PHASE II REMEDIAL INVESTIGATION
WORK PLAN
GRUMMAN AEROSPACE CORPORATION
BETHPAGE, NEW YORK

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April 1992

Prepared for

Grumman Aerospace Corporation
Bethpage, New York

Prepared by

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PHASE II REMEDIAL INVESTIGATION
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April 3, 1992

Geraghty & Miller, Inc. is submitting this report to the Grumman Aerospace Corporation (Grumman) for a Phase II Remedial Investigation at Grumman's Bethpage, New York facility. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets the highest standards in terms of methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

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PHASE II REMEDIAL INVESTIGATION
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1.0 INTRODUCTION

Geraghty & Miller, Inc. has prepared this work plan for the Grumman Aerospace Corporation's (Grumman) Bethpage, New York facility pursuant to a requirement by the New York State Department of Environmental Conservation (NYSDEC) for a second phase to the Remedial Investigation (RI) and an identification of strategies for the Feasibility Study (FS) at this site. This work plan was prepared as an addendum to the revised March 1990 work plan (Geraghty & Miller, Inc. 1990a and 1990b) and, except as noted, incorporates the NYSDEC-approved methods and procedures described in those documents.

This work plan was developed using data collected during the Phase I RI (Geraghty & Miller, Inc. 1992) and obtained from the following sources:

- Provisional copy of the U.S. Geological Survey (USGS) draft report entitled "Volatile Organic Compounds and Inorganic Constituents in the Bethpage-Hicksville-Levittown Area, Long Island, New York," in print. (This report has not been approved for release by the USGS.)

- "Draft Remedial Investigation Report for the U.S. Naval Weapons Industrial Reserve Plant at Bethpage, New York, February 1992." (This report does not include analytical data for the deep monitoring wells.)

- 1991 pumpage and analytical data for Public Supply Wells 6-1 and 6-2.

Sample locations specified in this work plan may be revised (contingent on NYSDEC approval) based on analytical data for the deep monitoring wells installed at the Navy site.

1.1 PURPOSE

The purpose of the Phase II RI is to collect additional data to define the nature and extent of contamination attributable to the Grumman Bethpage facility and to provide sufficient information for the conceptual design of a remedial action alternative (if needed) for the site.

1.2 APPROACH

The Phase II RI will focus on the investigation of potential on-site sources identified during the Phase I RI and on off-site ground-water quality. Strategies for the FS are described in Section 3.0 (Feasibility Study Strategies) of this work plan.

2.0 PHASE II REMEDIAL INVESTIGATION

The proposed scope of work for the Phase II RI is discussed in this section. Samples (soil and ground water) collected during this investigation will be analyzed by Industrial & Environmental Analysis, Inc. (IEA) of Monroe, Connecticut. Samples from background Well Cluster GM-7 and GM-13 and suspected source areas will be analyzed for the complete Target Analyte and Target Compound List (TA/TCL) plus hexavalent chromium; samples from other locations will only be analyzed for TCL volatile organic compounds (VOCs) (see Table 2-1). An abundance of data, generated by Grumman, Geraghty & Miller, the U.S. Navy (Haliburton-NUS 1992), and the USGS, demonstrates that VOCs are the primary contaminants attributable to the Grumman site. Other compounds, such as base/neutral extractables and pesticides/polychlorinated biphenyls (PCBs), exhibit far lower mobility in the subsurface and, if present, would be detected close to the source area. Should some of these lower mobility contaminants be detected and their extent not be determined by the limited sampling, then the individual compounds will be analyzed for in additional wells in subsequent ground-water sampling events. Proposed sample/well locations are shown on Figure 2-1. The rationales for selecting the sample/well locations are summarized in Table 2-2.

2.1 TASK 1: SOIL-GAS SURVEY

Based on data collected during the Phase I RI, a soil-gas survey will be conducted at location SG-13 (see Figure 2-1). If soil-gas results indicate the need for further investigation, this location may be added to the shallow soil boring program described in Task 2 below.

2.2 TASK 2: SOIL SAMPLING

Four soil borings are proposed for the Phase II investigation (see Figure 2-1). Borings B-4, B-6, and B-7 will be drilled to a maximum depth of 10 feet below land surface (bls). Boring B-5 will be drilled to 10 feet below the water table. Continuous split-spoon

core samples will be collected in Borings B-4, B-6, and B-7; split-spoon core samples will be collected at 10-foot intervals in Boring B-5.

Immediately upon opening the split-spoon core barrel, a portion of each core sample will be placed in a 40-ml volatile organic analysis (VOA) vial. The remaining sample will be placed in sample jars provided by the laboratory and packed on ice. The samples will also be visually inspected and described by the on-site hydrogeologist. Head space will be measured in the VOA vials with a portable gas chromatograph (GC). Samples (one each from Borings B-4, B-6, and B-7, and three from Boring B-5), with the highest GC results or with observed impact, will be sent to the laboratory for analysis (see Tables 2-1 and 2-2).

Following soil sampling, Borings B-4 and B-5 will be drilled to approximately 10 feet below the water table and completed as shallow monitoring wells (see Section 2.3 [Task 3: Drilling, Installation, and Development of Monitoring Wells]). Borings B-6 and B-7 will be abandoned by grouting to land surface with a 95 percent bentonite/5 percent cement slurry.

2.3 TASK 3: DRILLING, INSTALLATION, AND DEVELOPMENT OF MONITORING WELLS

Three shallow, two deep and three deep (D2) monitoring wells will be installed during the Grumman Phase II RI (see Figure 2-1). These wells, in combination with several existing wells (see Section 2.4 [Task 4: Ground-Water Sampling and Water-Level Measurements]), will form the Grumman Phase II monitoring network. The rationales for selecting the well locations are summarized in Table 2-2. Well completion data for existing wells are provided in Appendix A.

The proposed shallow, deep, and D2 wells will be drilled to approximately 10 feet, 150 to 200 feet, and 450 to 500 feet below the water table, respectively. The proposed shallow and deep wells will be drilled by the NYSDEC-approved methods used in the Phase I RI; D2 wells will be drilled by the mud-rotary method (using 100 percent polymer-free

bentonite and potable water as the drilling fluid). Although informal NYSDEC guidelines discourage the introduction of bentonite drilling fluids into the screen zone, the mud-rotary method is the only feasible drilling method available, as explained below.

Due to the proposed well depths and the high permeability of the formation (basal Magothy), use of the hollow-stem auger or combination hollow-stem auger/mud-rotary/reverse-rotary methods to drill the proposed D2 wells is not feasible. Air-rotary methods (conventional and cased, i.e., Barber) are not acceptable for this investigation because of the difficulty involved in collecting an undisturbed formation sample and the likely creation of airborne particulates in the residential drilling locations. The cable-tool method is not practical due to the time constraints imposed on the expedited RI schedule, as well as the very likely possibility that the casing string would break or could not be removed. The reverse-rotary technique, although probably capable of drilling the hole, would require large quantities of water and/or bentonite to do so. Even if bentonite is not used, our experience has been that so much water is used to drill the hole that even with extra well development, it could be several months or years before a representative ground-water sample can be obtained from the well. Furthermore, deep wells, installed by the USGS during their investigation of the area, were installed by the mud-rotary technique, and many of the monitoring wells installed for the Old Bethpage Landfill off-site ground-water investigation were also drilled by the mud rotary method. Wells at the Old Bethpage Landfill have been monitored since 1985, with no apparent differences between wells drilled by mud rotary, the Barber method, and the cable-tool method. One further consideration is that drilling will be conducted in a residential area, which places extreme constraints on working space. Based on discussions with drilling contractors, the mud- rotary method will require the least space.

The wells to be installed in the southeastern corner of the Grumman facility (GM-22D) and the deep well cluster to be installed southeast of the Grumman facility (GM-36D and GM-36D2) will serve two purposes. First, the locations and depth of these wells were selected to delineate the extent of the off-site ground-water contamination attributable to

the Grumman facility in these areas. Second, these wells will serve as early warning monitoring points for public water supply wells located southeast of the Grumman site. Therefore, GM-22D, GM-36D, and GM-36D2 will be installed and developed first. These wells will be sampled and analyzed for VOCs within 14 days after completion of well development. The analytical results will be shared with the NYSDEC and the Bethpage Water District. Depending on the analytical results, an additional monitoring well or wells may be installed in this southeastern off-site area. The drilling contract for monitoring well installation will be sufficiently flexible to allow installation of an additional well or wells during the Phase II RI.

During monitoring well drilling, split-spoon core samples will be collected, and head-space analyses and geophysical (natural gamma) logs will be conducted in the deepest borehole of the cluster,in accordance with methods used in the Phase I RI. Wells will be constructed of 4-inch I.D. PVC well casing and screen as in Phase I, except that D2 wells will be constructed with a 20-foot screen. Following installation, wells will be developed and measuring point elevations surveyed, as in Phase I.

2.4 TASK 4: GROUND-WATER SAMPLING AND WATER-LEVEL MEASUREMENTS

During the Phase II RI, one round of ground-water sampling from the Phase I and Phase II monitoring wells will be conducted (Tables 2-1 and 2-2). With the exception of Well Clusters GM-7 and GM-13, ground-water samples will be analyzed for TCL VOCs. Ground-water samples from Well Clusters GM-7 and GM-13 will be analyzed for TA/TCL and hexavalent chromium. Monitoring wells with dedicated pumps will be purged and sampled through a discharge line or valve. Monitoring wells without dedicated pumps will be purged with a submersible pump and sampled with a Teflon bailer. The sampling protocols will be the NYSDEC-approved methods that were used in the Phase I RI.

During the Phase II RI, monthly water-level measurements will be collected from the Phase I monitoring well network. Upon completion of Task 3 (Drilling, Installation, and Development of Monitoring Wells), the measuring point elevations will be determined and the Phase II monitoring well network will be added to the monthly water-level measurements. The water levels will be plotted to show the direction of ground-water flow at the site.

Water-level measurements will also be collected monthly in the off-site area northeast of the Grumman facility. At a minimum, Nassau County Well N-4175 and the capped Bethpage Water District Wells N-4063 and N-4146 will be measured. These data will be plotted as previously described to help determine ground-water flow in this northeastern area. If the plots of water-level measurements indicate that there are potential horizontal flow components from Grumman property into this northeastern area, then Well N-4175 and one of the capped Bethpage Water District wells will be sampled and analyzed for VOCs during the Phase II RI sampling round.

2.5 TASK 5: REMEDIAL INVESTIGATION REPORT

A draft RI report will be prepared following all phases of the on- and off-site investigation. The report will describe work conducted, summarize data collected, and include the preliminary list of technologies and the baseline exposure assessment. In addition, the RI report will include a list of recognized sources of contamination, along with a list of compounds that may have migrated from the sources. This report will incorporate comments received from the NYSDEC and the public.

3.0 FEASIBILITY STUDY STRATEGIES

This section discusses the strategies that, based on the current data, will be used in the FS to address site contaminants.

3.1 SOURCE CONTROL

In Phase I of the RI, VOCs were detected in soil gas and/or soil samples at locations on Grumman property (Plant 1, Plant 2, Plant 4, and Plant 15). During Phase II, the extent to which these sources are actively contributing to ground-water contamination will be determined. Sources that are determined to be active (e.g., appreciable concentrations of VOCs in the unsaturated zone) will be evaluated for the possible rapid implementation of source control remedies such as excavation or soil-vapor extraction. A full range of alternatives will also be evaluated, consistent with the United States Environmental Protection Agency Remedial Investigation/Feasibility Study (USEPA RI/FS) guidance manual, but Grumman intends to address source areas as quickly as possible.

3.2 CONTROL AND REMEDIATION OF CONTAMINATED GROUND WATER UNDER THE GRUMMAN PROPERTY

The work performed by the USGS has provided insight into the distribution and recirculation of contaminants in ground water under the Grumman site. As part of the renewal of its State Pollutant Discharge Elimination System (SPDES) permit, Grumman retained Geraghty & Miller to review historic Grumman pumpage and ground-water quality data to determine whether trends that could be used to alter pumping schedules and enhance contaminant removal existed.

During the FS, this previous work will be evaluated along with new data from the RI, which define contaminant plumes more accurately, to determine the optimal use of

Grumman's pumpage and recharge for contaminant removal. Modeling may be employed in this effort for both quantitative concentration and temporal determination.

Furthermore, Grumman has met with the NYSDEC under the SPDES program and has negotiated a schedule to meet drinking water standards in their regulated discharges. Outfalls at the southern end of the facility have been brought into compliance, the remaining outfalls will be brought into compliance by October 1, 1993.

The FS will also examine the fate of contaminants originating on adjacent properties (e.g., Navy and Hooker/RUCO). Remediation at these other sites cannot be separated from that performed at the Grumman site.

3.3 PROTECTION OF PUBLIC WATER SUPPLY

The primary mandate for an RI/FS is to develop a remedy that is protective of human health and the environment, while also meeting technical, statutory, and economic criteria. With respect to the Grumman site, protection of public water supplies is the highest priority. The Bethpage Water District has installed treatment at its Plant 6; Grumman has substantially funded the installation of the treatment system because of the potential relationship, based on preliminary data, between ground-water contamination at the Grumman facility and the contaminants detected at Plant 6.

The results of the second phase of the RI will determine whether other public water-supply wells are threatened. Long-term protection of public water-supply wells will include, at a minimum, ground-water monitoring.

4.0 REFERENCES

Geraghty & Miller, Inc. 1990a. Remedial Investigation/Feasibility Study Work Plan. Grumman Aerospace Corporation, Bethpage, New York. Vol. I - IV.

Geraghty & Miller, Inc. 1990b. Addendum Remedial Investigation/Feasibility Study for Grumman Aerospace Corporation, Bethpage, New York.

Geraghty & Miller, Inc. 1992. Data Report Phase I Remedial Investigation. Grumman Aerospace Corporation, Bethpage, New York. Vol. I and II.

Haliburton-NUS. 1992. Draft Remedial Investigation Report, Naval Weapons Industrial Reserve Plant, Bethpage, New York. Vol. I-IV.

TABLES

Table 2-1. Sample Matrix, Type, Location, and Designation, Grumman Aerospace Corporation, Bethpage, New York.

Sample Location	Sample Designation	TCL VOCs	TCL A/B/N	TCL Pest./PCB	TCL Metals (1)	Hexavalent Chromium	pH (Field)	pH (Lab)	Spec. Cond. (Field)	Spec. Cond. (Lab)	Temp. (Field)	VOC Search (2)
A. Ground-Water Monitoring Wells (One Round)												
GM-1S	GM-1S	X	--	--	--	--	X	--	X	--	X	--
GM-1I	GM-1I	X	--	--	--	--	X	--	X	--	X	--
GM-2S	GM-2S	X	--	--	--	--	X	--	X	--	X	--
GM-2I	GM-2I	X	--	--	--	--	X	--	X	--	X	--
GM-2I	GM-Rep 1	X	--	--	--	--	X	--	X	--	X	--
GM-3S	GM-3S	X	--	--	--	--	X	--	X	--	X	--
GM-3I	GM-3I	X	--	--	--	--	X	--	X	--	X	--
GM-4S	GM-4S	X	--	--	--	--	X	--	X	--	X	--
GM-4I	GM-4I	X	--	--	--	--	X	--	X	--	X	--
GM-5S	GM-5S	X	--	--	--	--	X	--	X	--	X	--
GM-5I	GM-5I	X	--	--	--	--	X	--	X	--	X	--
GM-6S	GM-6S	X	--	--	--	--	X	--	X	--	X	--
GM-6I	GM-6I	X	--	--	--	--	X	--	X	--	X	--
GM-6I	GM-Rep 2	X	--	--	--	--	X	--	X	--	X	--
GM-7S	GM-7S	X	X	X	X	X	X	X	X	X	X	--
GM-7I	GM-7I	X	X	X	X	X	X	X	X	X	X	--
GM-7D	GM-7D	X	X	X	X	X	X	X	X	X	X	--
GM-8S	GM-8S	X	--	--	--	--	X	--	X	--	X	--
GM-8I	GM-8I	X	--	--	--	--	X	--	X	--	X	--
GM-9S	GM-9S	X	--	--	--	--	X	--	X	--	X	--
GM-9I	GM-9I	X	--	--	--	--	X	--	X	--	X	--
GM-10S	GM-10S	X	--	--	--	--	X	--	X	--	X	--
GM-10I	GM-10I	X	--	--	--	--	X	--	X	--	X	--
GM-10I	GM-10I MS	X	--	--	--	--	X	--	X	--	X	--
GM-10I	GM-10I MSD	X	--	--	--	--	X	--	X	--	X	--
GM-11S	GM-11S	X	--	--	--	--	X	--	X	--	X	--
GM-11S	GM-Rep 3	X	--	--	--	--	X	--	X	--	X	--
GM-12S	GM-12S	X	--	--	--	--	X	--	X	--	X	--
GM-12I	GM-12I	X	--	--	--	--	X	--	X	--	X	--
GM-13S	GM-13S	X	X	X	X	X	X	X	X	X	X	--
GM-13I	GM-13I	X	X	X	X	X	X	X	X	X	X	--
GM-13D	GM-13D	X	X	X	X	X	X	X	X	X	X	--
GM-14S	GM-14S	X	--	--	--	--	X	--	X	--	X	--
GM-14I	GM-14I	X	--	--	--	--	X	--	X	--	X	--
GM-15S	GM-15S	X	--	--	--	--	X	--	X	--	X	--
GM-15I	GM-15I	X	--	--	--	--	X	--	X	--	X	--
GM-16S	GM-16S	X	--	--	--	--	X	--	X	--	X	--
GM-16I	GM-16I	X	--	--	--	--	X	--	X	--	X	--
GM-16I	GM-16I MS	X	--	--	--	--	X	--	X	--	X	--
GM-16I	GM-16I MSD	X	--	--	--	--	X	--	X	--	X	--
GM-17S	GM-17S	X	--	--	--	--	X	--	X	--	X	--

See last page for footnotes.

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Sample Location	Sample Designation	TCL VOCs	TCL A/B/N	TCL Pest./PCB	TCL Metals (1)	Hexavalent Chromium	pH (Field)	pH (Lab)	Spec. Cond. (Field)	Spec. Cond. (Lab)	Temp. (Field)	VOC Search (2)
A. Ground-Water Monitoring Wells (One Round) (Cont.)												
GM-18S	GM-18S	X	--	--	--	--	X	--	X	--	X	--
GM-18I	GM-18I	X	--	--	--	--	X	--	X	--	X	--
GM-18I	GM-18I MS	X	--	--	--	--	X	--	X	--	X	--
GM-18I	GM-18I MSD	X	--	--	--	--	X	--	X	--	X	--
GM-19S	GM-19S	X	--	--	--	--	X	--	X	--	X	--
GM-19I	GM-19I	X	--	--	--	--	X	--	X	--	X	--
GM-20S	GM-20S	X	--	--	--	--	X	--	X	--	X	--
GM-20I	GM-20I	X	--	--	--	--	X	--	X	--	X	--
GM-20D	GM-20D	X	--	--	--	--	X	--	X	--	X	--
GM-21S	GM-21S	X	--	--	--	--	X	--	X	--	X	--
GM-21I	GM-21I	X	--	--	--	--	X	--	X	--	X	--
GM-22S	GM-22S	X	--	--	--	--	X	--	X	--	X	--
GM-22I	GM-22I	X	--	--	--	--	X	--	X	--	X	--
GM-22I	GM-Rep 4	X	--	--	--	--	X	--	X	--	X	--
GM-22D	GM-22D	X	--	--	--	--	X	--	X	--	X	--
GM-23S	GM-23S	X	--	--	--	--	X	--	X	--	X	--
GM-23I	GM-23I	X	--	--	--	--	X	--	X	--	X	--
GM-31S	GM-31S	X	--	--	--	--	X	--	X	--	X	--
GM-32S	GM-32S	X	--	--	--	--	X	--	X	--	X	--
GM-33D2	GM-33D2	X	--	--	--	--	X	--	X	--	X	--
GM-34D	GM-34D	X	--	--	--	--	X	--	X	--	X	--
GM-34D2	GM-34D2	X	--	--	--	--	X	--	X	--	X	--
GM-35D2	GM-35D2	X	--	--	--	--	X	--	X	--	X	--
GM-35D2	GM-35D2MS	X	--	--	--	--	X	--	X	--	X	--
GM-35D2	GM-35D2MSD	X	--	--	--	--	X	--	X	--	X	--
GM-36D	GM-36D	X	--	--	--	--	X	--	X	--	X	--
GM-36D2	GM-36D2	X	--	--	--	--	X	--	X	--	X	--
GP-1	GP-1	X	--	--	--	--	X	--	X	--	X	--
GP-2	GP-2	X	--	--	--	--	X	--	X	--	X	--
GP-5	GP-5	X	--	--	--	--	X	--	X	--	X	--
GP-8	GP-8	X	--	--	--	--	X	--	X	--	X	--
GP-8	GP-Rep 5	X	--	--	--	--	X	--	X	--	X	--
GP-14	GP-14	X	--	--	--	--	X	--	X	--	X	--
N-6915	N-6915	X	--	--	--	--	X	--	X	--	X	--
N-6916	N-6916	X	--	--	--	--	X	--	X	--	X	--
N-8004	N-8004	X	--	--	--	--	X	--	X	--	X	--
N-8004	GM-Rep 6	X	--	--	--	--	X	--	X	--	X	--
N-3876	N-3876	X	--	--	--	--	X	--	X	--	X	--
N-8941	N-8941	X	--	--	--	--	X	--	X	--	X	--

See last page for footnotes.

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A. Ground-Water Monitoring Wells (One Round) (Cont.)												
1*	FB-1	X	--	--	--	--	--	--	--	--	--	--
2*	FB-2	X	--	--	--	--	--	--	--	--	--	--
3*	FB-3	X	--	--	--	--	--	--	--	--	--	--
4*	FB-4	X	--	--	--	--	--	--	--	--	--	--
5*	FB-5	X	--	--	--	--	--	--	--	--	--	--
6*	FB-6	X	--	--	--	--	--	--	--	--	--	--
7*	FB-7	X	--	--	--	--	--	--	--	--	--	--
8*	FB-8	X	--	--	--	--	--	--	--	--	--	--
9*	FB-9	X	--	--	--	--	--	--	--	--	--	--
10*	FB-10	X	--	--	--	--	--	--	--	--	--	--
11*	FB-11	X	--	--	--	--	--	--	--	--	--	--
12*	FB-12	X	--	--	--	--	--	--	--	--	--	--
13*	FB-13	X	--	--	--	--	--	--	--	--	--	--
14*	FB-14	X	--	--	--	--	--	--	--	--	--	--
15*	FB-15	X	--	--	--	--	--	--	--	--	--	--
--	TB- (3)	X	--	--	--	--	--	--	--	--	--	--
B. Soil Sampling Points (4)												
B-4	B-4	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5A	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5AMS	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5AMSD	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5ALD	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5B	X	X	X	X	X	--	X	--	--	--	--
B-5	B-5C	X	X	X	X	X	--	X	--	--	--	--
B-6	B-6	X	X	X	X	X	--	X	--	--	--	--
B-7	B-7	X	X	X	X	X	--	X	--	--	--	--
B-4	FBS-1	X	X	X	X	X	--	X	--	--	--	--
B-5	FBS-2	X	X	X	X	X	--	X	--	--	--	--
B-6	FBS-3	X	X	X	X	X	--	X	--	--	--	--
B-7	FBS-4	X	X	X	X	X	--	X	--	--	--	--
--	TB- (3)	X	--	--	--	--	--	--	--	--	--	--

See last page for footnotes.

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Sample Location	Sample Designation	TCL VOCs	TCL A/B/N	TCL Pest./PCB	TCL Metals (1)	Hexavalent Chromium	pH (Field)	pH (Lab)	Spec. Cond. (Field)	Spec. Cond. (Lab)	Temp. (Field)	VOC Search (2)
B. Soil-Gas Survey (5)												
SG-13	SG-13A	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13B	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13C	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13D	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13E	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13F	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13G	--	--	--	--	--	--	--	--	--	--	X
SG-13	SG-13H	--	--	--	--	--	--	--	--	--	--	X

TCL	Superfund Target Compound List.
VOC	Volatile organic compounds.
A/B/N	Acid/base/neutral extractable compounds.
GM	Monitoring well sample.
GP	Grumman Production Well.
N	Nassau County Well.
B	Soil sample from soil boring.
FB	Field blank for ground-water samples.
TB	Trip blanks.
FBS	Field blank for soil samples.
SG	Soil-gas samples.
REP	Replicate sample.
MS	Matrix spike sample.
MSD	Matrix spike duplicate sample.
LD	Laboratory duplicate sample.
X	Sample will be collected.
--	Sample will not be collected.
*	Day of sampling.
PCB	Polychlorinated biphenlys.
Spec. Cond.	Specific conductance.
Pest.	Pesticides.
(1)	Both total and dissolved metals samples will be collected and analyzed for ground-water samples.
(2)	Volatile organics search using a portable gas chromotograph.
(3)	One trip blank (TB) per sample cooler will be provided by laboratory. Trip blanks will be numbered and indicated on chain-of-custody form.
(4)	Soil samples will be scanned in the field for VOCs. If significant contamination is detected, two samples per boring will be submitted for laboratory analysis. Due to the nonhomogenous nature of soil samples, replicate soil samples will not be collected.
(5)	Blanks will be run only if positive results are found. Field blanks for samples GM-7D and GM-13D will be analyzed for TCL/TAL and hexavalent chromium.

Table 2-2. Rationales for Selecting Locations for Monitoring Wells, Soil Borings, Soil-Gas Surveys and Ground-Water Samples for the Phase II Remedial Investigation, Grumman Aerospace Corporation, Bethpage, New York.

Proposed Locations (1)	Rationales
B-4	Investigate shallow soil quality in the vicinity of SG-10 and SG-11.
B-5	Investigate soil quality (to water table) in the vicinity of SG-3, SG-4, and B-1 through B-3.
B-6	Investigate shallow soil quality in the vicinity of SG-5 and SG-6.
B-7	Investigate shallow soil quality in the vicinity of SG-1.
SG-13	Investigate soil-gas quality in the vicinity of a storage area identified by a Grumman employee during the Phase I Remedial Investigation.
GM-11S	Investigate shallow ground-water quality downgradient of the Plant 12 recharge basin. This well replaces existing Well N-6683 proposed for sampling during the Phase I Remedial Investigation.
GM-22D	Investigate ground-water quality at southeastern site border.
GM-31S	Investigate ground-water quality in the vicinity of SG-10 and SG-11.
GM-32S	Investigate ground-water quality in the vicinity of SG-3, SG-4, and B-1 through B-3.
GM-33D2	Investigate off-site ground-water quality downgradient of Plant 2/southwestern site border.
GM-35D2	Investigate off-site ground-water quality downgradient of south recharge basins and upgradient of Bethpage Water District Plant 6.
GM-36D and GM-36D2	Investigate off-site ground-water quality downgradient of southeastern site border and upgradient of Bethpage Water District Plants 4 and 5.
GP-8 and GP-14	Monitor ground-water quality between RUCO and U.S. Navy sites.
GP-5	Monitor ground-water quality downgradient of Plant 25.
GP-2	Monitor ground-water quality upgradient of Plant 2.
GP-1	Monitor ground-water quality downgradient of Plant 2.
N-6915 and N-6916	Monitor off-site ground-water quality at Bethpage Water District Plant 4.
N-8004	Monitor off-site ground-water quality at Bethpage Water District Plant 5.
N-3876 and N-8941	Monitor off-site ground-water quality at Bethpage Water District Plant 6.
N-10997 and N-10998 (GM-34D2 and GM-34D)	Monitor off-site ground-water quality downgradient of site southern border.

B	Soil boring.
SG	Soil-gas survey location.
GM	Monitoring well.
GP	Existing Grumman production well used for water-quality monitoring.
N	Existing monitoring or public supply well used for water-quality monitoring.
S	Shallow monitoring well screened approximately 10 ft below the water table.
D	Deep monitoring well screened approximately 150 to 200 ft below the water table.
D2	Deep 2 monitoring well screened approximately 450 to 500 ft below the water table.
(1)	Proposed locations are shown on Figure 1.

PROPHASE.XLS

FIGURES

OLD COUNTRY ROAD

SOUTH OYSTER BAY ROAD

SOUTH OYSTER BAY EXPRESSWAY

STEWART AVE

LONG ISLAND RAILROAD

BROADWAY

JERUSALEM AVE

WANTAGH AVE

HICKSVILLE ROAD

HEMPSTEAD TURNPIKE

PLANT 3

PLANT 2

GM-31S

GM-11S

GM-32S

GM-33D2

GM-35D2

GM-34D(10998)
GM-34D2(10997)

GM-22D

SC-19

GP-1

GP-2

GP-5

GP-14

B-1

B-5

B-6

B-7

BWD #1

BWD #4

BWD #5

BWD #6

LWD

Golf Course Irrigation

Hospital

TCE

EXPLANATION

- 7076 LOCATION AND DESIGNATION OF EXISTING WELL
- PROPERTY BOUNDARY OF GRUMMAN AEROSPACE CORPORATION
- RECHARGE BASIN
- PROPOSED SOIL GAS LOCATION
- PROPOSED MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED GRUMMAN PRODUCTION AND NASSAU COUNTY WELL SAMPLING LOCATION

0 1000 FT

GERAGHTY & MILLER, INC.
Environmental Services

SCALE VERIFICATION

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING

USE TO VERIFY FIGURE REPRODUCTION SCALE

PROJECT NO.: NY50809	FILE NO: 1489
DRAWING: GRUM-B2	PLOT SIZE:
DRAFTED BY: GS/MRF	DATE: 5-18-92
CHECKED BY: SG	DATE:
APPROVED BY: CSG	DATE:

REV. NO.	DATE	DESCRIPTION	BY	APPR.

REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROPOSED PHASE II MONITORING WELL, SOIL BORING, SOIL GAS, AND GROUND-WATER SAMPLING LOCATIONS

GRUMMAN AEROSPACE CORPORATION
BETHPAGE, NEW YORK

FIGURE
2-1

APPENDIX A

APPENDIX A

WELL COMPLETION DATA

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Nassau
County

[redacted]
Well No.

COMPLETION REPORT – LONG ISLAND WELL

OWNER: U.S. Geological Survey — Lat-Long 404354-732945

ADDRESS: 5 Aerial Way, Syosset NY

LOCATION OF WELL: Water Tower: Wantagh Ave & Universe Dr. Levittown

DEPTH OF WELL BELOW SURFACE: (570 TD) 525 ft.

DEPTH TO GROUND WATER FROM SURFACE: ft.

CASINGS

DIAMETER	4 in.		4 in.		in.		in.
LENGTH	(25) 20 ft.		(1) 10 ft.		ft.		ft.

SEALING:

CASINGS REMOVED:

SCREENS

MAKE:

OPENINGS:

DIAMETER	4 in.		in.		in.		in.
LENGTH	10 ft.		ft.		ft.		ft.

DEPTH TO TOP FROM TOP OF CASING: 510' (5 ft sump below screen)

PUMPING TEST

DATE:

TEST OR PERMANENT PUMP?

DURATION OF TEST: days / hours

MAXIMUM DISCHARGE: gallons per min.

STATIC LEVEL PRIOR TO TEST: ft. in. below top of casing

LEVEL DURING MAXIMUM PUMPING: -- ft. – in. below top of casing

MAXIMUM DRAWDOWN: ft.

Approximate time of return to normal level after cessation of pumping: hrs. / min.

PUMP INSTALLED

TYPE	MAKE	MODEL NO.
MOTIVE POWER	MAKE	H.P.

CAPACITY: g.p.m. against ft. of discharge head

NUMBER BOWLS OR STAGES: ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: in.	DIAMETER: in.
LENGTH: ft.	LENGTH: ft.

METHOD OF DRILLING: ☑ rotary ☐ cable tool ☐ other _____

USE OF WATER:

WORK STARTED:

COMPLETED:

DATE: 11/30/87

DRILLER: Delta Co.

LICENSE NO.

*NOTE: Show log of well - materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See Instructions as to Well Drillers' Licenses and Reports. Pages 5 - 7.

ORIGINAL – Environmental Conservation Copy

* LOG

Ground Surface mp El. 71.193 ft. above s

A / V ft.

TOP OF WELL

0 med. coarse brown sand/gravel

15' Fine to coarse yellow/brown sand with some Gravel & clay

60' Fine to med, yellow brown light g clay, silt sand

100' Fine, yellow brown streaks dark gray, clay & Sand

130' Fine, Tan & dark grey, clay silt, Sand

180' Fine, Tan - light gray, clay silt

240' Fine, dark grey, s silt

250' Fine, Gray - Tan silt with Tan clay streaks

290' Fine, Gray, sand with Tan clay s

320' Fine, dark gray clay/silt

390' Fine - med. gray s silt, some with clay s

410' Fine, gray clay, silt

420' Fine - coarse, gray silt / Sand

450' Fine - med, gray clay, silt sand

510' medium, gray, Sand, minor am of Tan Clay

520'

County

COMPLETION REPORT – LONG ISLAND WELL

Well No.

OWNER (Continued)

ADDRESS

LOCATION OF WELL

DEPTH OF WELL BELOW SURFACE ft.

DEPTH TO GROUND WATER FROM SURFACE ft.

CASINGS

DIAMETER	in.	in.	in.	in.
LENGTH	ft.	ft.	ft.	ft.

SEALING

CASINGS REMOVED

SCREENS

MAKE

OPENINGS

DIAMETER	in.	in.	In.	in.
LENGTH	ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING

PUMPING TEST

DATE

TEST OR PERMANENT PUMP?

DURATION OF TEST days hours

MAXIMUM DISCHARGE gallons per min.

STATIC LEVEL PRIOR TO TEST ft. in. below top of casing

LEVEL DURING MAXIMUM PUMPING ft. in. below top of casing

MAXIMUM DRAWDOWN ft.

Approximate time of return to normal level after cessation of pumping hrs. min.

PUMP INSTALLED

TYPE	MAKE	MODEL NO.
MOTIVE POWER	MAKE	H.P.

CAPACITY g.p.m. against ft. of discharge head

NUMBER BOWLS OR STAGES ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER In.
LENGTH ft.	LENGTH ft.

METHOD OF DRILLING ☐ rotary ☐ cable tool ☐ other _____

USE OF WATER

WORK STARTED

COMPLETED

DATE	DRILLER	LICENSE NO.

*NOTE: Show log of well - materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See Instructions as to Well Drillers' Licenses and Reports. Pages 5 - 7.

DUPLICATE – Retain

* LOG

Ground Surface

El. _____ ft. above s

A / V _____ ft.

TOP OF WELL

520 medium, coars
grey, Sand gave

523 Fine-medium, g
Sand-silt

539 Fine, grey, c
-silt, some T
clay streak

546 fine, medium,
grey, Sand-s
minor amo
of Tan clay
streaks

570

Y-21

(20)

N-

SKETCH OF LOCATION

Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.
Show North Point

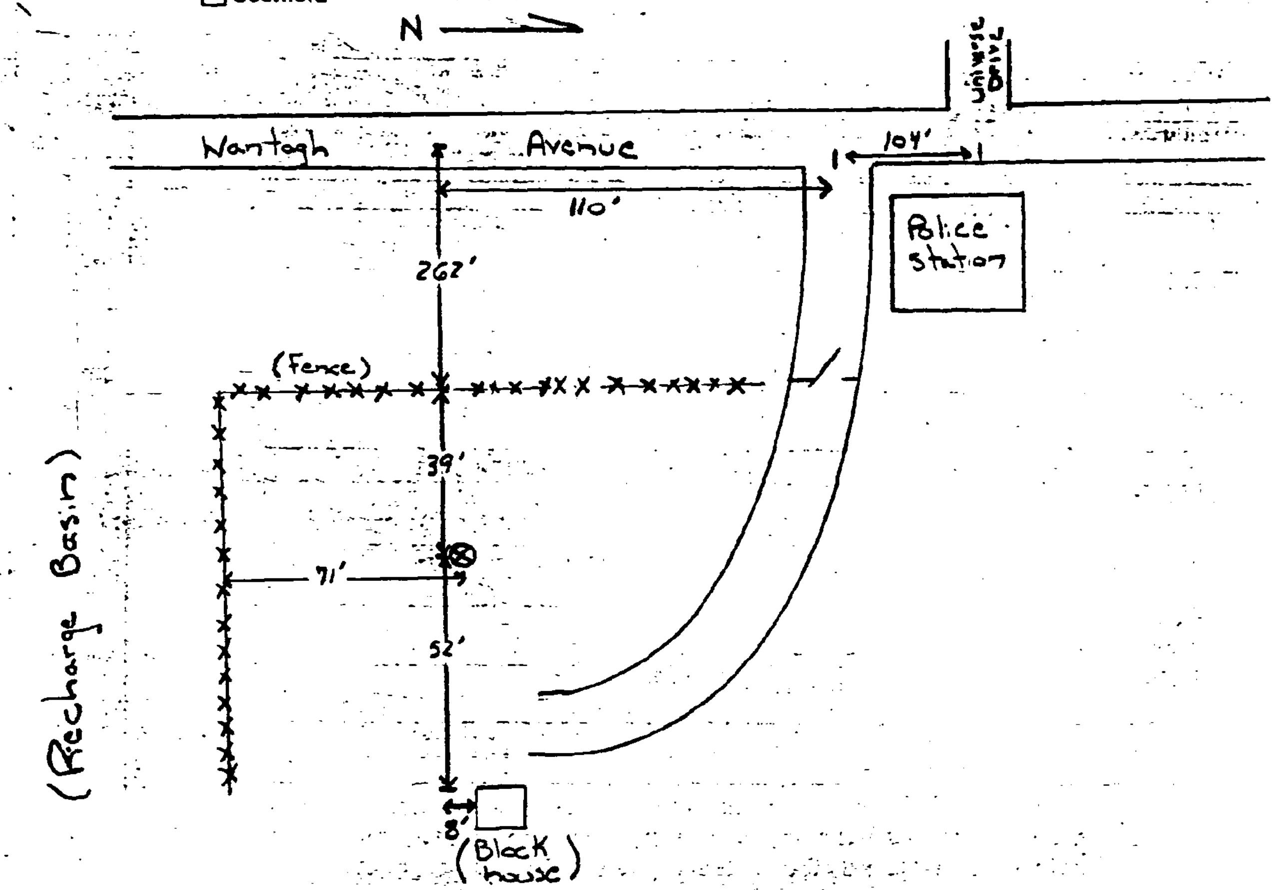
Check the Town in which the project is located:

Nassau County:

- [x] Hempstead
- [ ] North Hempstead
- [ ] Oyster Bay

Suffolk County:

- [ ] Babylon
- [ ] Brookhaven
- [ ] East Hampton
- [ ] Huntington
- [ ] Islip
- [ ] Riverhead
- [ ] Shelter Island
- [ ] Smithtown
- [ ] Southampton
- [ ] Southold



Nassau
County

COMPLETION REPORT – LONG ISLAND WELL

Well No.

OWNER: US Geological Survey Lat-Long 404354-732945

ADDRESS: 5 Aerial Way Syosset NY

LOCATION OF WELL: Water Tower: Wantagh Ave & Universe Dr Levittown

DEPTH OF WELL BELOW SURFACE: (570 TD) 324ft.

DEPTH TO GROUND WATER FROM SURFACE: ft.

CASINGS

DIAMETER	2 in.	2 in.	in.	in.
LENGTH	(15) 20 ft.	(1) 9 ft.	ft.	ft.
SEALING		CASINGS REMOVED		

SCREENS

MAKE		OPENINGS		
DIAMETER	2 in.	in.	in.	in.
LENGTH	10 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 309' (5 ft sump below screen)

PUMPING TEST

DATE		TEST OR PERMANENT PUMP?	
DURATION OF TEST	days / hours	MAXIMUM DISCHARGE	gallons per min.
STATIC LEVEL PRIOR TO TEST	ft. / in. below top of casing	LEVEL DURING MAXIMUM PUMPING	ft. / in. below top of casing
MAXIMUM DRAWDOWN	ft.	Approximate time of return to normal level after cessation of pumping	hrs. / min.

PUMP INSTALLED

TYPE	MAKE	MODEL NO.
MOTIVE POWER	MAKE	H.P.
CAPACITY	g.p.m. against	ft. of discharge head
NUMBER BOWLS OR STAGES		ft. of total head

DROP LINE	SUCTION LINE
DIAMETER in.	DIAMETER in.
LENGTH ft.	LENGTH ft.
METHOD OF DRILLING ☒ rotary ☐ cable tool ☐ other	USE OF WATER
WORK STARTED	COMPLETED 11/24/87

DATE	DRILLER	LICENSE NO.
11/30/87	Delta Co	

*LOG

Ground Surface mp El. 71.193 ft. above s

A / V ft.

TOP OF WELL

(See completion repor for N10997 since N109 and N10998 are double at same location with different screen interval

*NOTE: Show log of well - materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports. Pages 5 - 7.

ORIGINAL – Environmental Conservation Copy

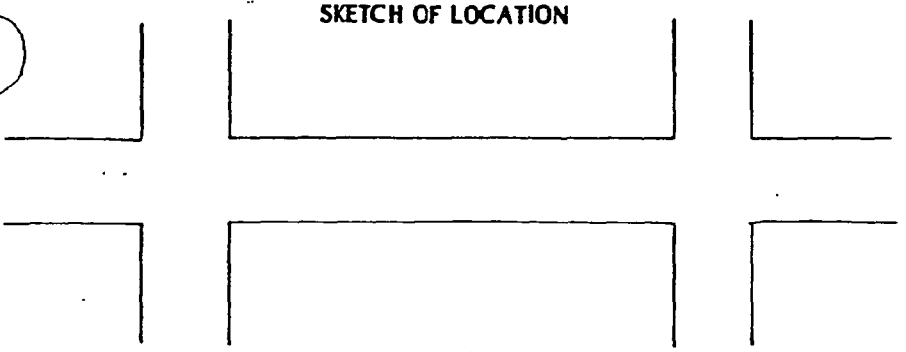
NYSDEC 045956

Y-21

(20)

N-10498

SKETCH OF LOCATION



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.
Show North Point

Check the Town in which the project is located:

Nassau County:

- [X] Hempstead
- [ ] North Hempstead
- [ ] Oyster Bay

Suffolk County:

- [ ] Babylon
- [ ] Brookhaven
- [ ] East Hampton
- [ ] Huntington
- [ ] Islip
- [ ] Riverhead
- [ ] Shelter Island
- [ ] Smithtown
- [ ] Southampton
- [ ] Southold