inspection were a result of incomplete vendor shipments, improvements or additions to the 100% specifications, or inconsequential changes in motor horsepower or wiring. Some discrepancies identified were:

- missing lids on several polyethylene tanks;
- a missing ladder for inspection of T-03;
- changes in horsepower and voltage on several pumps in the plant;
- use of a pressure sensor on the air stripper instead of a flow sensor;
- regenerative blower instead of rotary lobe blower, horsepower change; and
- general arrangement modifications to thermal oxidizer skid.

Both GTI's report and RETEC's response are presented in Appendix A of this document. RETEC responded to all the outstanding items, ensuring that the 100% specifications were met (or exceeded) to the PPG's satisfaction.

5.2 Pre-Final Construction Inspection

The Pre-Final Construction Inspection was conducted by the PPG in March 1995. Mr. Lawrence Hudson of Texaco, and Mr. Stephen Hoelscher of Phillips Petroleum were present during the inspection. A list of items requested by the PPG were documented in a RETEC memo dated March 27, 1995 (see Appendix A). The PPG requested that RETEC address the following items:

- add sample ports to well pumps, stripper effluent;
- increase the line size on the sludge tank discharge;
- add a ladder to the sludge tank skid;
- add a sample port on the groundwater collection tank; and
- install a pressure relief on the effluent pump discharge.

RETEC addressed all these items to the PPG's satisfaction. Most of these items were completed during the inspection by the onsite construction team.

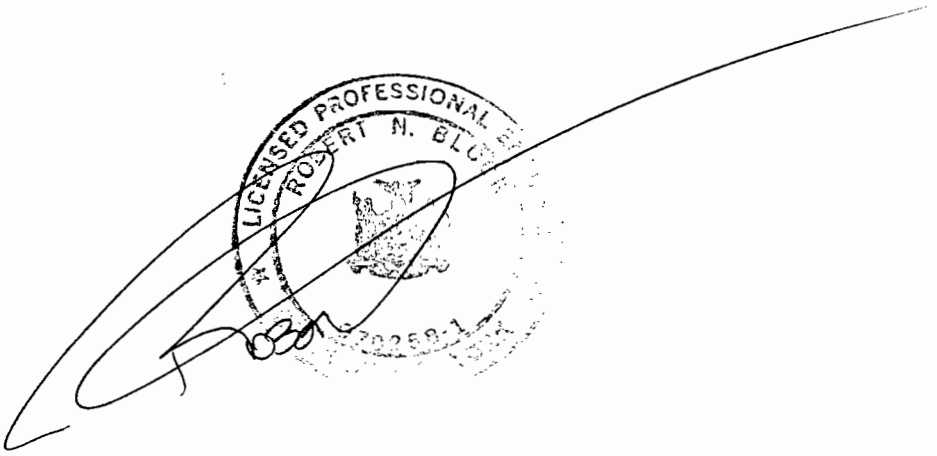
5.3 Final Construction Inspection

The Final Construction Inspection was conducted at a Site open house on September 20, 1995. In attendance were PPG Technical and Executive Committee members, NYSDEC and USEPA project coordinators, the North Hempstead Building Commission, and other agencies. Following the Site walk, both NYSDEC and the PPG gave their final approval of the implemented remedy.

6.0 CERTIFICATION THAT REMEDY IS OPERATIONAL AND FUNCTIONAL

It is hereby certified that the integrated remedial system for the Applied Environmental Services Site (a.k.a. Shore Realty) has been constructed in general conformance with the 100% design documents. The documents were prepared as specified in the Record of Decision (issued jointly by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) in June 1991), and were approved for construction by NYSDEC on March 29, 1994, after consultation with USEPA.

Furthermore, it is certified that the remedy is operating as designed within specified operating limits defined in the 100% design specifications. The remedy completed an initial testing period in which the system operated as designed for 45 consecutive days. Having completed this shakedown period, the system achieved the Operations Commencement Date on July 13, 1995 as defined in the Consent Judgement (lodged in June 1992).



Robert N. Block, P.E.
Project Principal

7.0 OPERATION AND MAINTENANCE

During the commissioning phase of the remedy construction, the PPG hired LandTech Remedial, Inc. as the Operations and Maintenance (O&M) contractor. LandTech's contracted scope of work is defined by the OM&M Plan (NYSDEC approved 12/95). RETEC was retained to manage the O&M of the site, and provide training and general oversite to LandTech. A training program was conducted during the commissioning phase of construction, and LandTech took over daily operations in June 1995.

The system was designed with the following operating and control philosophies:

- maintenance and plant data collection will be done on a weekly basis;
- the system is automated to operate without manual interface;
- the plant control system will shut down affected components of upset conditions;
- an auto-dialer informs operators of alarmed shutdowns in the plant; and
- the operators manually reset alarm conditions and restart the plant;

A typical week involves a single routine visit to collect plant data, restock chemicals, and perform maintenance tasks. Intermittent alarm conditions have historically occurred once or twice per week, and require several man-hours to respond appropriately.

The groundwater system accounts for most of the automated shutdowns at the plant. This is likely due to the following:

- the groundwater system accounts for ~75% of all the control points in the plant;
- iron is partially oxidized within the stripper and settles before the metals treatment system;
- particulate in metals treatment effluent impacts downstream filtration; and
- intermittent water from vapor extraction water collection overloads system.

Weekly maintenance of the air stripper has reduced the alarm conditions generated by this operation. Proper sequencing of filter backwash cycles and fine tuning of the metering systems will affect the frequency of shutdown events.

The lower site area is subject to frequent flooding during elevated high tides or moderate to heavy precipitation. Several low point level switches in the vapor extraction system interface

with shutoff valves to eliminate uptake of water during these events. Regardless, a brief surge of water will often exceed the pump out rate. High level switches in the vapor knockout occasionally trigger an automated shutdown. Tuning of the flood management and knockout system has been a recent focus of attention at the Site.

In addition to weekly collection of plant data, *in situ* performance data is collected through sampling and analysis and routine field measurements. On a monthly basis, dissolved oxygen level and pH are measured at selected monitoring locations across the Site. On a quarterly basis, a more extensive program is conducted. The quarterly testing includes groundwater sampling and analysis for microbial counts, BTEX and methylene chloride, and nutrient levels. Soil gas measurements are performed throughout the vapor extraction network, and at other select monitoring locations. A summary of the *in situ* monitoring program from the approved OM&M Plan is provided in Table 7-1.

TABLE 7-1

Summary of *In Situ* Performance Monitoring

Media	Parameter	Frequency		Criteria	Contingency Actions
		Startup	Long-Term		
Groundwater	Dissolved Oxygen (1)	Initial	Monthly for six months; frequency as required thereafter.	Concentration: 2-8 ppm Trend: increasing concentrations near sparging wells	Modify sparging/vapor extraction systems (flow rates, sequencing). Modify groundwater injection/recovery systems.
	Nutrients (nitrogen, phosphorus) (1)	Initial	Quarterly	Concentrations: N and P: 1 to 5 ppm Trend: increasing concentrations near injection trenches, then throughout the treatment zone.	Increase frequency of nutrient addition. Increase concentration of nutrients in formulation. Increase number of injection locations.
				Trend: increasing concentrations beyond 5 ppm design limit	Decrease frequency of nutrient addition. Decrease concentration of nutrient solution.
	pH (1)	Initial	Monthly for six months; frequency as required thereafter.	6.0 to 8.0 Trend: no consistent increase or decrease during monitoring	Increase buffering capacity of injected water.
	Microbial Populations	Monthly	Quarterly for first year; Semi-annually thereafter.	Total and VOC-degrading populations > 100 CFU/ml Trends: steady or increasing populations; significant proportion of total population is VOC-degraders	Modify process conditions as above (DO, nutrients, pH).
	BTEX and Methylene Chloride	Monthly	Quarterly	Overall trend toward decrease in concentrations	Modify sparging, vapor extraction and/or groundwater pumping rates (Flow rates, sequencing). Modify process conditions (DO, nutrients, pH).
Soil	Microbial Populations	Initial	Annually	Total and VOC-degrading populations > 100 CFU/g Trends: steady or increasing populations; significant proportion of total population is VOC-degraders	Modify process conditions as above (DO, nutrients, pH).
	Microbial Activity (lab biological assay)	None	As necessary	Measurable uptake of oxygen and degradation of constituents of interest (BTEX)	Modify process conditions as above (DO, nutrients, pH).
	Soil Gas	Initial	Quarterly	Trends: decreasing PID readings, Benzene and Methylene Chloride concentrations by Draeger tube. Annual analysis of charcoal tube samples	Modify sparging and vapor extraction pumping rates (flow rates, sequencing).

NOTE: Groundwater monitoring will be conducted at existing SW-1, SW-2, SW-3, SW-4, SW-5, SW-6 and at proposed locations in the treatment area.
Soil sampling will be performed at same approximate locations during each sampling event.
(1) Monthly monitoring for the first year and quarterly or semi-annually, thereafter.

APPENDIX A

SYSTEM SUPPORTING DOCUMENTS

GROUNDWATER TECHNOLOGY ®

Groundwater Technology, Inc.
101-1 Colin Drive, Holbrook, NY 11741 USA
Tel: (516) 472-4000 Fax: (516) 472-4077

REMEDIAL SYSTEM EQUIPMENT EVALUATION
SHORE REALTY SITE
GLENWOOD LANDING, NEW YORK

February 27, 1994

prepared for:

Performing Parties Group
Glenwood Landing Superfund Site

Written/Submitted by
GROUNDWATER TECHNOLOGY, INC.

Mark S. Sowa
Staff Engineer

Reviewed by
GROUNDWATER TECHNOLOGY, INC.

Brock Lownes
Project Manager

TABLE OF CONTENTS

1.0 INTRODUCTION

Groundwater Technology, Inc. (GTI) has been contracted to evaluate the remediation system equipment installed at the Shore Realty Site in Glenwood Landing to determine if it complies with the engineering design drawings (Piping and Instrumentation Diagrams(P&ID); P2-1, P3-1, P4-1, 10/24/94) and the system specifications (Retec, "Construction and Equipment Specifications", March 1994). On January 26 and 27, 1995 GTI personnel performed a site inspection at the facility. GTI personnel witnessed the placement of the remediation system equipment under the supervision of Retec personnel. The placement of the equipment was completed in one (1) day and, at the time of the inspection, no piping or electrical connections to the equipment had been completed.

The majority of the equipment was delivered mounted with its associated components on preconstructed skids. The equipment skids (or major components) installed included:

- the soil vapor extraction blower and thermal oxidizer;
- the air sparging air compressor and receiver tank;
- the caustic, cationic, and anionic mixers;
- the sludge thickener;
- the $KMnO_4$ mixer;
- the nutrient mixer and storage tank;
- the gravity settling and decant tanks;
- the feed holding tank;
- and the low profile air stripper.

All components are located inside the equipment building except for the feed holding tank.

2.0 REMEDIATION SYSTEM EQUIPMENT

The installed equipment (as of 1/27/95) is listed below including comments related to the engineering design drawings and the equipment specifications. If there are no comments listed for a component, then there were no noted exceptions from the design. Note that the "Equipment Specifications" appendix to the 100% Design specifications lists equipment from the "90% Design". In follow up conversations with Retec, GTI was informed that these were the most current specifications. Also, information regarding all major components was not included in the specifications. In those cases, only the design drawings have been used for the evaluation. The equipment designations in this section (i.e. T-07) refer to the designations shown on the P&ID drawings.

2.1 T-07, $KMnO_4$ Mix Tank

The tank and associated equipment are mounted on a skid measuring 5'-0" x 5'-6". The major equipment includes:

- Tank
  Size: 360 gallon
  Dim: 48" Dia x 48" high
  Material: HDPE
- P-09, Metering Pumps (3 on skid)
  Model: Pulsatron Series E Plus
  Max. Flow: 240 GPD
  Max. Press: 35 PSI
- M-04, Mixer
  Sharpe Mixer Model D-050
  Motor: Reliance Electric Model S-2000
  1/2 HP, TEFC, 1Ph, 1725 RPM

Additional exceptions to the design:

- the specifications call for a hinged lid to be included with the tank.

2.0 REMEDIATION SYSTEM EQUIPMENT

The installed equipment (as of 1/27/95) is listed below including comments related to the engineering design drawings and the equipment specifications. If there are no comments listed for a component, then there were no noted exceptions from the design. Note that the "Equipment Specifications" appendix to the 100% Design specifications lists equipment from the "90% Design". In follow up conversations with Retec, GTI was informed that these were the most current specifications. Also, information regarding all major components was not included in the specifications. In those cases, only the design drawings have been used for the evaluation. The equipment designations in this section (i.e. T-07) refer to the designations shown on the P&ID drawings.

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  Material: HDPE
- P-09, Metering Pumps (3 on skid)
  Model: Pulsatron Series E Plus
  Max. Flow: 240 GPD
  Max. Press: 35 PSI
- M-04, Mixer
  Sharpe Mixer Model D-050
  Motor: Reliance Electric Model S-2000
  1/2 HP, TEFC, 1Ph, 1725 RPM

Additional exceptions to the design:

- the specifications call for a hinged lid to be included with the tank.

2.2 T-03, Gravity Settling Tank/T-09 Decant Tank

The tanks and associated equipment are mounted on a skid measuring 90" x 120". The major equipment includes:

- T-03, Tank
  Size: Estimated 1600 gallons
  Dim: Cyl. 88" Dia x 56" High, Cone 88" - 12" Dia x 20", Domed top Approx 24" High
  Material: HDPE
  The tank differs from the design by having 4 draw-off points at varied levels.
- T-09, Tank
  Size: 150 gallons
  Dim: 32" Dia x 48" High

Material: HDPE

- P-17, Pump
  Grundfos Model EP100
  Motor: 0.5 HP (Varies for 1.5 HP in design), TEFC, 1 Ph, 230 V.
- P-05, Waste Sludge Pump
  Wilden Pump & Engineering, Colton, CA. Model 104348
  Double Diaphragm

Additional exceptions from design:

- the tank was specified to be carbon steel;
- the tank in not equipped with access ladder or manways as specified.

2.3 T-04, Nutrient Mix Tank/T-06, Nutrient Storage Tank

The tanks and associated equipment are mounted on a skid measuring 5'-6" x 10'-0". The major equipment includes:

- T-04, Nutrient Mix Tank
  Size: 150 gallons
  Dim: 32" Dia x 48" High
  Material: HDPE
- M-05, Mixer
  Sharpe Mixer Model D-050
  Motor: Reliance Electric Model S-2000
  1/2 HP, TEFC, 1Ph, 1725 RPM
- P-11, Nutrient Addition Pump
  Grundfos Model CR2-30
  Motor: 0.75 HP (Varies for 1.5 HP in design), TEFC, 1 Ph, 230 V.
- T-06, Nutrient Storage Tank
  Size: 360 gallons
  Dim: 48"Dia x 48" High
  Material: HDPE
- P-10, Water Effluent Pump
  Grundfos Model CR4-30
  Motor: 1.5 HP, TEFC, 1PH, 230V

Addtional exceptions to the design:

- the specifications call for a hinged lid to be included with the tank.

2.4 T-02 (M-01, M-02, M-03, A-01), Caustic, Cationic, Anionic Mixers and Sludge Thickener

The mixers are combined in one unit with internal partitions and the sludge thickener is a separate unit hard-piped to the mixers. The units and associated equipment are free standing on integral steel supports.

- T-02, Tank(s)
  The unit actually consists of two (2) separate tanks manufactured by Great Lakes Environmental
- M-01, Caustic Rapid Mixer and M-02, Cationic Rapid Mixer
  Lightning Duramix

Motor: Model R77R3045R-3, 0.3 HP, TEFC, 3 PH, 230 V **(Varies from 1 PH in design)**

- M-03, Anionic Slow Mixer
  Lightning Mixers and Aerators Model XJ-33SCR
  Motor: 1/3 HP, TEFC, 1 PH, 90 V
- A-01, Sludge Thickener
  MaxiTorq Split Phase Gearmotor Model 6Z389
  Motor: 1/4 HP, 1 PH, 115 V
  Maximum Torque: 1087 in-lb
- P-04, Settled Sludge Pump
  ARO Double Diaphragm Pump Model 666IA3-322

2.5 AS-01, Air Stripper

The air stripper, the blower, and the discharge pump are mounted on a common skid. The major equipment includes:

- AS-01, Air Stripper
  Type: Low profile air stripper, 4 trays
  Remedial Systems, Inc. Model RTS-25-4
- B-1, Air Stripper Blower
  American Fan Model 10A
  Motor: Manufactured by Baldor, 1.5 HP, TEFC, 1 PH, 230 V **(Varies from 2 HP, 3 PH in design)**
- P-03, Stripper Drain Pump
  Gould Model 1ST1C4F3
  Motor: Franklin Electric Model 1113910406, 0.5 HP, TEFC, 230 V, 1 PH, 3450 RPM **(Varies from 1.5 HP, 3 PH in design)**

Additional exceptions from design:

- a pressure sensor has been substituted for the blower flow sensor (FSL 212).

2.6 T-01, Feed Holding Tank

The tank and associated equipment are mounted on a common skid. The major equipment includes:

- Tank
  Size: 360 gallon
  Dim: 48" Dia x 48" high
  Material: HDPE
- P-02, Feed Water Pump
  Grundfos Model CR2-30
  Motor: 0.75 HP, TEFC, 1PH, 230 V **(Varies from 1.5 HP, 3 PH in design)**

2.7 Soil Vapor Extraction(SVE)/Thermal Oxidation Equipment

The SVE blower, thermal oxidation system, and associated equipment are mounted on a common skid measuring 18'-0" x 8'-0". The major equipment includes:

- B-02 (Drawing P4-1, there are two B-02 designations in the design), Primary SVE Blower

Lamson Turbotron Model TBS10RA25TCB45
Motor: Toshiba International Corp Model B0252FLG3UM, 25 HP, TEFC, 230/460 V, 3515 RPM, 3 PH **(Varies from 20 HP in design)**

- B-03, Booster Blower
  Manufacturer could not be determined by inspection (blower repainted)
  Motor: 7.5 HP, TEFC, 230/460, 3500 RPM (Direct Coupled to Blower), 3 PH **(Varies from 7 HP in design)**
- Air Compressor
  The system has pneumatic controls and an air compressor is included on the skid.
- TO-01, Thermal Oxidizer Unit
  Component specifications could not be determined by equipment inspection.

Additional exceptions to the design:

- the specifications call for a rotary lobe blower to be used for SVE;
- the dilution valve immediately proceeding blower B-02 has both manual and automatic controls;
- an inlet silencer is installed on the intake to the dilution valve;
- there are two additional solenoid valves on the influent lines to the two blower which are not shown on the design drawings.

2.8 B-02 (Drawing P6-0), Air Sparging Air Compressor

- Manufactured by Atlas, Rotary Screw Type Compressor
  Motor: 75 HP, 460 V
- Receiver Tank/Air Receiver
  Estimated Volume 350 - 400 gallons.

3.0 EQUIPMENT EVALUATION AND RECOMMENDATIONS

The remediation system component are in general conformance with the engineering design with only minor variations and should be capable of meeting the performance requirements. Presented below is a list of discrepancies between the design and the installed equipment, and recommendations regarding the equipment.

- Several of the pumps installed have motors below the size specified in the design and it should be verified during initial testing that the system has the capability to maintain the design flow rate at the operating pressure.
- It should be verified that the SVE blower can maintain the design flow rate at the operating vacuum and pressure requirements. Based on evaluation of the Turbotron blower performance curve, the blower would require a brake horsepower of approximately 20 HP to maintain 600 scfm at 100 inches of water column differential (vacuum plus pressure) pressure as designed.
- Based on the location of the automatic valves on the SVE system, it appears that the thermal oxidizer controls can automatically close the SVE influent lines. This should be adequately interlocked to the air sparging system if the generation and/or mobilization of vapors is a concern.
- The air flow rate of the air stripper blower should be confirmed under operating conditions. Based on the configuration of the unit, it did not appear that the manufacturer planned to have the blower's intake ducted to the outside. The additional flow resistance from the duct-work may result in lower performance.

RETEC

MEMORANDUM

TO: Shore Realty PPG **DATE:** March 14, 1995

FROM: Steve McInerney **SUBJECT:** GTI Evaluation of System Hardware, RETEC Invoice #11940262

In response to GTI's "Remedial System Equipment Evaluation" dated 2/27/95, it is important first to note that all **Minor** hardware studied during this evaluation is outside the scope of Change Order #11, and is therefore not included in RETEC Invoice #11940262. The scope of Change Order #11 (and the subject invoice) is limited to the **Major** Hardware which includes the Thermox Unit, the Air Stripper, the Metals Treatment System, and the Air Sparging Compressor.

Specific responses to comments are presented according to GTI's report numbering, and are segregated by Minor and Major equipment categories for clarity.

Minor Equipment

General Notes: All motors (except those within the Thermox system or the Compressor unit) were purchased as single phase units. In some instances, this may be a change from the 100% drawings. Though the wiring of these units may have been changed to simplify the control system, the performance specs were not altered.

Sect 2.1 The hinged lid blew off on route to the site and has since been replaced by the vendor.

Sect 2.2 The four draw off points were an upgrade following the 100% design, it allows for further concentration of product sludges.

The 100% design specs for T-03 were apparently not updated to reflect the change in materials of construction to HDPE as was done on the P&IDs. Translucent HDPE allows for manual decantation of product to reduce waste volumes.

The need for a manway or ladder can be reviewed during the upcoming PPG plant inspection.

Tank T-09 was not included in the 100% design package, and was an upgrade to plant hardware at no cost to the PPG.

Sect 2.3 All motor horsepowers were estimated at the 100% design level so as to develop a worst case electrical loading for electrical service installation. If any pump or

blower does not meet required "performance" levels, RETEC will replace or upgrade them.

This lid also blew off, and has subsequently been replaced.

Sect 2.4 All 3 phase motors have since been replaced by the manufacturers per "General Notes" above.

Sect 2.6 See horsepower comment from Sect 2.3.

See single phase comments in "General Notes" above.

Major Equipment

Sect. 2.4 See single phase comments in "General Notes" above.

Sect 2.5 See horsepower comment from Sect 2.3.

See single phase comments in "General Notes" above.

FSL-212 was not included in the 100% design package, and was an upgrade to plant hardware at no cost to the PPG. We will add the designation PSL-212 to the "as-built" drawings.

Sect 2.7 See horsepower comment from Sect 2.3.

The booster blower was not included in the 100% design package, and was an upgrade to plant hardware at no cost to the PPG.

The change from a rotary lobe to a regenerative type blower for the SVE application will have no performance implications, and is safer for hydrocarbon laden vapors.

The additional control hardware and dilution stream silencer were not included in the 100% design package, and are an upgrade to plant hardware at no cost to the PPG.

Sect 3.0 See horsepower comment from Sect 2.3.

The addition of the booster blower eliminates the discharge head requirement of the SVE blower. On-line performance evaluations will be based on this multi-blower system.

There are appropriate interlocks programmed between the Compressor and Thermox system.

Ducting to the outside (for both the stripper fan and the compressor) is a potential recommendation that RETEC may make to the PPG to save on building heating costs. Outside ducting is not currently within our scope of work.

If there are any questions or comments regarding the above, please do not hesitate to call. We are looking forward to meeting with the technical committee next week, and will address any additional concerns that may arise during the plant inspection.

SJM\tat

File 1-1677-640\SJM\GTIEval.005

REIEC

MEMORANDUM

TO:	Shore Realty PPG	**DATE:**	March 27, 1995
FROM:	Steve McInerney	**RE:**	Initial PPG Plant Inspection, Updated Project Schedule

Initial Plant Inspection -

As a follow-up to the recent plant inspection, a list of changes and additions requested by the PPG is provided below for review. Please let us know if we omitted anything, or if there are any subsequent requests. We will address these items in the next few weeks prior to commissioning.

Sample Ports - additional sample taps will be added at the well pump discharges, and the stripper effluent

Sludge Piping - a larger pipe run was routed for the sludge thickener bottoms, a tap for an air lance was also included

Sludge Tank Ladder - a ladder will be secured to the skid allowing for inspection and washdown of the vessel from the top handway

T-01 Product Sampling - a capped nozzle will be provided in the tank cover, allowing for sample collection and product thickness determination

Pressure Relief - a safety relief device will be tee'd into P-10's discharge, the relief stream will be piped back to T-06

Updated Project Schedule -

An updated project schedule is attached for review. The upcoming project milestones of note are commissioning, paving, and the start of the acceptance period.

We expect to finish all electrical connections by April 14. Given this, our target date to begin commissioning is Monday, April 17. Commissioning will be a two to three week programs which will be dedicated to testing and debugging the system (a brief startup plan will be published shortly), and training the O&M contractor. The operator(s) should be available on a full time basis for the length of the commissioning program.

We tentatively expect to begin paving the lower site area on May 1. Prior to doing so, two outstanding issues must be addressed. First of all, the stockpile of material from GTI's tank pull is within the limits of our paving boundaries, and must be moved. Secondly, the plan for closure of the concrete vaults and management of their contents must be finalized and implemented.

According to the attached schedule, the acceptance period will begin in early May. Prior to taking the plant to full operation, the initial site monitoring program is to be implemented to provide a "pre-operation" site baseline for subsurface conditions. Contingent upon NYSDEC's acceptance of the OM&M Manual, we should plan on implementing this program by the end of April.

As a final note, the attached schedule does not include an allowance for construction of the system expansion plan. Draft system expansion drawings have been published, and RETEC would be happy to conduct a joint review session. Should the PPG decide to implement the expansion, timely completion of design package will help speed up implementation.

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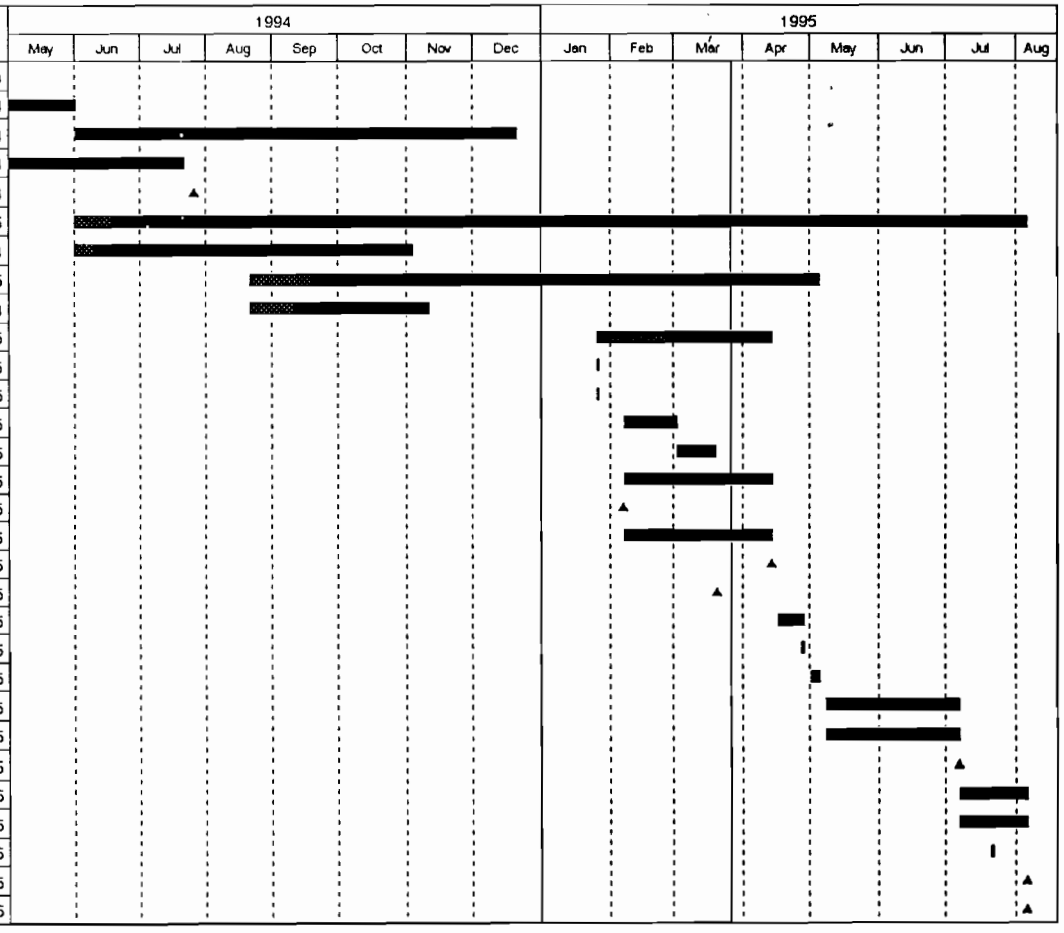
Figure 1

Project Update Schedule

Shore Realty Superfund Site

Task Name	Start Date	End Date
Remedial Design	28-Jan-94	31-Mar-94
Decommissory/Demolition Activit	15-Jan-94	2-Jun-94
Building Inspection/Refurbish	2-Jun-94	21-Dec-94
Contract Negotiations	31-Mar-94	22-Jul-94
Notice to Proceed (Start)	27-Jul-94	27-Jul-94
Remedial Action Activities	1-Jun-94	6-Aug-95
Pre-Construction	1-Jun-94	4-Nov-94
Construction Acitivities	22-Aug-94	5-May-95
Field Activities	22-Aug-94	11-Nov-94
Treatment System Construction	26-Jan-95	14-Apr-95
Rigging (Start)	26-Jan-95	27-Jan-95
Footing	26-Jan-95	27-Jan-95
Utility Installations	7-Feb-95	3-Mar-95
Piping	3-Mar-95	20-Mar-95
Electrical	7-Feb-95	14-Apr-95
Electrical Start	7-Feb-95	7-Feb-95
Electric Activities	7-Feb-95	14-Apr-95
Electric Complete	14-Apr-95	14-Apr-95
Pre-Final Inspection	21-Mar-95	21-Mar-95
Commissioning	17-Apr-95	28-Apr-95
Final Inspection	27-Apr-95	28-Apr-95
Paving	1-May-95	5-May-95
Acceptance Period	8-May-95	7-Jul-95
Operation (Start)	8-May-95	7-Jul-95
Operation Commencement Date	7-Jul-95	7-Jul-95
PPG Acceptance & Approval	7-Jul-95	6-Aug-95
Submit & Accept Testing Data	7-Jul-95	6-Aug-95
Final Inspection	21-Jul-95	22-Jul-95
PPG Approval	6-Aug-95	6-Aug-95
Contract Closeout	6-Aug-95	6-Aug-95



REIEC

FAX TRANSMITTAL SHEET

9 Pond Lane
Concord, MA 01742
(508) 371-1422
FAX (508) 369-9279

Date	July 14, 1995
Charge No/Project No	1-1677.800
Send to FAX No	Steve Hoelscher 918.661.5664 Larry Hudson 914.838.7124 Mark Brush 412.642.3318 Robin Einbinder 212.527.1680
From	Steve McInerney/Rob Block

Shore Realty Performing Parties Group

We are pleased to report that as of Thursday, July 13, the remediation system at the Shore Realty site has operated continuously for 45 days as designed. Therefore, we have completed the Acceptance Testing specified in our contract and have achieved Operations Commencement Date as specified in the Consent Decree.

We will continue to be on site in the next week as we complete system expansion. If you have any questions or need additional information, please call us.

Rob Block

C:\RNB\SHORE\OCDNOTE.MEM

If you have any problems receiving this FAX, please call (508) 371-1422 as soon as possible.

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-7010

Langdon Marsh
Acting Commissioner

March 28, 1994

Mr. Tuss Erickson
Phillips Petroleum Company
Health, Environmental and Safety
13D1 Phillips Building
Bartlesville, Oklahoma 74004

Mr. Gary D. Meyer
Staff Environmental Geologist
Texaco, Inc.
Environmental Affairs
P.O. Box 509
Beacon, New York 12508

Gentlemen:

RE: Shore Realty Site (Applied Environmental Services)
Site #1-30-006

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the Shore Realty Site 100% Design Documents. The NYSDEC had only one comment regarding Cathodic Protection-Passive, Section 02655. This concern was addressed immediately by RETEC.

The NYSDEC hereby approves the 100% Design Documents. Please forward final copies signed and sealed by a Professional Engineer licensed in New York State.

As the Remedial Design is now completed, I will be formally turning the project over to Mr. John Grathwol in the Bureau of Construction Services. Mr. Grathwol will be the project manager for the construction (remedial action) phase. He may be reached at (518) 457-9280. I will schedule a conference call in the near future to introduce Mr. Grathwol.

If you have any questions regarding this matter, please contact me at (518) 457-1708.

Sincerely,

Jeffrey E. Trad, P.E.
Project Manager
Eastern Projects Manager
Bureau of Eastern Remedial Action
Div. of Hazardous Waste Remediation

cc: J. Grathwol
S. McInerney

RETEC

MEMORANDUM

TO:	Shore Realty PPG	**DATE:**	May 26, 1995
FROM:	Steve McInerney	**RE:**	Close of Commissioning, Start of Acceptance Period

As of 9:00 pm Thursday (11/25/95), the commissioning program for the treatment plant has been completed. At this writing, the unit remains fully operational with 42 hour of continuous duty, having treated roughly 25,000 gallons of water and over 2 million cubic feet of contaminated gases. The feed gases are at roughly 6% LEL, and the Thermox unit is using little or no makeup fuel gas.

The metals treatment system is currently removing approximately 95% of the iron in the air stripper effluent, discharging at about 1.5 ppm of total iron. A portion of the effluent iron concentration is a fine suspension which is impacting the discharge filters. Earlier this week, the filter buildup was affecting our discharge flowrates and shutting the plant down on level alarms. We have since added a backwashable sand filter upstream of the original filters, and now have a much more operable system.

With some additional run data, we will be able to determine the required backwashing frequency, and will consider automating the backwash if appropriate. We will also consider making changes to the original filtration equipment, or eliminate it entirely.

As of 9:00 pm Thursday, we have entered the 45 day Acceptance Period, and plan to continue to operate through the long weekend with the existing three filter system. If the lack of a backwash during the three day period shuts the plant down, we will reconfigure this portion of the plant for auto-backwash, and re-start the 45 Acceptance Period next week.

Next week we plan to complete training of Landtech technicians, and transfer day to day operating responsibilities by weeks end. By meeting time the following week, (w/o 6/9/95) we will have completed a report detailing the results of testing during the commissioning program for the PPG's review.

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