Phase 2 Work Plan Addendum

for

Naval Weapons Industrial Reserve Plant

Bethpage, New York

Northern Division Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Contract Task Order 0089

November 1992

HALLIBURTON NUS
Environmental Corporation

DEPARTMENT OF THE NAVY
NORTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
10 INDUSTRIAL HIGHWAY
MAIL STOP, #82
LESTER, PA 19113-2090

IN REPLY REFER TO
5090
Ser 1769/1821/FK
NOV 30 1992

MEMORANDUM

FOR THE MEMBERS OF THE TECHNICAL REVIEW COMMITTEE (TRC) FOR INSTALLATION RESTORATION PROGRAM AT NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP) BETHPAGE, NEW YORK

We are pleased to submit a copy of the U.S. Navy's Final Phase 2 Work Plan Addendum for NWIRP Bethpage, New York to your office. This addendum has incorporated all appropriate comments which were forwarded to this office during the comment period for the TRC.

If there are any major problems or concerns to the Navy's response to your individual comments, they may be addressed at the next TRC meeting.

If you have any questions or require additional information, please call myself or Mr. Jack Dunleavy at (215) 595-0567.

Sincerely,

Frank Klanchar

FRANK KLANCHAR
Remedial Project Manager
By direction of the Commanding Officer

Distribution:
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NYSDEC, John Barnes/Henry Wilkie
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Navy Comments:

1. Comment: Page 1-1: Include another bullet stating the objective of the groundwater flow model: "To determine flow conditions at and adjacent to the NWIRP site".

   Response: The following statement will be added to Sections 1.0 and 3.0. "Determine flow conditions at and adjacent to the NWIRP site."

2. Comment: Pages 3-2 and 3-4: Please assure the final work plan includes pages 3-2 and 3-4 as they were inadvertently omitted from some of the draft submissions.

   Response: These pages will be included.

3. Comment: Page 3-2: Revise the number of samples and rationale for Site #3 soils to include three soil samples taken from the intermediate wells located near HN-24I at the 140', 150', and 160' depth.

   Response: This section will be revised to add six field samples obtained at these depths plus QA/QC samples.

4. Comment: Page 3-4: Revise 5th bullet to become more flexible based on computer molding; state that the wells may either be located upgradient and/or downgradient of well HN-24I.

   Response: This statement will be added to several locations in Section 3.0.

5. Comment: Page 4-5: Based on our discussions of 12 Nov. 92, include a temporary well location at Site #1 that will be also used during the pump tests.

   Response: This well will be added. Please note that similar statements will be added to Section 3.0 as well.

6. Comment: Page 4-5: Include a separate graphic depicting possible locations of permanent monitoring well locations both on-site and off-site. State in the narrative on Page 4-5 that these locations are tentative. Also, state the approximate direction and distance for the on-site wells from HN-24I.

   Response: Figure 4-3 will be added to the report to indicate tentative locations for the new permanent monitoring wells. Also, the location of the new wells near HN-24I and the approximate distance of 100 to 300 feet will be referenced.

7. Comment: Figure 4-2: Replace Figure 4-2 with the revised Figure indicating the seventeen (17) potential locations of temporary off-site wells. Revise the figure to reflect comment #3. Describe in the narrative on page 4-5 why these locations were selected.

   Response: Figure 4-2 will be revised accordingly. Additional text has been added to Section 4.0 describing the rationale for the placement of the offsite wells.

8. Comment: The Navy does not believe that the current scope of work needs to have a contingency plan to address additional fieldwork if the stated purpose/goals of the proposed investigation are not achieved. If it is determined over the next few months that the objectives are not met, we may perform an interim study specific to the data gap. However, our position is that we will continue to proceed into the feasibility study.

   Response: As discussed, a new section (Section 3.3) will be added to the report to discuss potential future actions.

NYSDEC Comments:

1. Comment: The Plant 3 study scope of work needs to be more flexible as discussed in the 10/28/92 TRC meeting. The concept of conducting a soil gas underneath the plant was a good suggestion.

   Response: A new section (Section 3.3) has been added to the report, which presents potential future actions. Currently there is insufficient evidence of contamination at this location to justify this level of intrusive activities. However, such an activity may be required in the near future if this area is identified as a potential source area. These additional activities would be performed so as not to interfere with the FS and ROD schedule.

2. Comment: Page 2-3, 5th bullet: As stated during the recent TRC meeting, there are now five (5) theories concerning the source of the TCE contamination observed at well HN-24I:

   1 - Hooker/RUCO
   2 - Site #1, NWIRP site
   3 - GAC plants to the north of the NWIRP site
   4 - Areas south of the LIRR tracks
   5 - Former coal storage area (vicinity of HN-24)

   In my opinion, theories 1-3 and 5 are the most reasonable. Therefore, any efforts to determine the source of the contamination at HN-24I (if possible) should be concentrated on the reasonable theories that have been offered. Two intermediate wells which have been proposed here should be installed in areas which are upgradient of HN-24I.

   In addition, how far from HN-24I will these two new wells be installed?

   Response: Pending the preliminary results of the computer modeling, the Navy would like to keep both the upgradient and downgradient options open. The text in the work plan has been revised to reflect the potential use of both wells in hydraulically upgradient locations.

   In general the two monitoring wells near HN-24I will be installed 100 to 300 feet away from it.

3. Comment: Page 4-5 and Figure 4-2: It states in the first paragraph on page 4-5 that eight pre-determined temporary monitory well locations have been established. On Figure 4-2, ten such locations are shown. This inconsistency needs to be corrected.

   Response: This figure has been revised to illustrate the location of 18 potential temporary monitoring well locations, because of the need to obtain utilities clearances. Overall 13 temporary monitoring wells are planned, however, based on the results of the groundwater testing, more or less wells may be installed. The exact location and number of the opportunity locations will be determined during the field activities.

4. Comment: HNUS should consider what site specific soil parameters they will need in order to evaluate soil clean-up alternatives (e.g. - TOC in soil), and add these parameters to their list of analytes.

   Response: This data has already been collected during the Phase 1 RI. The data is presented in the Appendix of the Phase 1 RI report.

5. Comment: The Department's specific comments concerning the pump test will follow in a separate letter which will be issued following the 10/11/92 conference call with HNUS staff.

   Response: As per conference call on November 10, 1992, no additional comments from the State are expected. Two actions items from this meeting are: 1) HALLIBURTON NUS will prepare a detailed field plan prior to the pump tests; and 2) the conduct of a third pump test involving Production Wells nearest Hooker/RUCO will be considered this spring.

6. Comment: Computer modeling: As suggested during the 10/28/92 TRC meeting, HNUS staff should meet with the USGS staff to discuss the USGS/NCHD modelling efforts in the Bethpage area. After this meeting is held, a conference call (or a full TRC meeting) between the Navy, HNUS, and the DEC and NYSDOH should be held in an attempt to determine how the modelling efforts should be handled.

   Response: The planned approach with the computer modeling is for HALLIBURTON NUS to discuss the USGS/NCHD modeling efforts with them in December. HALLIBURTON NUS will continue with its current modeling efforts and prepare for a TRC meeting in February 1993 to discuss the model results.

7. Comment: A task-by-task schedule for the FS must be incorporated into the work plan. Tentative TRC meeting dates and a list of deliverables to the TRC (as well as tentative deliverable dates) should be incorporated into this schedule.

   Response: Scheduling will be addressed in a separate letter from the Navy to NYSDEC. The work plan will be revised to indicate that the FS will be issued in sections to allow for TRC interactions during the preparation.

8. Comment: Additional wells to those proposed may be needed to better define the plume in order to design a pump-and-treat system(s). Installation of these wells (if necessary) can be deferred to the design stage (post ROD).

   Response: The Navy concurs. A discussion on the potential need for additional wells has been added to a new section (Section 3.0).

Grumman/Geraghty & Miller Comments:

1. Comment: The stated purpose of the Phase II investigation should include defining the complete nature and extent (both horizontal and vertical) of contamination attributable to the Naval facility. In addition, determining flow conditions at and adjacent to the site should be included as a Phase II investigation goal.

   Response: The purpose of the Phase 2 investigation is to define the nature and extent of contamination. The objective of determining flow conditions at and adjacent to the site will be added to the work plan.

2. Comment: The work plan lacks a discussion of additional steps that will be considered and/or taken by the Navy if the stated purpose/goals of the proposed investigation are not achieved. A contingency plan, included as an appendix to the work plan, is suggested as one possible way of responding to this comment.

   Response: A new section (Section 3.3) has been added to the report to discuss potential additional actions at the site.

3. Comment: The installation and sampling of deep (400 to 550 ft), off-site wells is not proposed. Since on-site contamination is documented to exist at depths of 300 to 500 ft below land surface, deep wells are needed to determine the off-site extent of this contamination (see also next comment).

   Response: The Navy also believes that based on the complexity of the groundwater flow patterns at the site, it is premature to install 300 to 500 feet deep monitoring wells without an understanding of potential locations of groundwater contamination. This understanding is expected to be achieved through computer modeling efforts. If required, additional monitoring wells would be installed.

4. Comment: Given the complexity of the ground-water flow patterns beneath the site, the variable nature of past and present site conditions (e.g., number, depth, and location of production wells, pumping and recharge rates, etc.) that affect these flow patterns, and the difficulty associated with trying to model historic contaminant sources that are poorly defined, we disagree with the Navy's proposed approach to use a model to predict the current nature (concentration) and extent (horizontal and vertical) of ground-water contamination attributable to their facility. Even if the model can be used as a predictive tool, several well clusters (shallow, intermediate, and deep wells) would be needed to confirm model results.

Response: The Navy disagrees with the comment. Computer modeling is a valuable tool in both planning data collection activities as well as for use in the design of remediation systems, especially when complex flow patterns are present. The Navy acknowledges that additional monitoring wells may be required in the future. However, the need for additional monitoring wells would not be expected to interfere with the overall remediation schedule.

R-49-11-92-6

PHASE 2 WORK PLAN ADDENDUM
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Northern Division
Environmental Branch, Code 18
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090

Submitted by:
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Contract Number N62472-90-D-1298
Contract Task Order 0089

NOVEMBER 1992

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1.0 INTRODUCTION

1.1 PURPOSE

The work to be performed under Contract N62472-90-D-1298, Contract Task Order (CTO 089) is to conduct a Phase 2 Remedial Investigation (RI) and a Feasibility Study (FS) of environmental contamination at the Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, New York. A Phase 1 Remedial Investigation was concluded in May 1992 with the issuance of the Remedial Investigation Report (HALLIBURTON NUS, 1992). This investigation found soil and groundwater contamination at the NWIRP. A Technical Review Committee (TRC) was held in June 1992 to aid in the planning of the Phase 2 RI activities. This Work Plan closely follows the direction developed during this TRC meeting and will provide the details of the specific tasks to be performed for the RI and FS.

To cost effectively and expeditiously proceed with the remediation process, this work plan is being prepared as an addendum to the Work Plan used for the Phase 1 RI activities (HALLIBURTON NUS, 1991). Therefore, the 1991 Work Plan will be referenced throughout this document. The general tasks considered under this work plan are summarized as follows.

- Remedial Investigation (Phase 2)
- Feasibility Study
- Community Relations

The purposes of the Phase 2 RI are summarized as follows.

- Further define the horizontal extent of volatile organic-contaminated groundwater, particularly in offsite areas south and east of the former drum marshaling area and the vertical extent of volatile organic-contaminated groundwater in the area south of the former drum marshaling area.

- Quantify the concentration of PCBs in onsite soils. PCBs were confidently detected in most site soils sample in which they were analyzed. However, PCBs were tentatively identified in many site soils in which no PCB analysis was performed.

- Determine flow conditions at and adjacent to the NWIRP site.

The purpose of the Feasibility Study (FS) is to develop potential remedial alternatives to address contaminated soils and groundwater. The FS will be used as the basis for the selection of cleanup options.

The purpose of the Community Relations to inform the community of activities and findings and to identify community concerns.

1.2 ORGANIZATION

This report consists of five sections. Section 1.0 is this introduction. Section 2.0 presents the site background information. Section 3.0 provides the scoping of the remedial investigation. Section 4.0 describes the specific tasks to be conducted under this CTO. Section 5.0 provides the management structure and planned schedule of activities. The Quality Assurance Project Plan for these activities is provided in Appendix A.

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2.0 SITE BACKGROUND INFORMATION

The NWIRP is a government-owned contractor-operated facility situated on 108 acres in Nassau County in the Hamlet of Bethpage, Town of Oyster Bay, Long Island New York, (see Figure 2-1). The NWIRP is surrounded on three sides by the Grumman Corporation (which also operates the NWIRP), and on the fourth side by a residential neighborhood, (see Figure 2-2). Presented below is a summary of the previous activities and documents available for the site. Additional information can be found in the Initial Assessment Study of the Site (IAS) (RGH, 1986), the Phase 1 RI Work Plan (HALLIBURTON NUS, 1991), and the Phase 1 RI Report (HALLIBURTON NUS, 1992).

In 1986, the IAS (RGH, 1986) identified three areas as potentially contaminated. These areas are as follows.

- Site 1 - Former Drum Marshaling Area
- Site 2 - Recharge Basin Area
- Site 3 - Salvage Storage Area

In August 1991, based on the Phase 1 RI Work Plan, onsite site field investigations were initiated by HALLIBURTON NUS at the site. The field investigations included the following field activities.

- Soil-gas measurements
- Temporary monitoring wells
- Permanent monitoring wells
- Soil and sediment sampling and analysis
- Groundwater and surface water sampling and analysis
- Water-level measurements

In May 1992, the RI report for the site was issued by HALLIBURTON NUS. The findings of the study indicate the following.

- Site 1 - Former Drum Marshaling Area is a significant source of groundwater volatile organic contamination.

- Site 2 - Recharge Basin Area is not a significant source of groundwater volatile organic contamination.

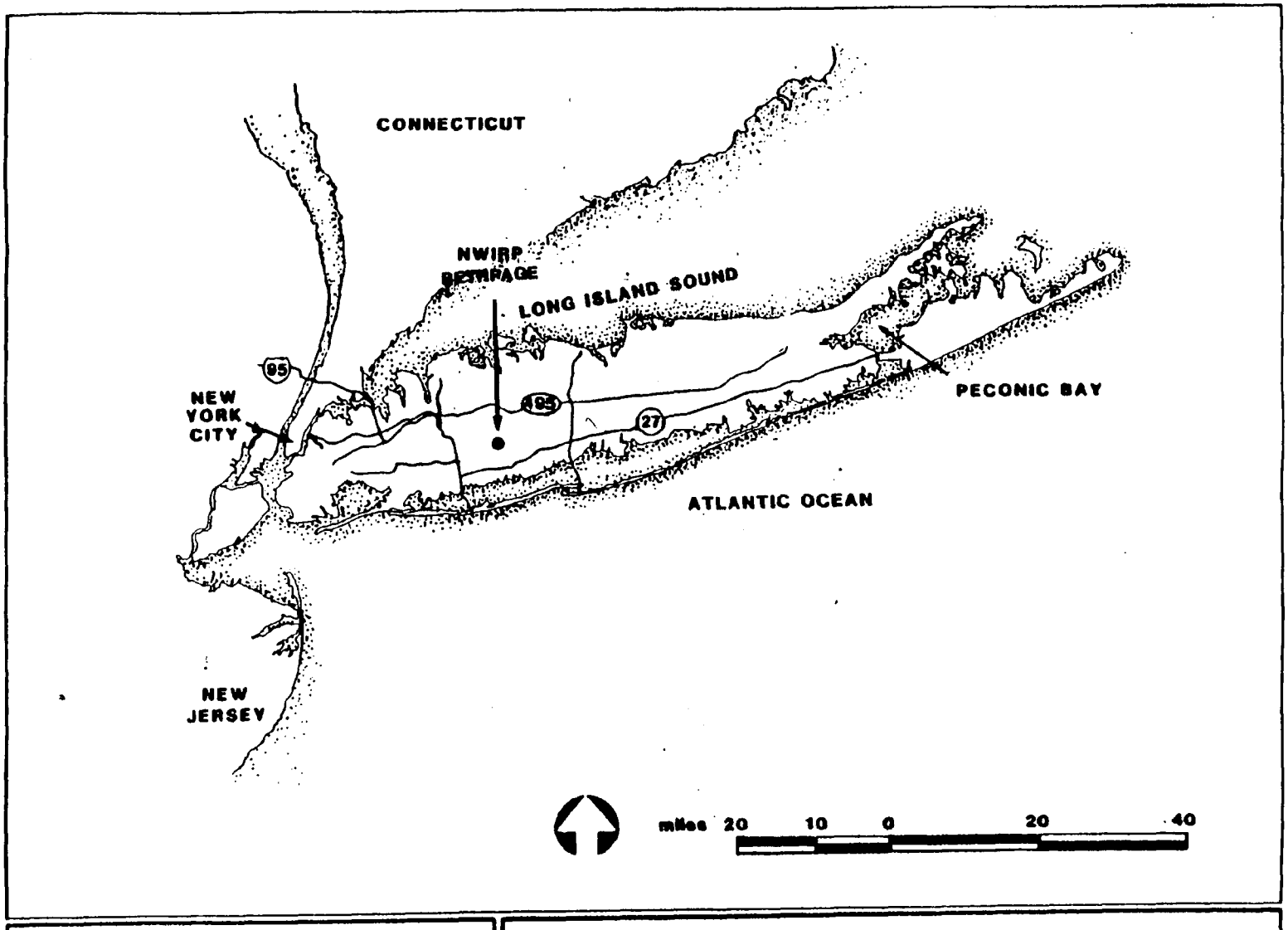
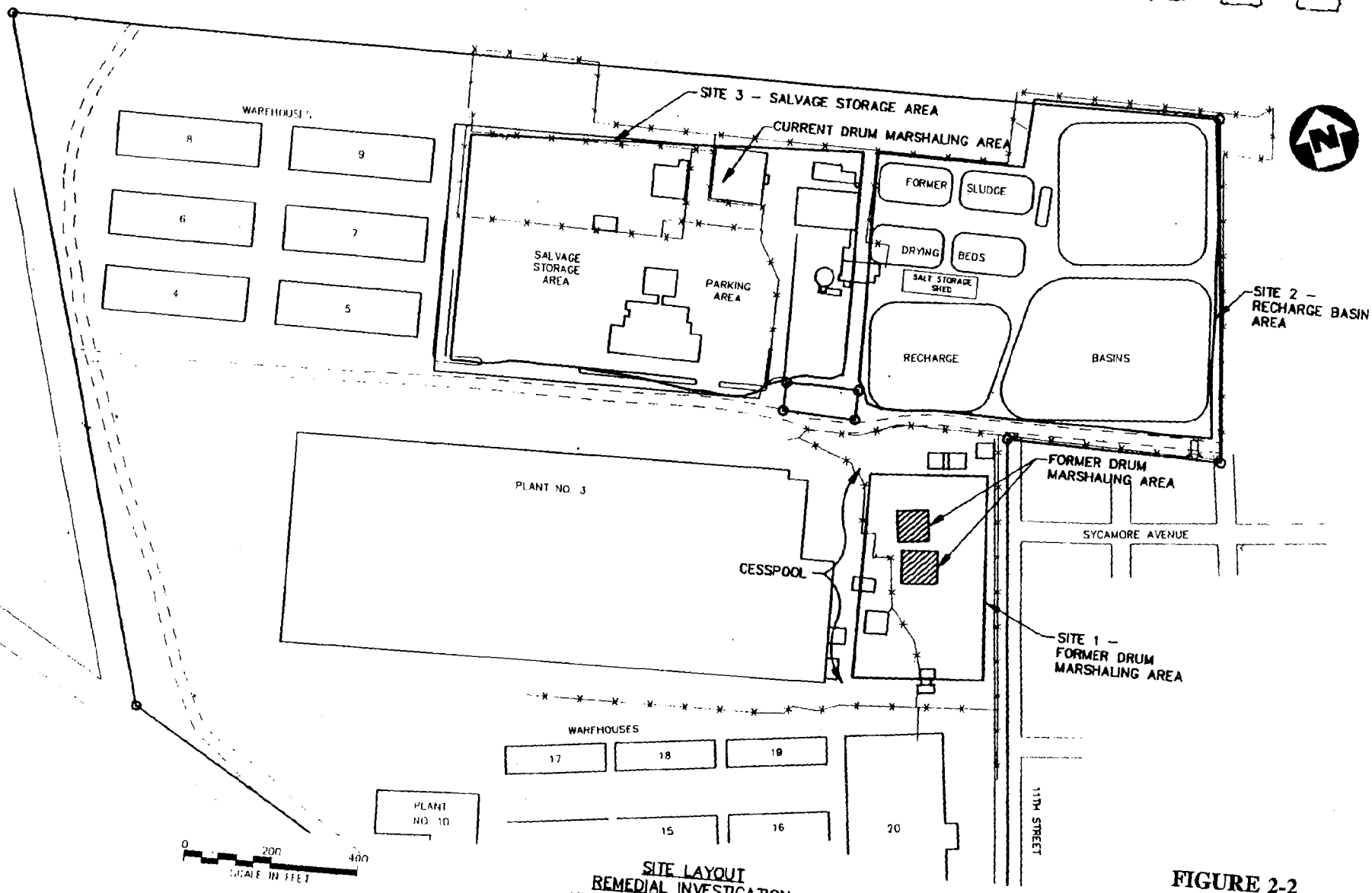


FIGURE 2-1

GENERAL LOCATION MAP
NWIRP, BETHPAGE, NEW YORK

Naval Weapons Industrial
Reserve Plant
Bethpage
Long Island, New York



SITE LAYOUT
REMEDIAL INVESTIGATION
NWIRP, BETHPAGE, NEW YORK

FIGURE 2-2

HALLIBURTON NUS
Environmental Corporation

- Site 3 - Salvage Storage Area is a potentially minor source of groundwater volatile organic contamination.

- Soil contamination has been detected at all three sites. With the exception of PCBs, the nature and extent of the contamination is sufficiently developed to proceed to the FS stage. PCBs were tentatively identified in a number of samples.

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3.0 SCOPING OF THE REMEDIAL INVESTIGATION

This section presents the data limitations and requirements for the Phase 2 RI. Information on the available analytical data, a description of RI/FS activities at the bordering Grumman Corporation, a description of the three sites, and a description of data quality objectives (DQO) can be found in the Work Plan for the Phase 1 RI (HNUS, 1991), the Grumman Work Plans (G&M, 1990 and G&M, 1992), and the Phase 1 RI Report (HNUS, 1992). As with the Phase 1 RI, DQO Level D quality control and CLP methods and protocol are to be used for this Phase 2 RI. The Quality Assurance Plan for the Phase 2 RI work is presented in Appendix A.

The Phase 2 RI activities consist of field sampling/testing tasks and computer modeling.

3.1 FIELD AND ANALYTICAL DATA REQUIREMENTS

The data deficiencies identified during the Phase 1 RI and as discussed during the June 1992 TRC meeting are summarized as follows.

- The horizontal extent of volatile organic-contaminated groundwater, particularly in offsite areas south and east of the former drum marshaling area, and the vertical extent of volatile organic-contaminated groundwater in areas south of the former drum marshaling area, are not defined. There is no groundwater data in the locations referenced. In order to evaluate cleanup options, the extent of contamination in these locations must be defined.

- The concentration of PCBs in onsite soils, where PCBs were tentatively identified, needs to be quantified. The tentative determination of PCBs at these locations is insufficient to serve as a basis for a cleanup evaluation.

- Determine flow conditions at and adjacent to the NWIRP Site.

In order to address these data needs, additional sampling and analysis of onsite and offsite media is required. The site and media specific basis for additional analytical testing is provided in Table 3-1.

TABLE 3-1

BASIS OF ANALYTICAL TESTING
PHASE II REMEDIAL INVESTIGATION
BETHPAGE, NEW YORK

Site	Sample Type	Number of Samples	Rationale
1	Soils	Seven samples to be collected near the Phase 1 sample localities where PCBs were found as tentatively identified compounds (TICs). Analysis: TCL PCBs and pesticides on all samples.	PCBs were tentatively identified during Phase 1 of the Remedial Investigation. The nature and extent of the PCB contamination will be determined in order to assess its impact on the existing Risk Assessment, to evaluate the need for and extent of remediation as directed by NYSDEC-mandated action levels, and to support the evaluation of potential remediation techniques in the Feasibility Study.
1	Groundwater	Eight existing monitoring wells will be resampled. Also one temporary monitoring well will be installed and sampled. Analysis: TCL VOAs on samples from existing monitoring wells and limited VOA on sample from temporary monitoring well.	Site 1 has been identified as a significant source of volatile organic contamination. The monitoring wells will be resampled as part of and in support of the sampling program that will occur off-site to the east and south of Site 1. The results will also be used to support the computer modeling study of the groundwater regime. The temporary monitoring well will be used to further define contamination near the former drum marshaling areas.
2	Soils	Ten samples to be collected near the Phase 1 sample localities where PCBs were found as TICs. Analysis: TCL PCBs and pesticides on all samples.	PCBs were tentatively identified during Phase 1 of the Remedial Investigation. The nature and extent of the PCB contamination will be determined in order to assess the impact on the existing Risk Assessment, to evaluate the need for and extent of remediation as directed by NYSDEC-mandated action levels, and to support the evaluation of potential remediation techniques in the Feasibility Study.
3	Soils	Nine samples will be collected. One sample will be collected near sample SS-322 of the Phase I RI where PCBs were found as TICs. Four samples will be taken from each of two borings to be drilled at location HN-24 during the installation of new monitoring wells. One sample will be obtained in the vadose zone, one sample at 140 feet deep, one sample at 150 feet, and one sample at 160 feet. Analysis: TCL PCBs and pesticides for the sample obtained from sample SS-322. TCL VOAs on eight samples obtained near location HN-24.	PCBs were tentatively identified during Phase 1 of the Remedial Investigation. The nature and extent of the PCB contamination will be determined in order to assess the impact on the existing Risk assessment, to evaluate the need for and extent of remediation as directed by NYSDEC-mandated action levels, and to support the evaluation of potential remediation techniques in the Feasibility Study. Significant levels of volatile organic contamination were found in the groundwater at HN-24I. The source is unknown; a former coal storage pile at this site (which could have been used as an adsorption/filtration unit) is suspect. Also the clay layer located at approximately 150 feet below grade surface may have adsorbed/concentrated solvents. The nature and extent of volatile organic contamination in the soils will be determined in order to evaluate the site as a potential source of the contamination.

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TABLE 3-1
BASIS OF ANALYTICAL TESTING
PHASE II REMEDIAL INVESTIGATION
BETHPAGE, NEW YORK
PAGE TWO

Site	Sample Type	Number of Samples	Rationale
3	Groundwater	Seven samples will be collected. One sample will be collected from each of the five deep facility production wells located adjacent to Plant 3. One sample will be collected from each of the two new intermediate monitoring wells to be installed at HN-24. Analysis: TCL VOAs on all samples.	Significant volatile organic contamination was found at intermediate (158 foot) depths south of Plant 3 at HN-24I. The new intermediate wells may be placed upgradient and/or downgradient of HN-24I in order to delineate the lateral extent and chemical concentration. Exact locations will be determined based on the computer modeling results. The facility production wells will be sampled to evaluate the deep (500 to 600 feet deep) groundwater contamination near Plant 3. The data generated from all of these samples will be used in the computer modeling to delineate groundwater flow patterns beneath the site, in order to determine the impact of the pumping of the deep aquifer on the spatial distribution of the contamination and to aid in the identification of potential source(s).
Off-Site	Groundwater	Eighteen samples will be taken. Twelve samples will be obtained from temporary monitoring wells, three samples will be obtained from new permanent shallow monitoring wells, and three samples will be obtained from new permanent intermediate monitoring wells. Analysis: Limited VOAs (quick turn-around) for the temporary monitoring wells. TCL VOAs for the permanent monitoring wells.	The Phase 1 Remedial Investigation revealed that significant volatile organic contamination was originating at Site 1. This current sampling program will evaluate the potential shallow and intermediate groundwater contamination east and south of Site 1, and thus delineate off-site migration of the contamination. The results will also be used in the computer modeling to delineate off-site groundwater flow patterns.

The specific field tasks to be performed under this work plan are summarized as follows.

- Visual Inspection of Plant 3 tanks, sumps, and drains to determine the potential for these areas to be a source of contamination. If there is evidence of leaks, then additional source area study would occur.

- Confirmatory sampling and analysis for PCBs at the following locations.

SB 121 03	SS 101
SS 102	SS 103
SS 104	SS 105
SS 106	SB 206 03
SB 215 03	SS 216
SS 207	SS 208
SS 210	SS 212
SS 214	SS 322
SD 201	SD 202

- The use of temporary monitoring wells (all but one offsite) to evaluate shallow groundwater contamination east and south of Site 1. The program will include predetermined temporary monitoring wells and opportunity locations. Samples will be analyzed for VOAs; quick turn around (1- to 2-day) of analytical result will be used.

- The use of offsite permanent monitoring wells to evaluate potential shallow and intermediate groundwater contamination east and south of Site 1. Three clusters are proposed for the area; each cluster would include a shallow-depth (water table at approximately 50 feet deep) and an intermediate-depth (up to 150 feet deep) monitoring well.

- The use of additional onsite permanent monitoring wells to evaluate intermediate groundwater contamination near HN-24I. Based on the results of computer modeling and potential source areas, the intermediate monitoring wells will be located hydraulically upgradient and/or downgradient of HN-24I. During drilling, samples will be collected to evaluate potential soil contamination (from former coal piles and residual contamination in the clay layer present at 150 feet).

- Sampling of Production Wells 8, 9, and 14 and re-sampling of Production Wells 10 and 11 with analysis for VOAs only will be used to evaluate deep (500 to 600 feet deep) groundwater contamination in this area.

- Resampling of Monitoring Wells HN-24S, HN-24I, HN-27S, HN-27I, HN-28S, HN-28I, HN-29S, HN-29I, HN-29D, and the onsite USGS well with analysis for VOAs only will be used to confirm previous findings.

- Pump tests at HN-27 and with the Productions Wells will be conducted to define aquifer characteristics. This data will be used to refine the computer modeling efforts. In support of the pump tests, a temporary monitoring well will be installed near the former drum marshaling area at Site 1 and converted to a piezometer.

In addition, some of the soil and drilling mud residues that remain from the Phase 1 RI field investigation will require sampling and analysis. There is sufficient information on most of the residues to allow either spreading, consolidation, or continued onsite inventory. The analytical testing of some of the residues is required to allow a determination of these residues. Appendix B presents additional detail on the sampling and handling of the soils.

3.2 COMPUTER MODELING

Computer modeling of the groundwater in the area of the NWIRP, Grumman, and east/northeast of Site 2 will be performed. Model inputs are to include regional information, monthly water-level measurements (being conducted by Grumman), and pump tests (to be conducted during Phase 2 RI). Specific objectives are as follows.

- Evaluate potential for recharge basin water to be intercepted by BWD wells located east/northeast of Site 2.

- Evaluate potential horizontal and vertical migration of contaminants from Site 1 and 3, and groundwater flow patterns near HN-24I.

- Evaluate different cleanup alternatives.

3.3 POTENTIAL DATA GAPS

The implementation of activities discussed in Sections 3.1 and 3.2 are expected to provide sufficient information to achieve the objectives, to allow the conduct of the Feasibility Study, and to serve as the basis for the site remedy. However, it must be recognized that additional investigative-type activities may be required in the near-future to further refine potential contaminant sources and the boundaries of groundwater contamination. These activities would be conducted during the Record of Decision (ROD) process or as part of Remedial Design activities and would not be expected to delay remediation. Two areas of concern are specifically identified at this time, namely a potential source area of solvent contamination under Plant No. 3 and the potential need for additional monitoring wells at the site.

One potential source area of contamination is the soils underlying Plant No. 3. The presence of the building significantly limits the ability to investigate this area. If, based on the computer modeling and the sampling results to be obtained near HN-24I, these soils are determined to be a likely source of this contamination, then a soil-gas type program may be conducted to locate the potential source areas.

Because of the complex flow patterns in the area, a detailed computer model is being used as a tool to estimate potential locations for contamination. Otherwise, selection of exact locations, depths, and number of monitoring wells becomes arbitrary. Based on the results of the modeling, additional data gaps may become apparent and require the installation of additional monitoring wells. Of particular concern at this time, the greatest uncertainty is with groundwater at depths of 300 to 500 feet below grade surface.

4

4.0 CTO TASK PLAN

This CTO Task Plan is divided into nine tasks and corresponding subtasks to address the technical scope of work. These tasks follow the sections in the Standard IR Scope of Work dated January 7, 1992, as presented in the Statement of Work. The nine tasks are as follows.

Task 0100 (E1) - Phase 2 Remedial Investigation
Task 0300 (E3) - Meetings And Presentations
Task 0700 (R7) - Community Relations
Task 0800 (F8) - Feasibility Study Description of Current Situation
Task 0900 (F9) - Feasibility Study Preliminary Remedial Technologies
Task 1000 (F10) - Feasibility Study Development of Alternatives
Task 1100 (F11) - Feasibility Study Initial Screening of Alternatives
Task 1200 (F12) - Feasibility Study Evaluation of Alternatives
Task 1300 (F13) - Feasibility Study Report

A summary of all the specific activities that are to be performed under this CTO are as follows..

- Collect and analyze 18 soil and sediment samples for PCBs and eight additional soil samples for volatile organics (former coal pile area).
- Install 13 temporary monitoring wells and 8 permanent monitoring (three shallow- and five intermediate-depth wells).
- Collect groundwater samples from 13 temporary monitoring wells and conduct volatile organic analysis of the samples at a local non-NEESA-approved laboratory with 1- to 2-day turn around.
- Collect groundwater samples from 18 monitoring wells and 5 production wells and provide volatile organic analysis of the samples at RAI (PACE) using routine turnaround.
- Conduct two pump tests to determine vertical and horizontal hydraulic conductivity.
- Conduct three-dimensional computer modeling of contaminant and groundwater migration.

- Prepare a Feasibility Study to evaluate remedial alternatives for soil and groundwater contamination.

- Provide Community Relations support.

Task 0100 (E1) - Phase 2 Remedial Investigation

There are six subtasks under Task 0100. These subtasks are described as follows.

0101 - Work Plan Addendum - This addendum is being prepared to address the planned Phase 2 RI activities. This addendum addresses modification to the existing Work Plan and the Quality Assurance Plan, primarily to identify sampling locations and analytical procedures. Each type of field activity, except for the pump tests, were conducted during the Phase 1 RI field activities. Also covered under this task will be the preparation of technical specifications and bid evaluation for the drilling, quick turn-around analytical, and surveying contracts as well as contracting efforts with the analytical laboratory. These activities will parallel the previous solicitations with three to six bidders per solicitation.

0102 - Phase 2 RI Field Work - The Phase 2 RI field activities will consist of a inspection of Plant No. 3 for potential source areas, supplemental soil sampling to delineate PCB contamination, a temporary and permanent monitoring well program to define volatile organic-contaminated groundwater, and pump tests to estimate hydraulic conductivities. A summary of the analytical testing to be conducted is provided in Table 4-1. Specific activities and assumptions are as follows.

Activity 1 - Plant 3 Inspection. A visual inspection of the current and historic manufacturing and solvent storage areas will be conducted. This inspection is expected to require two days in the field.

Activity 2 - Soil Sampling. Eighteen surface and subsurface soil samples will be collected. These samples will be taken near the Phase 1 Remedial Investigation sample locations where PCBs occurred as tentatively identified compounds (TICs). The purpose of these samples is to quantify the nature and extent of PCB contamination. Seven samples will be taken at Site 1, ten samples will be taken at Site 2, and one sample will be taken at Site 3. Refer to Figure 4-1 for the sample locations. Each sample will be analyzed for TCL PCBs and pesticides.

Eight additional subsurface soil samples will be obtained near location HN-24 during the installation of the two new monitoring wells. Four samples will be obtained from each of the wells, one in the

R49-10.92-8

TABLE 4-1

ANALYTICAL REQUIREMENTS
PHASE 2 RI
NWIRP, BETHPAGE, NEW YORK

Parameter	Field Samples	Field Duplicate	Field Blanks	Trip Blanks	MS/MSD	Rinsate Blanks	Total
Temporary Monitoring Wells[1]							
VOAs	13	2	1	0	2	3	21
Soil Samples[2]							
PCBs	18	2	1	0	2	3	26
VOAs	8	1	1	2	2	1	15
Groundwater Samples (Permanent Wells)[2]							
VOAs	23	3	1	6	4	6	43
Soil Residues[2]							
VOAs	7	1	0	2	2	2	14
PCBs	8	1	0	0	0	0	9
Metals	2	1	0	0	0	0	3
TCLP - Arsenic	1	0	0	0	0	0	1

1) A local non-NEESA-approved laboratory is planned for this testing using 1- to 2-day turnaround.
2) RAI is currently the laboratory considered for this CTO. Standard (35 day) turnaround time is considered.

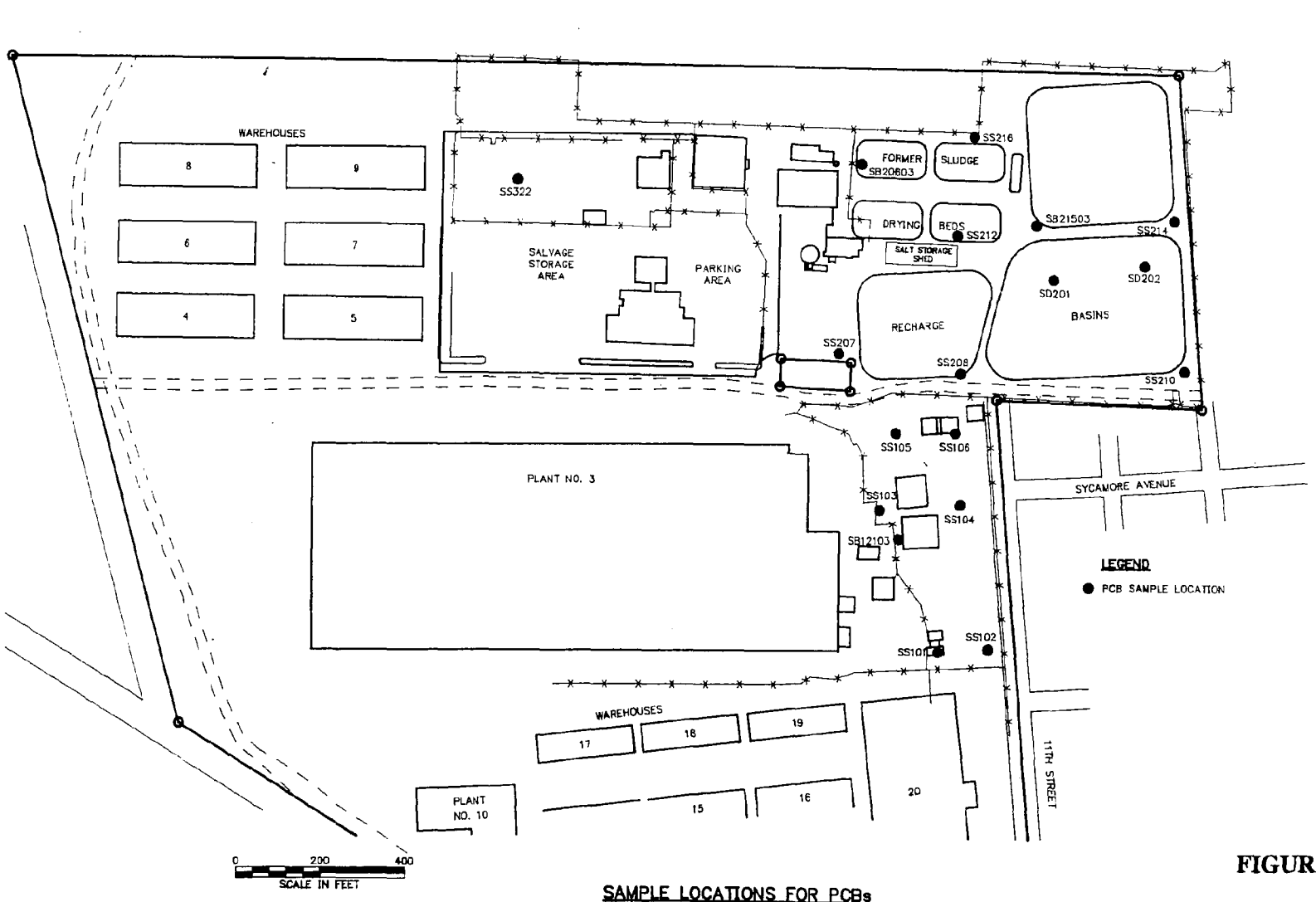


FIGURE 4-1

SAMPLE LOCATIONS FOR PCBs
PHASE 2 REMEDIAL INVESTIGATION/FEASIBILITY STUDY
NWIRP, BETHPAGE, NEW YORK

HALLIBURTON NUS
Environmental Corporation

vadose zone, one at a depth of 140 feet bgs, one at a depth of 150 feet bgs, and one at a depth of 160 feet bgs. The purpose of these samples is to investigate potential sources of the volatile organic contamination found in the groundwater at this location. These soil samples will be obtained with a split-spoon sampling tool from a predetermined depth from each borehole. The exact location will be determined based on the findings of the first phase of the computer modeling.

Activity 3 - Temporary Monitoring Wells. Approximately twelve temporary monitoring wells will be installed off-site in the bordering residential neighborhood located to the east and south of Site 1 and one temporary monitoring well will be installed onsite at Site 1. The primary purpose of these wells is to obtain shallow groundwater samples for quick turn-around volatile organic analyses (VOAs). These results will be used to determine the horizontal extent of volatile organic contamination and to determine the optimal placement of the permanent monitoring wells. These wells will extend approximately five to seven feet below the water table. Seventeen tentative locations have been selected for the placement of the offsite monitoring wells (see Figure 4-2). These seventeen locations were established in a grid pattern, based on potential groundwater flow patterns from Site 1. Initially, locations 1 through 4 will be sampled. Based on the results from these locations, other temporary monitoring well locations will be selected.

Activity 4 - Permanent Monitoring Wells. Six (three shallow- and three intermediate-depth) permanent monitoring wells will be installed off-site in the bordering residential neighborhood located to the east and south of Site 1 and two intermediate-depth monitoring wells will be installed onsite within 100 to 300 feet of HN-24I. The purpose of the offsite wells is to provide permanent groundwater sampling points to delineate the present and future nature and extent of off-site groundwater volatile organic contamination. The six offsite wells will be installed in three well clusters, each consisting of a shallow-depth well (approximately 60 feet deep) and an intermediate-depth well (approximately 100 to 150 feet deep) will be installed in the offsite locations. The purpose of the onsite monitoring wells near HN-24I is to help determine the source of contamination found at this location. These wells will be located hydraulically upgradient and/or downgradient of HN-24I and installed to a depth of about 158 feet.

Tentative locations for the offsite and onsite permanent monitoring wells are presented in Figure 4-3. Each groundwater sample will be analyzed for TCL VOAs. The exact location of each well cluster will be based on the results of the temporary monitoring well program and the computer modeling.

Activity 5 - Groundwater Pumping Tests. Two pumping tests will be conducted at the Naval Weapons Industrial Reserve Plant. The data generated by these tests will be used to define the water-

yielding characteristics of the aquifers, develop groundwater velocity values and determine aquifer parameters such as horizontal and vertical hydraulic conductivity, storativity, transmissivity, and dispersivity, which will be used in computer modeling simulations. Pumping test 1 will involve pumping a new intermediate depth well near HN-27 and monitoring water level changes in shallow and intermediate depth observation wells. Pumping test 2 will involve pumping a Production Well while monitoring water levels in shallow and intermediate depth observation wells and deep production wells. Prior to the conduct of the pump tests, a detailed field plan will be prepared which identifies exact activities to be conducted. General procedures and considerations are summarized below.

Pumping test 1: Prior to the beginning of the pumping test, production wells in the vicinity should not be pumped for a period of 72 hours. This will allow water levels in the areas to more closely reflect natural or non-pumping conditions. Pumping records or discharge records will be maintained for the production wells and recharge basins which are active during the pumping test and the 72-hour stabilization period preceding the pumping test.

For this pumping test, a 8" to 10" diameter monitoring well will be installed near HN-27, and will be pumped at a rate of 200 to 500 gallons per minute (gpm) for 72 hours. The actual pumping rate for the long term pumping test will be established through preliminary step-drawdown test. Several observation wells will be used to monitor drawdown during this pumping test. These observation wells include the shallow and intermediate wells in clusters HN-26, HN-27, HN-28 and HN-30. In addition, one offsite temporary shallow monitoring well will be used during the pumping test.

Water levels in the nearest observation wells will be monitored with pressure transducers which will collect data throughout the duration of the pumping test. Data will be recorded by a data logger on a logarithmic cycle. Water levels in observation wells located at greater distances from the pumping well will be monitored using transducers or manual measurements.

Pumping test 2: For approximately two weeks before the beginning of the second pumping test, water levels will be collected from the shallow and intermediate wells in clusters HN-26, HN-27, HN-29, and HN-30. This data will provide an indication of normal (baseline) conditions. Data will be recorded using hand measurements on a daily basis, and data loggers on a more continuous basis.

Production wells in the vicinity of the pumping well should not be pumped during the two week time period before the initiation of the pumping test. Pumping records, production well drawdowns, and

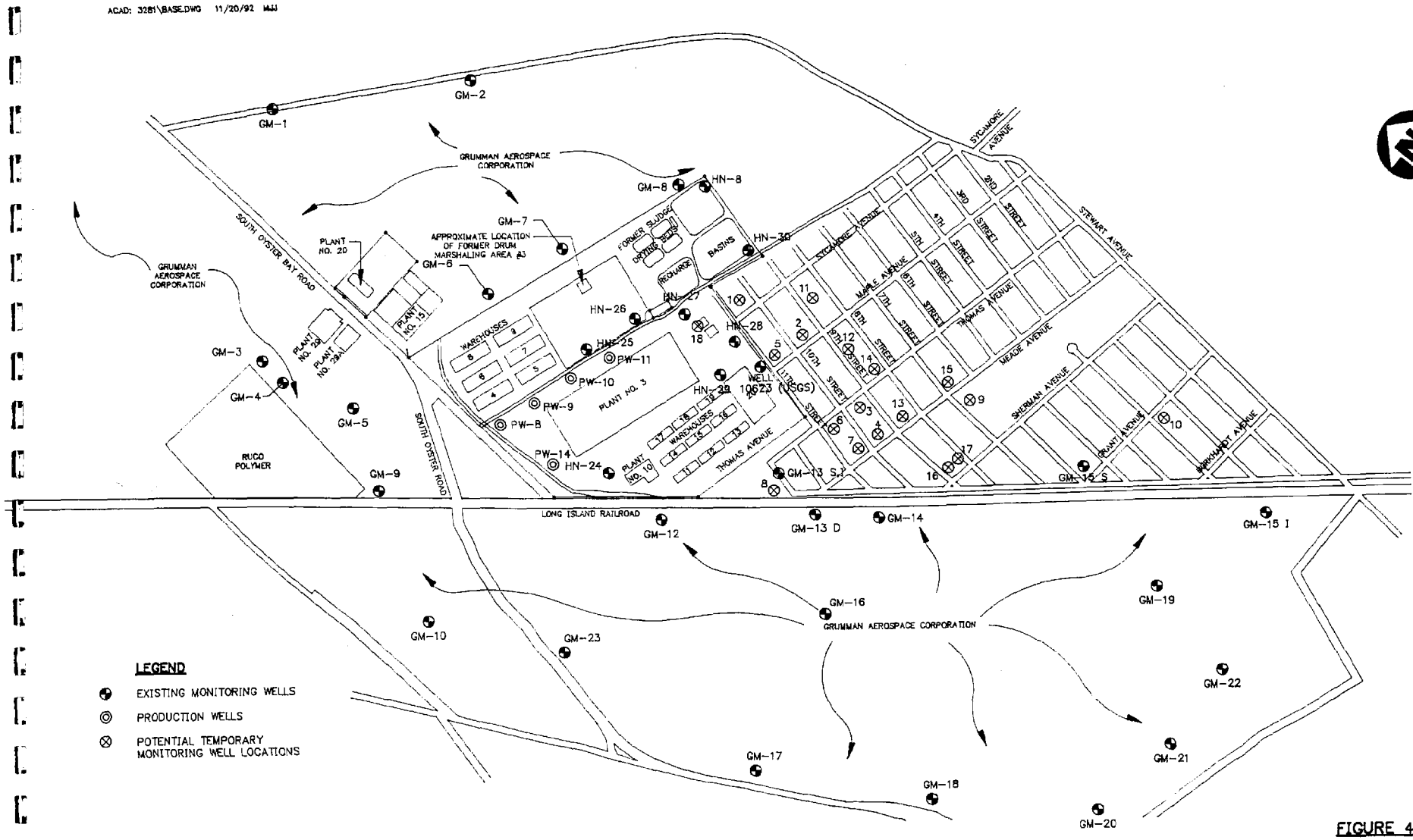
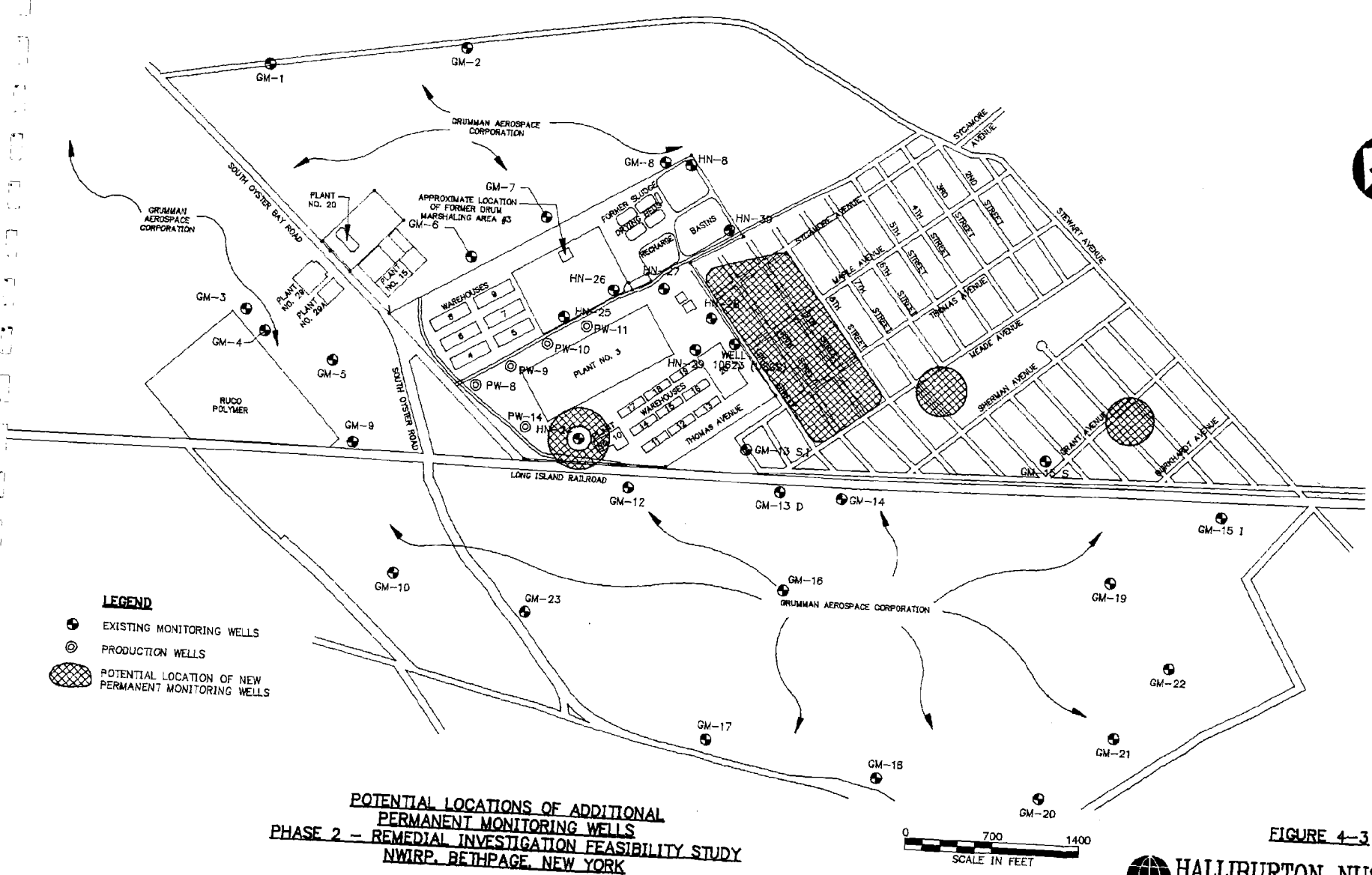


FIGURE 4-2

POTENTIAL LOCATIONS OF ADDITIONAL TEMPORARY MONITORING WELLS
PHASE 2 – REMEDIAL INVESTIGATION FEASIBILITY STUDY
NWIRP, BETHPAGE, NEW YORK

HALLIBURTON NUS
Environmental Corporation



POTENTIAL LOCATIONS OF ADDITIONAL PERMANENT MONITORING WELLS
PHASE 2 – REMEDIAL INVESTIGATION FEASIBILITY STUDY
NWIRP, BETHPAGE, NEW YORK

FIGURE 4-3

HALLIBURTON NUS
Environmental Corporation

discharge records will be maintained for production wells and recharge basins during the pumping test and the two week stabilization period preceding this pumping test.

During the second pumping test a deep production well (PW-11) will be pumped continuously for 72 hours at a rate of approximately 1200 gpm. The observation wells will be the shallow and intermediate wells at HN-24, HN-25, HN-26, HN-27 and HN-29. The water levels in these observation wells will be recorded using data loggers or manually, using an electronic water level measuring device. In addition, the nearest deep production wells (PW-10, PW-9, PW-8, PW-14) will be used as observation wells. Water levels in the deeper production wells will be measured at the same time interval as the shallow or intermediate observation wells. The deep production wells will be measured by hand using M-Scope water level indicators.

If facility water needs are such that the continuous pumping of PW-11 alone will not provide sufficient water, then the pumping test will be modified by pumping 2 production wells (PW-11 and PW-8) continuously and simultaneously for 72 hours.

Pumping test data will be analyzed using standard curve-matching, and numerical solution techniques. The calculated values for aquifer parameters will be used along with reference values to accurately define the groundwater system during computer modeling simulations. Pumping test data will also be used during model calibration.

0103 - Computer Modeling - The groundwater flow and transport modeling consists of three phases. The first phase is designed to utilize currently available data to develop a preliminary model of the study area. A pumping test will be performed simultaneously during the first phase of model development. Because of the limited data available, assumptions will be required for contaminant, hydrogeological and geochemical parameters that are not well defined by previous studies. Sensitivity analyses on these parameters will provide guidelines for additional data collection efforts. The model development procedures in the first phase include the following.

- Review and analysis of existing data.
- Develop a conceptual model of the site.
- Determine the model calibration criteria and proper analytical model for model verification.
- Determine proper extent of the model area and model resolution.

- Implement the groundwater flow model using MODFLOW.

- Perform preliminary steady state calibration of the flow model based on available groundwater level measurements.

- Perform preliminary contaminant transport simulations using MT3D and groundwater flow field produced by MODFLOW to estimate the extent of contamination.

- Conduct a sensitivity analysis.

Based on the results of the transport simulations and sensitivity analyses by the preliminary model, additional field data will be collected. When the aquifer test and data analyses are completed, the second phase of the model development will start. The second phases include the following.

- Recalibrate the flow model with all the available groundwater level measurements under normal conditions.

- Validate the model by simulating the pumping test conditions.

- Recalibrate and revalidate the flow model until the model can match both the normal and pumping conditions.

- Adjust the transport model parameters as site specific geochemical data becomes available.

- Perform contaminant transport simulations to estimate the extent of contamination.

- Simulate select scenarios to determine the possibility of the Bethpage Water Distribution Well being contaminated by sources from the NWIRP.

- Assist risk assessment effort to develop soil and groundwater cleanup goals.

- Summarize the remaining assumptions, limitations, and uncertainties in the final model.

The third phase of the modeling is to apply the developed model in the remedial design of a pump-and-treat system. Model simulations will be performed to determine proper well locations, well screen intervals, pumping rates, and duration of operation for a system of recovery wells.

The computer codes select for implementing the groundwater flow model and transport model for the project are USGS MODFLOW and MT3D, respectively.

The U.S. Geological Survey Modular Three-Dimensional Finite Difference Ground Water Flow Model, known as MODFLOW, is a commonly used three-dimensional groundwater model. Groundwater flow within the aquifer is simulated using a block-centered, finite difference approach. Flow associated with streams, recharge, evapotranspiration, drains and wells can be simulated. The model is well established, and has been used in many CERCLA and other Government-related groundwater simulations.

Contaminant transport will be simulated using MT3D, a modular three dimensional transport model which runs in conjunction with MODFLOW. After a MODFLOW model is developed and calibrated, the information needed by the transport model is retrieved and can be used to simulate changes in concentrations of single species contaminants in groundwater. Simulations consider advection, dispersion and various types of boundary conditions, and external sources and sinks.

0104 - Phase 1 RI-derived Residues - This task includes the sampling and analysis of soil residues derived during the Phase 1 RI, and the subsequent transportation and spreading/storage of these soils onsite at a Navy-specified area, (see Appendix B). In addition, the drilling muds will be slowly drained to an onsite depression to filter out the suspended solids. These drained muds will then be handled with the residual soils. As identified in the SOW, it is planned to analyze seven soil samples for VOAs, nine soil samples for PCBs, and two soil samples for total metals. In addition, one soil sample will be tested using the Toxic Characteristic Leaching Procedure (TCLP) to determine if the material may be classified as a hazardous waste for arsenic. The samples will be analyzed at RAI, a NEESA-approved laboratory with standard 35-day turnaround time. For the purposes of this work plan addendum, it is assumed that all the soils will remain on site. A backhoe and dump truck will be used to transport the bulk soils.

0105 - Phase 2 Rough Draft and Draft RI Report - The Phase 2 Rough Draft and Draft RI Report will be used to present the findings of the Phase 2 RI Information. Included in this task is 100% data validation. The Rough Draft Report will be for internal Navy review and the Draft Report will be for external review.

The format of the report will be identical that of the Final (Phase 1) RI Report. The previous RI data will be summarized to allow it to be a stand alone document, however the report will focus of the Phase 2 data. Since the new data is not expected to significantly affect the risk assessment, new risk

assessment and contaminant fate and transport sections will not be prepared. Rather a qualitative evaluation of the effects of the new data on the risk assessment will be prepared.

0106 - Phase 2 Final RI Report - Comments from the Navy and TRC members will be addressed in a letter. Pending resolution of comments from the Navy, a Final Phase 2 RI Report will be prepared.

Task 0300 (E3) - Meetings And Presentations

There are two subtasks under Task 0300. These subtasks are described as follows.

0301 - Formal Meetings - No activities are planned under this task.

0302 - Formal Presentations - The meetings scheduled under this task are considered to be technical meetings for presentation of activities and data to the activity personnel, governmental agencies, and to the TRC members. Over the anticipated schedule of one year, it is anticipated that there will be a total of six half-day meetings at the NWIRP not addressed elsewhere.

Task 0700 (R7) - Community Relations

There are five subtasks under Task 0700. These subtasks are described as follows.

0701 - Public Reports - The task includes the preparation and dissemination of up to 6 reports. These reports include the RI/FS Fact Sheet, the Question and Answer Fact Sheet, the Status/Update Fact Sheet, the Proposed Plan Fact Sheet, the Field Work Fact Sheet, and the responsive summary. Included under this task is the announcement in the Bethpage Tribune and two additional periodicals.

0702 - Arrange Public Meetings - This task includes all the necessary logistics to facilitate public meetings. This includes rental of two facilities, one for the small group meeting and one for the RI/FS Public Meeting. Also included is the hiring of a transcriber for the Public Meeting.

0703 - Assess the CRP - This task will consist primarily of two phone surveys of 8 to 10 households to assess the adequacy of the community relations efforts. No modifications to the CRP are anticipated.

0704 - Report Preparation and Public Meeting Participation - This task includes preparation and participation in up to six public meetings in Bethpage, New York.

0705 - Implement CRP - This task includes the ongoing updates of the information in the repository. It is also assumed that there will be limited interagency coordination with NYSDEC and EPA.

Task 0800 (F8) - Description of Current Situation

Tasks 0800 through 1300 refer to preparation of the FS. A FS will be prepared in accordance with the Standard IR Scope. Presented below is a brief description of each activity. Assumptions defining the scope are also presented.

0801 - Modifications to Project Scope - This task relates to the introduction sections of the FS. Relevant RI data will be summarized in the FS report with a reference for additional details to the RI reports. Changes to scope, if any, will be discussed at the point.

0802 - Purpose Statement - This task relates to the purpose statement in the FS. The purpose statement identifies actual and potential exposure pathways.

Task 0900 (F9) - Preliminary Remedial Technologies

There are two subtasks under Task 0900. These subtasks are described as follows.

0901 - Potential Feasible Technologies - A master list of potentially feasible technologies will be developed. This information will be presented in a table format with a brief (one or two sentence) description of each technology.

0902 - Technology Screening - The master list of potentially feasible technologies will be screened based on site conditions, waste characteristics, and statement of purpose. For the technologies which are obviously not applicable, the screening will occur in a table format (preliminary screening). Additional description of retained technologies and more detailed screening will then follow in this section.

Task 1000 (F10) - Development of Alternatives

There are three subtasks under Task 1000. These subtasks are described as follows.

1001 - Remedial Response Objectives - Remedial Response Objectives will be developed which identify media, receptor, pathway, contaminant, and concentration. These objectives serve as the

basis for remediation. As a result, they will be developed early to allow adequate review by the Navy, EPA, and the state.

1002 - Identify Remedial Alternatives - Remedial alternatives will be developed for both soil and groundwater. It is estimated that six alternatives will be developed for each media. One alternative will be "No Action" and a second alternative will be "Limited Action" such as monitoring or institutional controls.

1003 - Technology Exclusion Documentation - The technology exclusion documentation will be provided under Task 0902.

Task 1100 (F11) - Initial Screening of Alternatives

There is one subtask under Task 1100. This subtask is described as follows.

1101 - Preliminary Screening of Alternatives - The preliminary screening of alternatives is conducted to eliminate those alternatives which are infeasible or inappropriate. Typically, this section can be eliminated from an FS by assembling only feasible and appropriate alternatives under Task 1001. Is was assumed that there would be minimal activities under this task.

Task 1200 (F12) - Evaluation of Alternatives

There is one subtask under Task 1200. This subtask is described as follows.

1201 - Alternative Analysis - This task consists of the detailed description and evaluation of alternatives. Note that HALLIBURTON NUS is planning to utilize EPA CERCLA terminology in this task. This should enhance agency review of the report. The EPA description appears to address each of the items presented in the Standard IR Scope of Work. The EPA components are as follows.

- Description of Alternative
- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Reduction of Toxicity, Mobility, or Volume
- Short-term Effectiveness
- Long-term Effectiveness

- Implementability
- Cost

Two factors identified under EPA terminology, which are not planned on being addressed, are community acceptance and state acceptance. These criteria are typically considered during the responsiveness summary after accurate information on community and state acceptable is available.

The third phase of the computer modeling will also be conducted under this task. The modeling will be used to size groundwater extraction and injection systems, evaluate cleanup times, and evaluate the no action alternative.

Task 1300 (F13) - Reports

There are six subtasks under Task 1300. These subtasks are described as follows.

1301 - FS Phase Report - No specific activities are planned under this task.

1302 - Rough Draft FS Report - This task includes the preparation of the rough draft of the FS report. The rough draft report is intended for internal Navy review.

1303 - Draft FS Report - This task includes the preparation of the draft FS report. The draft report is intended for external review.

1304 - Final FS Report - This task includes the preparation of the final FS report.

1305 - FS Presentation - This task assumes a one half day meeting at the activity with two people.

1306 - Response to Comments - This task includes the written response to comments on the rough draft and on the draft FS reports.

5

5.0 PROJECT STAFFING

5.1 MANAGEMENT APPROACH

HALLIBURTON NUS will be the lead technical firm for this assignment. As proposed, the work will be managed in the Pittsburgh office with field personnel support from both the Pittsburgh and Wayne offices.

The project manager is responsible for the day-to-day contact with the Navy's Remedial Project Manager, Mr. Frank Klanchar, and for maintaining the projects scope, schedule, and budget. Program Management staff are responsible for overseeing all administrative activities for individual projects.

Program Planning documents include the Contract Management Plan, Quality Control Management Plan, and Health and Safety Plan and provide overall direction for the execution of projects under CLEAN. These plans require technical review of all deliverables, routine project reviews and establish responsibilities.

5.2 KEY PROJECT TEAM MEMBERS

The Project Manager assigned to this CTO is Mr. David Brayack, P.E.. He is located in the Pittsburgh Office and can be reached at 412-921-8375 by phone and at 412-921-4040 by telecopy. Mr. Brayack will be assisted by other members of the technical staff as necessary.

5.3 SCHEDULE

The project schedule for CTO 0089 is presented in Figure 5-1. The schedule for deliverables is summarized as follows. During the preparation of the RI and FS, TRC meetings are anticipated to review and provide direction for the preparation of these documents.

Deliverable	Date
Award Date	09/30/92
RD Work Plan Addendum	10/07/92
Receive Comments	10/11/92
Draft Work Plan Addendum	10/14/92
Receive Comments	11/16/92
Final Work Plan Addendum	11/23/92
RD Phase 2 RI Report	05/05/93
Receive Comments	05/19/93

Deliverable	Date
Draft Phase 2 RI Report	06/03/93
Receive Comments	07/09/93
Final Phase 2 RI Report	07/23/93
RD FS Report	05/12/93
Receive Comments	05/28/93
Draft FS Report	06/11/93
Receive Comments	07/15/93
Final FS Report	07/29/93

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Figure 5-1

10-Sep-92

Bethpage Phase 2 Schedule

	Sep-92	Oct-92	Nov-92	Dec-92	Jan-93	Feb-93	Mar-93	Apr-93	May-93	Jun-93	Jul-93
Rough Draft Work Plan		XX									
Draft Work Plan		XX									
Final Work Plan			XX								
Computer Modeling - Preliminary		XXXXXXXX	XXXXXXXX								
Computer Modeling - Final						XXXXXXXX	XXXXXXXX	XXXXXXXX			
Plant 3 Inspection		XX									
Soil Sampling				XX(18 samples)							
Soil Analytical				XXXX	XXXXXX						
Drum Residues					XXX						
Drilling Procurement		XXXXXXXX									
Temporary Monitoring Wells				XXX(13 wells)							
Permanent Monitoring Wells				XXXXXXXX	XXXXXXXX	XX(3 shallow, 5 intermediate)					
Pumping Well Installation/tests				XXXXXX	XX						
Groundwater Sampling						XX(23 samples)					
Groundwater Analytical						XXXX	XXXXXXXX				
Data Validation					XX	XXXXXX		XXXXXX			
Rough Draft RI Report						XXXXXXXX	XXXXXXXX	XXXXXX			
Draft RI Report									X		
Final RI Report										X	
Rough Draft FS Report						XXXXXXXX	XXXXXXXX	XXXXXXXX			
Draft FS Report										X	
Final FS Report											X

REFERENCES

REFERENCES

G&H (Geraghty and Miller), 1990. Remedial Investigation/Feasibility Study Work Plan, Grumman Aerospace Corporation, Bethpage, NY, March.

G&H (Geraghty and Miller), 1992. Phase II Remedial Investigation/Feasibility Study Work Plan, Grumman Aerospace Corporation, Bethpage, NY, March.

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HNUS, 1992. Final Remedial Investigation Report, Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract. Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, New York, Contract N62472-90-D-1298, CTO 003, May.

RGH (Roger, Golden, & Halpein), 1986. Initial Assessment Study of NWIRP Bethpage NY and NWIRP Calverton, NY. Contract No. N62474-84-3386, Environmental Restoration Department, Naval Energy and Environmental Support Activity, December.

APPENDICES

A

APPENDIX A

PHASE 2 QUALITY ASSURANCE PROJECT PLAN FOR THE NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, BETHPAGE, NEW YORK

Phase 2
Quality Assurance Project Plan
for
Naval Weapons
Industrial Reserve Plant
Bethpage, New York

Northern Division
Naval Facilities Engineering Command
Contract Number N62472-90-D-1298
Contract Task Order 0089

November 1992

R-49-11-92-6

PHASE 2 QUALITY ASSURANCE PROJECT PLAN
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

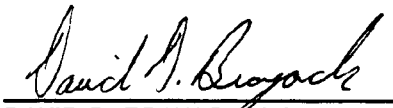
Submitted to:
Northern Division
Environmental Branch, Code 18
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090

Submitted by:
HALLIBURTON NUS Environmental Corporation
993 Old Eagle School Road, Suite 415
Wayne, Pennsylvania 19087-1710

Contract Number N62472-90-D-1298
Contract Task Order 0089

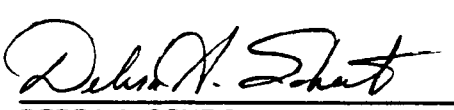
NOVEMBER 1992

SUBMITTED BY:



DAVID D. BRAYACK, P.E.
PROJECT MANAGER
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMISSION BY:



DEBRA A. SCHEIB
QUALITY ASSURANCE MANAGER
PITTSBURGH, PENNSYLVANIA

APPENDIX A

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1.0 PROJECT DESCRIPTION

This project is a continuation of the Phase 1 Remedial Investigation conducted between August 1991 and May 1992. As a result, this Quality Assurance Project Plan (QAPP) is being prepared as an addendum to the Remedial Investigation QAPP prepared for this site in August 1991, (HNUS, 1991). Additional detail is provided in that document as well as the Phase 2 Work Plan Addendum.

2.0 RI/FS SCOPE OF WORK

A description of the Phase 2 RI scope of work can be found in Section 4.0 of the Phase 2 Work Plan Addendum.

3.0 SAMPLE MATRICES, PARAMETERS, AND FREQUENCY COLLECTION

As part of the RI, environmental quality samples will be collected from the following matrices: soil, bottom sediment, and groundwater. A listing of the sample matrices, parameters, and frequency of collection is found in Table 3-1. Sampling procedures to be used in this study are addressed in Section 6.0 of this QAPP. As required by NEESA, a sampling rationale is included in Section 3.0 and Section 4.0 of the Phase 2 Work Plan Addendum.

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

4.1 PROJECT ORGANIZATION

A description of the project organization can be found in the Phase 2 Work Plan Addendum as well as the Phase 1 QAPP, (HNUS, 1991).

4.2 FIELD ORGANIZATION

The field organization is identical to that used during the Phase 1 RI, see the Phase 1 QAPP (HNUS, 1991). Debra Scheib is the current QA Manager.

TABLES

4.3 LABORATORY OPERATIONS

Analyses of environmental samples will be performed by a NEESA-approved laboratory, namely RAI. The laboratory work will be performed on QC Level D, which requires CLP methods and CLP deliverables. These QA/QC procedures should meet or exceed NYSDEC requirements. Analytical testing of the temporary monitoring well samples will be performed by a local non-NEESA laboratory.

5.0 QUALITY ASSURANCE OBJECTIVES

The quality assurance objectives are presented in the Phase 1 QAPP, (HNUS, 1991). The elements addressed are as follows.

- Data Quality Objectives
- Quantitation Limits
- Detection Limits
- PARCC Parameters
  - Precision
  - Accuracy
  - Representativeness
  - Comparability
  - Completeness
- Field Blanks
- Trip Blanks
- Rinsate Blanks
- Bottleware

6.0 SAMPLING PROCEDURES

6.1 SITE BACKGROUND

The site background information can be found in the Phase 1 Work Plan, (HNUS, 1991a).

6.2 SAMPLING OBJECTIVES

The sampling objectives can be found in the Phase 2 Work Plan Addendum.

TABLE 3-1

ANALYTICAL REQUIREMENTS
PHASE 2 RI
NWIRP, BETHPAGE, NEW YORK

Number of Samples	Number of Duplicates	Number of Field Blanks	Number of MS/ MSD/LD	Number of Rinsate Blanks	Number of Trip Blanks	Total Number of Samples	Analysis	Analytical Method
TEMPORARY MONITORING WELLS								
13	2	1	2	3	0	21	TCL Volatiles	SW846 5030/8010
SOIL SAMPLES								
8	1	1	2	1	2	15	TCL Volatiles	CLP SOW
18	2	1	2	3	0	26	Pesticides/PCBs	CLP SOW
GROUNDWATER SAMPLES (PERMANENT WELLS)								
23	3	1	4	6	6	43	TCL Volatiles	CLP SOW
SOIL RESIDUES								
7	1	0	2	2	2	14	TCL Volatiles	CLP SOW
8	1	0	0	0	0	9	Pesticide/PCBs	CLP SOW
2	1	0	0	0	0	3	Metals	CLP SOW
1	0	0	0	0	0	1	TCLP Arsenic	Method 1311/ CLP SOW

6.3 SAMPLE LOCATION AND FREQUENCY

The sample location and frequency can be found in the Phase 2 Work Plan Addendum.

6.4 SAMPLE DESIGNATION

The sample designation will be as presented in the Phase 1 QAPP, (HNUS, 1991).

6.5 SAMPLE EQUIPMENT AND PROTOCOLS

The sample equipment and protocols will be as presented in the Phase 1 QAPP, (HNUS, 1991).

6.6 SAMPLE HANDLING AND ANALYSIS

The sample handling and analysis will be as presented in the Phase 1 QAPP, (HNUS, 1991).

6.7 EQUIPMENT DECONTAMINATION

The equipment decontamination will be as presented in the Phase 1 QAPP, (HNUS, 1991).

7.0 SAMPLE CUSTODY

The sample custody will be as presented in the Phase 1 QAPP, (HNUS, 1991). Elements discussed are summarized as follows.

- Field Custody
- Transfer of Custody and Shipment
- Sample Shipment Procedures
- Field Documentation Responsibilities

8.0 CALIBRATION PROCEDURES

The calibration procedures will be as presented in the Phase 1 QAPP, (HNUS, 1991).

9.0 ANALYTICAL PROCEDURES

The analytical procedures will be as presented in the Phase 1 QAPP, (HNUS, 1991).

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

The data reduction, validation, and reporting will be as presented in the Phase 1 QAPP, (HNUS, 1991).

11.0 INTERNAL QUALITY CONTROL CHECKS

The internal quality control checks will be as presented in the Phase 1 QAPP, (HNUS, 1991).

12.0 PERFORMANCE AND SYSTEM AUDITS

The performance and system audits will be as presented in the Phase 1 QAPP, (HNUS, 1991).

13.0 PREVENTIVE MAINTENANCE

Preventative maintenance will be conducted as presented in the Phase 1 QAPP, (HNUS, 1991).

14.0 DATA ASSESSMENT PROCEDURES

Data assessment procedures will be as presented in the Phase 1 QAPP, (HNUS, 1991).

15.0 CORRECTIVE ACTION

Corrective action procedures will be as presented in the Phase 1 QAPP, (HNUS, 1991).

16.0 QUALITY ASSURANCE REPORTS

Quality assurance reports will be as presented in the Phase 1 QAPP, (HNUS, 1991).

17.0 REFERENCES

HNUS (HALLIBURTON NUS), 1991. Final Remedial Investigation Quality Assurance Plan, Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract, Naval Weapons Industrial Reserve Plant, Bethpage, New York, Contract N62472-90-D-1298, CTO 003, August 1991.

HNUS 1991a. Final Remedial Investigation Work Plan, Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract, Naval Weapons Industrial Reserve Plant, Bethpage, New York, Contract N62472-90-D-1298, CTO 003, August 1991.

B

APPENDIX B

RI-DERIVED RESIDUES AT NWIRP, BETHPAGE, NEW YORK

HALLIBURTON NUS
Environmental Corporation

661 ANDERSEN DRIVE · PITTSBURGH, PENNSYLVANIA 15220 (412) 921-7090

C-49-06-92-168

June 17, 1992

Northern Division
Naval Facilities Engineering Command
U.S. Naval Base, Building 77-L
Philadelphia, Pennsylvania 19112-5094

Attention: Mr. Frank Klanchar (Code 1423)
Remedial Project Manager

Reference: Contract No. N62472-90-D-1298, CTO No. 0003

Subject: RI-Derived Residues at NWIRP, Bethpage, New York

Dear Mr. Klanchar:

As discussed previously, there remain soil and water residues at the NWIRP Bethpage, which were generated during the Remedial Investigation between August 1991 and January 1992. The residues can be classified into three groups, namely monitoring well soil residues, soil boring soil residues, and monitoring well drilling muds.

Description of Residues at NWIRP Bethpage

The monitoring well soil residues result from the auger cuttings collected during the installation of the shallow, intermediate, and deep monitoring wells. There are approximately 20 to 40 cubic yards of this material. These residues are currently contained in plastic wraps at each individual well location (except for HN-30). For well HN-30, because PCBs were detected in the subsurface soils, the majority of these cuttings were drummed (14 drums). The drums remain at the location of HN-30.

The soil boring soil residues result from auger cutting collected during the sampling of subsurface soil. These residues are currently contained in 55-gallon drums at a single location near the drum marshaling area. There are approximately 54 drums at this location. Plastic has been placed above and below the drums to serve as secondary containment.

During the installation of the deep monitoring wells, a mud rotary drilling method was used. This mud was collected and stored in plastic tanks located near the former sludge drying beds. There about 7,000 gallons of monitoring well drilling muds in these tanks. During the RI, several hundred gallons of the drilling muds

were discharged to the Industrial Waste Water Treatment Plant. Because of interferences to the operation of the treatment plant, this practices was halted. The drilling muds were sampled on February 11, 1992 to determine chemical characteristics of the muds.

Monitoring Well Soil Residues - Results and Recommendations

A summary of the contaminates found and the maximum concentration detected in the monitoring well samples, as well as soil samples from nearby soil borings are presented in Table 1 and Table 2. The residual soils at the site would be expected to be a composite of the soil and groundwater results. The actual concentration of each constituent in the soil residues would be expected to be lower since the results presented were the maximum detected in the sample. Also, the volatile organic concentrations would be expected to even lower, since the volatile organics would have volatilized during drilling operations and the subsequent storage period. However, the actual decrease in concentration cannot be accurately estimated.

Based on these results, the soil residues associated with HN-8 and HN-26 appear to be relatively uncontaminated and can be used as unrestricted fill at the facility.

The soil residues associated with HN-24, HN-25, HN-27, HN-28, and HN-29 potentially contain significant quantities of volatile organics and/or PCBs. As a result, these materials should be consolidated at one central location away from active areas. One potential location is Site 1 west of Monitoring Well HN-28. Other potential sites, which are further from the NWIRP property line, include the salvage storage area and the former sludge storage area.

The soil residues from these monitoring wells should be sampled and analyzed. One soil sample should be collected for each monitoring well location and analyzed for volatile organics. In addition, one sample of the soils at HN-27 and HN-28 should be collected and analyzed for PCBs. If chemical analysis indicates that these soils are similar or lower in concentration to the soils in the area, these soils can be stockpiled at the storage area pending the Record on Decision (ROD) on the site soils. The plan for the stockpile is provided below.

PCBs were found in the subsurface soils near HN-30 at a concentration of approximately 7 mg/kg. Because of the PCBs, and based on availability of drums, about 75% of the soil residues associated with HN-30 have been placed in fourteen 55-gallon drums. The remaining soils should be placed in drums and the one sample of

the soils should be collected for volatile organic analysis and three samples of soil should be collected for PCB analysis. If chemical analysis indicates that these soils are similar or lower in concentration to the soils in the area, these soils can be stockpiled at the area near HN-28, pending the ROD on the site soils.

Monitoring Well Drilling Muds - Results and Recommendations

The mud consists of a mixture of the soils in the borehole, bentonite clay, groundwater, and potable water. Based individual chemical analysis, the groundwater, potable water, and soils are relatively uncontaminated except for the presence of volatile organics. The analytical tests on the drilling indicates that volatile organics are not present in the drilling muds.

The analytical tests also indicate that the drilling muds contain between 1 and 3 percent suspended solids and that only barium, lead, zinc, and PCBs are present in the drilling mud at a equivalent solids concentration greater than that determined for background soils at the NWIRP. (The equivalent solids concentration is determined by dividing the chemical concentration in the drilling mud by the suspended solids concentration of the drilling mud.) For the three metals, the equivalent concentration of these chemicals is about two to three times the background soil concentration and based on the absence of these metals at similar concentrations in the soil samples, the metals are probably present because of natural constituents found in bentonite clay.

The PCBs are likely present because of PCB contamination in the borehole soils. To evaluate the significance of the PCBs, the drilling mud PCB concentration was converted to an equivalent solids concentration. The equivalent solids concentration of PCBs is 0.024 mg/kg. This equivalent concentration is well below any soil standard for PCBs.

To address these drilling muds, the general concept would be to separate the solids from the liquids, retain the solids and discharge the liquids. Because of the natural filtration capability of the sandy soils in the area, a small depression can be used to separate the solids from the water. The drilling mud would be drained slowly into the depression to prevent runoff. The residual sludge would then collected and placed with the other solid residues from this investigation.

Soil Boring - Results and Recommendations

A summary of the contaminates found, and the maximum concentration detected, in the soil samples are presented in Table 3. The actualconcentration of each constituent in the soil residues would be expected to be lower since the results presented were the maximum detected in the sample. Also, the volatile organic concentrations would be expected to even lower, since they would have volatilized during drilling operations and the subsequent storage period. However, the actual decrease in concentration cannot be accurately estimated.

Many of the contents of the drums are uncontaminated and can be used as unrestricted fill at the NWIRP, see Table 3. Other of the drums contain soils with chemicals at concentrations which may be above background concentrations. These samples should be analyzed to determine actual concentrations. Table 3 summarizes the suggested analytical testing. If chemical analysis indicates that these soils are similar or lower in concentration to the soils in the area Site 1, these soils can be stockpiled with the monitoring well soils near HN-28, pending the ROD on the site soils.

If any of the drums are considered to contain soils which may be classified as a hazardous waste (arsenic in sample 119), then these materials should be disposed offsite.

Stockpile Area

A potential location of the stockpile area at Site 1 is adjacent to the fence along the southern boundary approximately 200 to 300 feet west of the NWIRP property line. Other potential locations include the former sludge drying beds and the salvage storage area. The monitoring well soils would be segregated, as reasonable, but placed adjacent to each other to minimize affected area. Drummed material and collected solid residue from the drilling mud would be similarly placed. The emptied drums and tanks would be recycled or reused.

Because of the low level of mobile (volatile organic) contaminants present (pending chemical testing) plastic would not be used. Additionally, the concentration of chemicals present in the soils to be stockpiled is expected to be similar to or less than those present in the soils in this area, and therefore no additional impact would be expected on the (already contaminated) groundwater. The area would be covered with straw and seeded to minimize infiltration and erosion of the soils. During the ROD, these soils would be considered a part of Site 1.

If have any questions or require additional information, please call me at (412) 921-8375.

Very truly yours,

David D. Brayack

David D. Brayack, P.E.
Project Manager

/DDB

cc: Mr. R. Boucher (Navy) w/o attachment
Mr. D. Rule (Navy) w/o attachment
Mr. J. Trepanowski (HNUS)
Ms. D. Wroblewski (HNUS)
Ms. P. Patton (HNUS) w/o attachment

TABLE 1

MONITORING WELL RESIDUES (ppb)
NWIRP, BETHPAGE, NY

Parameter	MW-24		MW-26		MW-27		MW-28		MW-30	
	Soil	GW	Soil	GW	Soil	GW	Soil	GW	Soil	GW
Trichloroethene	ND	58000		16		16		1100		6
Tetrachloroethene		14		2	25	10	7	430	4	
1,1-Dichloroethene								10		
1,1-Dichloroethane								32		
1,2-Dichloroethene								180		
1,1,1-Trichloroethane		6		3		8		240		3
Carbon Tetrachloride		8								
Toluene		9		7						10
Methyl Phenols										
PANs									1558	
Di-n-Octyl Phthalate				4				17		
Aroclor-1248									6800	
PCB TICs									6430	
Arsenic									10700	
Cadmium						392				
Chromium						169		59	18300	
Chromium (Hex)								61		1
Copper									35700	
Iron		24900				106000		20700		6980
Lead				30		43			43000	
Mercury						0.2			170	
Zinc		80							36800	
Potential Fate		Spread		Spread	Test for PCBs and VOAs (Spread)		Test for PCBs and VOAs (Spread)		Test for PCBs, metals, and VOAs (Spread)	

ND - No data.
ppb - parts per billion, ug/kg for soils, ug/l for groundwater (GW).

For soils, only the chemicals detected above background are presented. For groundwater, generally only those chemicals detected above drinking water standards are presented.

TABLE 2

MONITORING WELL RESIDUES (ppb)
NWIRP, BETHPAGE, NY

Parameter	MW-8			MW-25			MW-29		
	Soil	GW	Mud	Soil	GW	Mud	Soil	GW	Mud
Trichloroethene		5		9	120			780	
Tetrachloroethene				8	75		2	3600	
1,1-Dichloroethene									
1,1-Dichloroethane					6			880	
1,2-Dichloroethene				8	100			3600	
1,1,1-Trichloroethane					9			10000	
Carbon Tetrachloride									
Toluene				3	5				
Methyl Phenols								11	
PAHs								4	
Di-n-Octyl Phthalate									
Aroclor-1242			0.36						0.29
Aroclor-1248									
PCB TICs									
TSS (%)			1.5			2.7			1.3
Arsenic				4600	99				
Barium			917			1550			957
Chromium					163	82.8			
Chromium (Hex)					43				
Copper				15800					
Iron			52200		155000	132000		93000	51000
Lead			202	19700	33	446		19	264
Mercury				220					
Zinc			986	28800	104	1840			784
Potential Fate	Spread			Test for VOAs and metals (Spread)			Test for VOAs (Spread)		

ND - No data;
ppb - parts per billion, ug/kg for soils, ug/l for groundwater (GW), and % for TSS (total suspended solids).

For soils, only the chemicals detected above background are presented. For groundwater, generally only those chemicals detected above drinking water standards are presented.

TABLE 3

SOIL RESIDUE DRUMS
REMEDIAL INVESTIGATION, BETHPAGE NEW YORK

Sample Location	Number of Drums	Quantity (gal)	C-VOAs (ppm)	NC-VOAs (ppm)	SVOAs (ppm)	PCBs (ppm)	RCRA Metals		Potential Fate
							Back-ground	Haz Level	
103	2	110	2J	ND	ND	NA	Cd	ND	Spread
104	1	55	2J	ND	NA	NA	NA	NA	Spread
107	2*	110	-	-	-	-	-	-	Identify during drum handling
110	2	110	2J	ND	13J	NA	ND	ND	Spread
111	2	110	5	ND	ND	NA	ND	ND	Spread
112	2	110	3J	ND	16J	NA	ND	ND	Spread
113	1	55	25	ND	35J	NA	ND	ND	Spread
115	1	55	3J	ND	ND	NA	ND	ND	Spread
119	1	55	5,279	ND	140J	NA	Cd,CN	As	Test for VOAs and TCLP
121	1	55	28	ND	214J	TIC	Ba,Cr Pb,Hg	ND	Test for PCBs
123	2	83	7	ND	ND	NA	ND	ND	Spread
202	1	55	ND	ND	150J	NA	ND	ND	Spread
204	2	110	1J	ND	ND	NA	ND	ND	Spread
205	2	110	ND	ND	ND	NA	ND	ND	Spread
206	?**	?**	4J	ND	696J	TIC	Ag	ND	Identify during drum handling and test for PCBs
209	1	55	ND	ND	ND	NA	ND	ND	Spread
215	3	138	33J	ND	266J	TIC	ND	ND	Test for PCBs
217	?**	?**	6	ND	10,783	NA	Ag	ND	Spread
218	1	55	3J	ND	147J	NA	As,Hg	ND	Spread
219	1	55	3J	ND	69J	NA	As,Ag	ND	Spread
225	2	87	ND	ND	ND	NA	ND	ND	Spread
227	2	110	ND	ND	241	NA	ND	ND	Spread
229	16***	880+	ND	ND	1,558J	6,800	As,Hg,Ag	ND	Test for PCBs
304/329	1	55	55	108	7,040	ND	ND	ND	Spread
307	?**	?**	ND	ND	ND	NA	ND	ND	Spread
314	2	110	ND	ND	ND	NA	ND	ND	Spread
316	2	87	7J	65	52J	ND	ND	ND	Spread
318	2	110	2J	ND	ND	NA	ND	ND	Spread
328	1	55	6J	1J	- 338J	ND	As	ND	Spread

*Sample Location	Number of Drums	Quantity (gal)	C-VOAs (ppm)	NC-VOAs (ppm)	SVOAs (ppm)	PCBs (ppm)	RCRA Metals		Potential Fate
							Back-ground	Haz Level	
329	2	110	5J	108	7,040	ND	ND	ND	Spread
334	2	110	16J	ND	40Z	NA	As,Pb,Hg	ND	Spread
338	2	110	5J	ND	41J	NA	ND	ND	Spread
PPE	6	330			—				
Total	68	3,640							

C-VOAs: Chlorinated volatile organics.
NC-VOAs: Non-chlorinated volatile organics.
SVOAs: Semivolatiles.
RCRA Metals: Eight metals regulated under 40 CFR 261.24, which include: Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Lead (Pb), Mercury (Hg), Selenium (Se), and Silver (Ag).
Background: Metals above site background concentrations, (See Table 4-5 of the RI).
Haz Level: Metals above a concentration that may cause them to be considered a hazardous waste under RCRA 40 CFR 261.24. Assumes that the metal is 100% soluble in the TCLP test.
ppm: parts per million: mg/l for liquids and mg/kg for solids.
ND: Not Detected.
NA: Not Analyzed.
*: Sample location does not exist. Drums must be rechecked to identify sample location.
**: Number of drums is between 1/2 and 2. Contents likely to be included with other drums identified.
***: Majority of drums contain soils from HN-30.