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

IN REPLY REFER TO

5090
Code 1821/JLC

21 JUN 2001

Mr. Gerard Burke
Project Engineer
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Dear Gerard:

Subj: Soil Sampling Results and Workplan for Application of Permeable Cover; Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, New York

During a meeting held between the Navy and New York State Department of Environmental Conservation (NYSDEC) on April 11, 2001, the Navy distributed soil sampling locations and analytical results for IR Sites 2 and 3 where a permeable cover is to be placed over residual compounds that are expected to remain in surface and near-surface soils. Application of this cover is in accordance with a Record of Decision (ROD) prepared by the Navy and concurred with by NYSDEC in July 1995.

The enclosed document is the Navy's Final Report regarding the results of the soil sampling program and workplan for application of the permeable cover. As outlined in the report, a combination soil and gravel cover is proposed for IR Site 2 while no additional cover will be applied at IR Site 3 in light of the efforts conducted by the Northrop Grumman Corporation. In addition, the Navy reviewed NYSDEC's proposal for the use of a subsurface marker (i.e. orange snow fence) but does not recommend it's use for reasons outlined in the report.

The Navy has taken the workplan, as described in the enclosed report, and has begun pre-award activities to secure the services of a contractor to install the permeable cover. However, at this time, funding constraints makes it unlikely that the cover will be applied until at least the August or September 2001 timeframe. Therefore, if you have any questions or comments regarding the enclosed report, especially regarding the workplan, please contact me by email at colterjl@efane.navfac.navy.mil or by phone at (610) 595-0567, extension 163.

Sincerely,

JAMES L. COLTER
Remedial Project Manager
By direction of the
Commanding Officer

Enclosure: (1) Surface Soil Sampling Results - IR Sites 2 and 3

Distribution: (via email)

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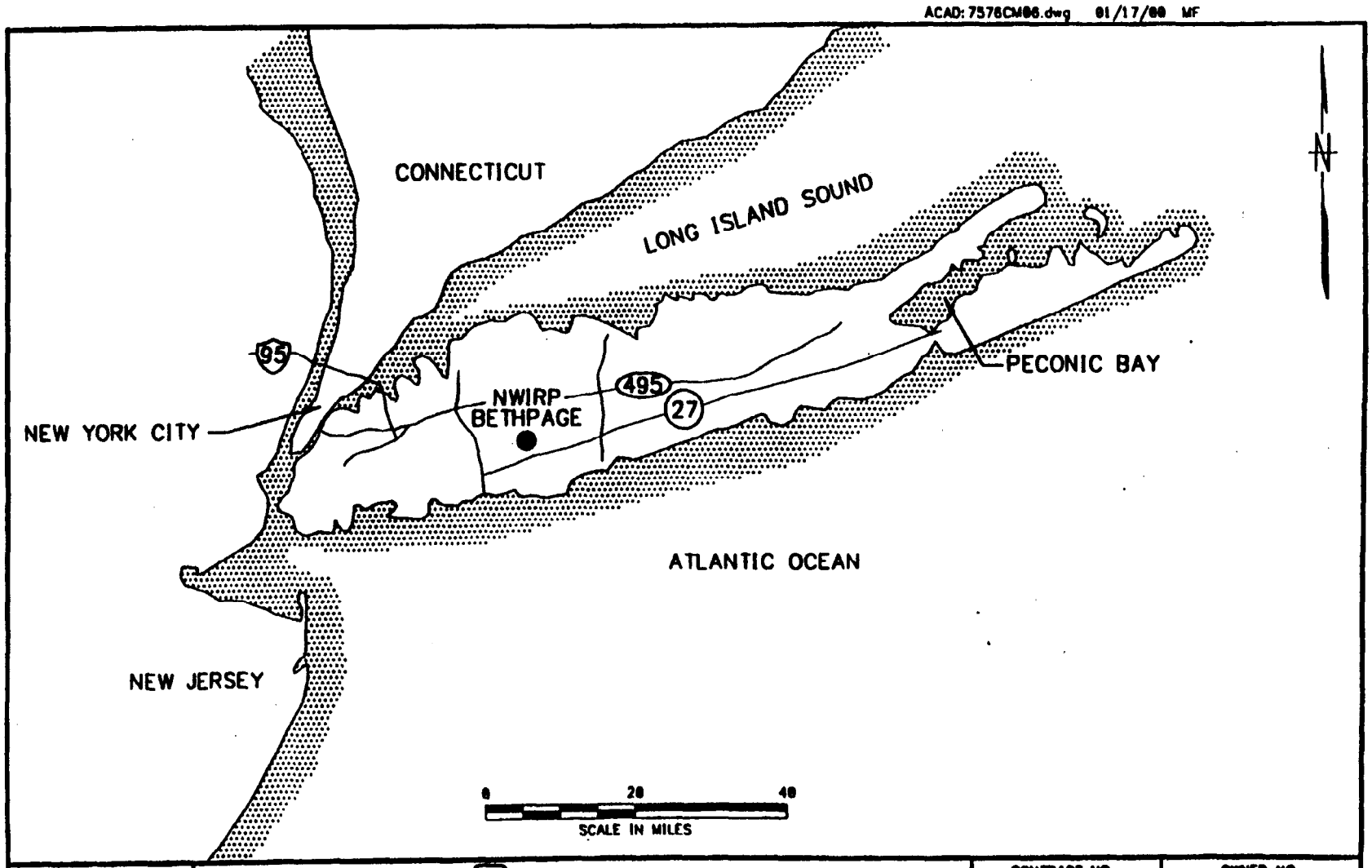
SURFACE SOIL SAMPLING RESULTS
SITE 2 - RECHARGE BASIN AREA
SITE 3 - SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK

1.0 INTRODUCTION AND OVERVIEW

Tetra Tech NUS, Inc. (TtNUS) was contracted to perform a surface soil investigation for the Department of Navy, Engineering Field Activity Northeast at the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage located in Bethpage New York, See Figure 1-1. The work is being conducted in support of the Record of Decision (ROD) dated July 5, 1995 that requires "A 6-inch permeable gravel and/or vegetated soil cover will be installed on top of those areas where residual metal and organic contamination is expected to remain in place." This cover is to be installed at portions of Sites 1, 2, and 3. Sites 2 and 3 are currently being prepared for transfer and the cover requirements of the ROD must be competed prior to transfer. Site 1 is being retained by the Navy.

Currently, remediation of VOC contaminated soils is underway at Site 1, but final remediation of the site is not expected to be completed for one or more years. At Site 2, soils contaminated with polychlorinated biphenyls (PCBs) at concentrations greater than 10 parts per million have been excavated and disposed off site in accordance with the ROD. Also, several areas where metal and organic contamination were identified in the past have been significantly reworked (e.g. former sludge drying beds). Site 3 has been similarly reworked with debris removed, the surface soil raked of metal parts, and two inches of clean fill placed on the site. In addition, many of the organic contaminants in the surface soils are known to naturally attenuate, and therefore may be present at lower concentrations than measured in the early 1990s.

The objective of this soil sampling program is to characterize the existing condition of the surface soils at Sites 2 and 3 and to delineate those areas that require permeable cover in accordance with the ROD. The chemicals of concern are listed in the 1995 ROD and consist of semi-volatile organic compounds (SVOCs) - primarily polynuclear aromatic hydrocarbons (PAHs), pesticides, PCBs, and several metals. VOCs were found to be only a minor issue at Sites 2 and 3 and would be addressed through a natural flushing.



DRAWN BY MF DATE 1/17/00	Tetra Tech NUS, Inc.	CONTRACT NO. 7576	OWNER NO. 0283
CHECKED BY DATE	GENERAL LOCATION MAP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT BETHPAGE LONG ISLAND, NEW YORK	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 1-1	REV. 0

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2.0 FIELD INVESTIGATION TASKS

The field activities are described below.

2.1 Sample Locations And Rationale

TtNUS, the Navy, and a representative of Nassau County field identified 17 locations at Site 2 and 10 locations at Site 3 on February 7, 2001. Based on a review of these initial locations, several sample points were moved slightly in the field (less than 50 feet) on February 8, 2001 to provide more uniform coverage within these sites.

The locations of these sample points are provided on Figures 2-1 and 2-2 and are discussed below.

Samples BP-S2-250 and 251 are located in a grassy area between the cemetery and the industrial wastewater treatment plant (WWTP). This area has no history of industrial activities.

Samples BP-S2-252, 253, 254, 255, 256, 257, and 264 are located on the access roads around the recharge basins. If present, contamination would have likely occurred during historic dust control activities (oiling) of the roads.

Samples BP-S2-258, 259, 260, 261, 262, and 263 are located in the area of the former sludge drying beds. This area also served as the staging area for sediments scrapped from the site 2 recharge basins and other facility soils. Sample BP-S2-260 is from the area previously excavated for subsurface PCB soil contamination and should reflect the clean soils used to refill the excavation.

Samples BP-S2-265 and 266 are from a lightly vegetated area south of the recharge basins. No activity is known to have occurred in this area other than potential over spray from dust control activities.

Site 3 was used to store miscellaneous parts and equipment. The area is currently lightly vegetated. Samples BP-S3-350 to 359 are uniformly distributed throughout the area at Site 3. Areas where samples were not collected are currently covered with concrete and asphalt.

Because of the absence of historic activities, samples were not collected north of the recharge basins at Site 2. Similarly, samples were not collected in the asphalt parking lot at Site 3. The asphalt provides adequate cover in this area.

2.2 Sampling Activities

Surface soil samples were collected from the upper 6 inches of the surface soils on February 20 and 21, 2001. Six inches were selected to coincide with the requirement for 6 inches of permeable cover over the contaminated soils.

A disposable PVC trowel was used to collect the soils and place them directly into the sample bottles. These samples were packaged and shipped to Severn Trent Laboratories for analysis. Sample log sheets and chain--of-custody forms are presented in Appendix A.

The sample points were marked with pin flags and the exact location was determined during sample collection using a tape measure with buildings, fences, and roadways as reference points. Surveying activities were not conducted.

2.3 Sample Analysis and Data Validation

A summary of the sample collection and analysis is presented as follows. Sample duplicates were collected at a frequency of 1 per 10 (3 total) and matrix spike/matrix spike duplicates were collected at a frequency of 1 per 20 per site (2 total). Since only disposable equipment was used, field blanks were not collected. Samples were analyzed using current Contract Laboratory Program analytical methods, see Appendix A. Data was validated in accordance with Navy and U.S. EPA requirements, See Appendix A. No major QA/QC problems were noted.

Sample Number	Analysis
BP-S2-250	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-251	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-252	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-253	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-254	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-255	SVOCs, pesticides, PCBs, and TAL metals

Sample Number	Analysis
BP-S2-256 BP-S2-256-Dup BP-S2-256-MS/MSD	SVOCs, pesticides, PCBs, and TAL metals Collect additional sample for duplicate and matrix spike/matrix spike duplicate.
BP-S2-257	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-258	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-259	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-260	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-261	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-262	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-263	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-264	SVOCs, pesticides, PCBs, and TAL metals
BP-S2-265 BP-S2-265-Dup	SVOCs, pesticides, PCBs, and TAL metals Collect additional sample for duplicate.
BP-S2-266	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-350	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-351	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-352	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-353	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-354	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-355	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-356	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-357	SVOCs, pesticides, PCBs, and TAL metals
BP-S3-358 BP-S3-358-Dup BP-S3-358-MS/MSD	SVOCs, pesticides, PCBs, and TAL metals Collect additional sample for duplicate and matrix spike/matrix spike duplicate.
BP-S3-359	SVOCs, pesticides, PCBs, and TAL metals

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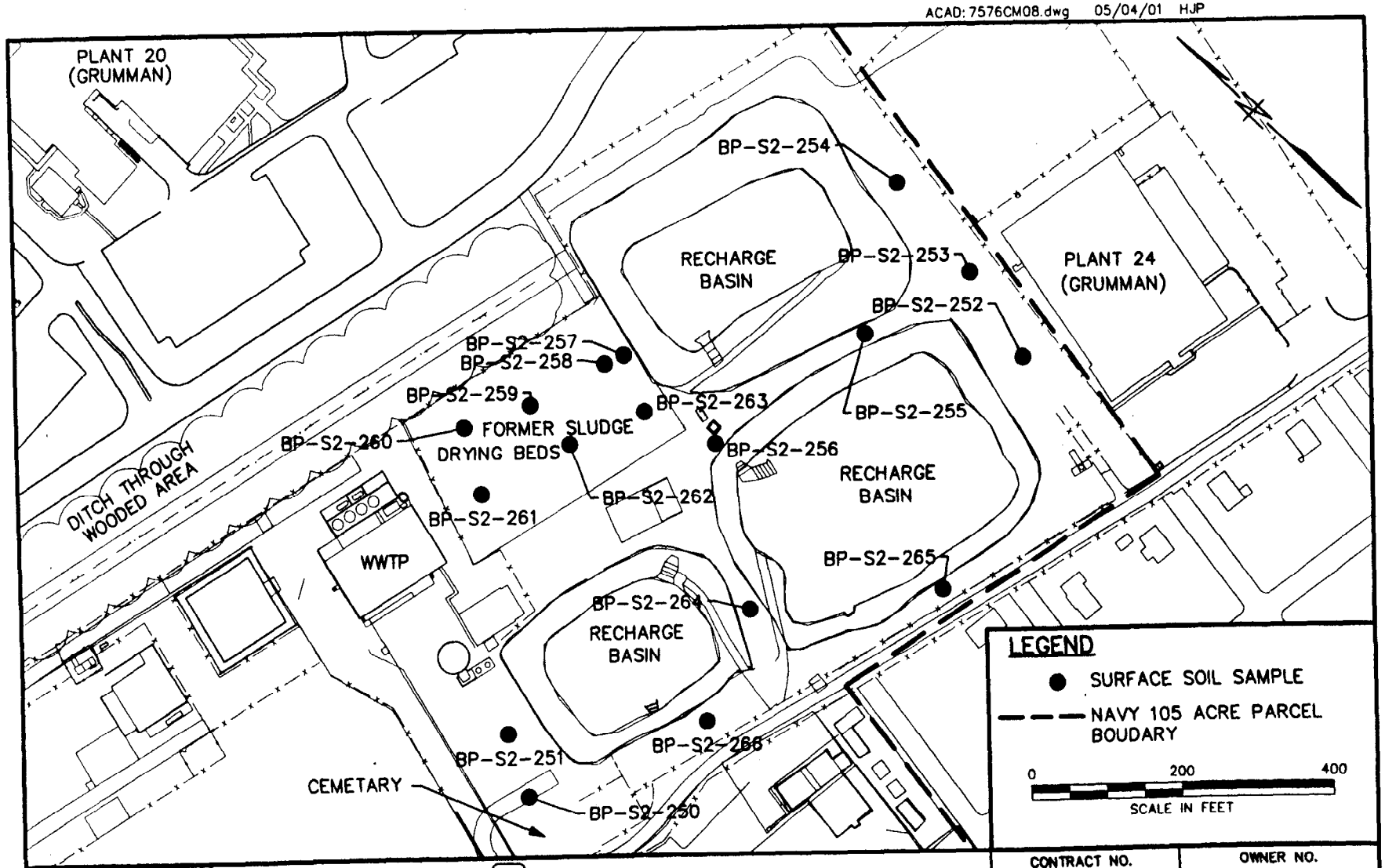

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CHECKED BY DATE	SURFACE SOIL SAMPLE LOCATIONS SITE 2 - RECHARGE BASIN AREA NWIRP BETHPAGE, NEW YORK	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2-1	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

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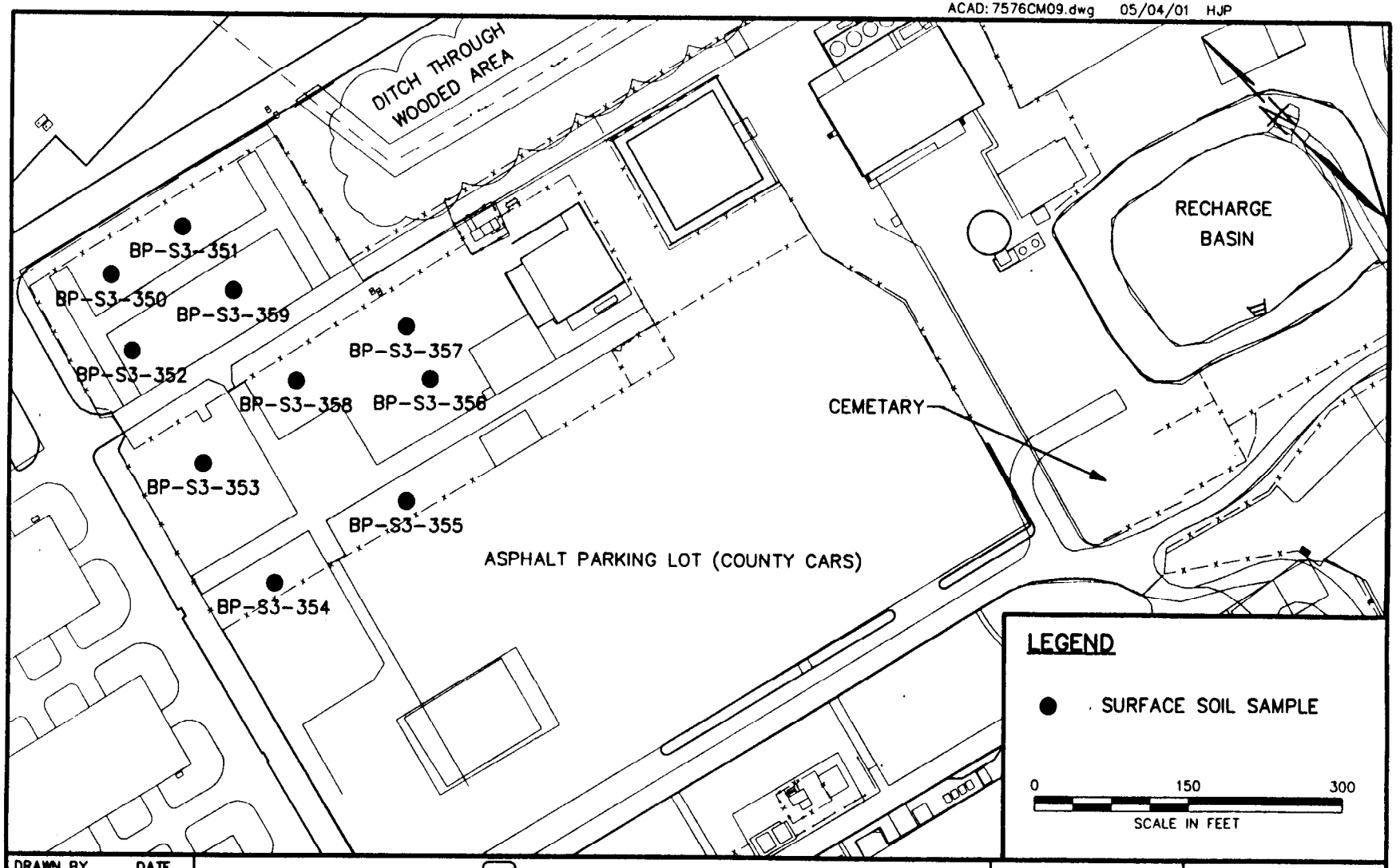

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CHECKED BY DATE	SURFACE SOIL SAMPLE LOCATIONS SITE 3 – SALVAGE STORAGE AREA NWIRP BETHPAGE, NEW YORK	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2-2	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

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3.0 ANALYTICAL RESULTS

The analytical results for the 2001 Site 2 and Site 3 surface soil investigation are discussed below. To evaluate the data, the analytical results were compared to several criteria, as follows. If the chemicals were detected at concentrations below NYSDEC TAGM 4046, inorganic background levels, and ROD PRGs, then no action was considered and the surface soils in the area were identified as clean. If the chemical concentrations exceeded the U.S. EPA Region IX PRGs (industrial), which are more stringent than the U.S. EPA Region III RBCs (industrial), then the area would be considered for the 6-inch permeable cover and a land use control or deed restriction. Note that the U.S. EPA Region IX PRGs (industrial) conservatively represent chemical concentrations in soils that would not result in a significant risk to human health under normal non-residential use of the site (e.g. construction, recreational use, office, and parking). These values are consistent with the planned industrial/commercial use of the site. For areas in which chemical concentrations that fall between the NYSDEC TAGM 4046, inorganic background, and ROD PRG values and the U.S. EPA Region IX PRGs (industrial), a land use control or deed restriction would be required, but additional cover would not be placed.

3.1 Site 2 - Recharge Basin Area

Sixteen surface soil samples were collected at Site 2 and analyzed for SVOCs, Pesticides, PCBs, and inorganic constituents. Positive detections were noted in each of these groups of constituents, see Table 3-1 and Figure 3-1. Every sample location had at least one exceedence of a NYSDEC TAGM 4046 and ROD PRG, indicating that a deed restriction for future use of the site will be required. However, as discussed below, several areas did not the EPA Region IX PRGs (industrial).

Two adjacent sample locations that are in the grassy area north of the cemetary (BP-S2-250 and -251) and two adjacent sample locations that are in a grassy area south of the recharge basins (BP-S2-265 and -266) had positive detections of target chemicals, but with only minor exceedences of NYSDEC TAGM 4046 or ROD PRGs. The exceedances in these four samples were for PAHs and/or a few metals. The detections did not exceed industrial use type scenario concentrations (EPA Region IX PRGs). Based on the absence of historic activities in these areas, the positive detections noted in these areas probably resulted from anthropogenic sources.

Polynuclear aromatic hydrocarbons (PAHs) exceeded both NYSDEC TAGM 4046 and U.S. EPA Region IX PRGs (industrial) in twelve sample locations. Patterns were noted in the distribution of contamination. For locations associated with Site 2 roads and the former sludge drying beds/stock pile areas, the PRG exceedences were by one to two orders of magnitude. The PAHs likely results from historic dust control activities and potentially asphalt.

Polychlorinated biphenyls (PCBs) were detected in 15 of the 16 sample locations at Site 2. However, the concentrations exceeded both NYSDEC TAGM 4046 and U.S. EPA Region IX PRGs (industrial - 1,000 ug/kg) in only three sample locations. The measured concentrations were 1660, 4180, and 5940 ug/kg and occurred in the area of the former sludge drying beds and the access road leading to the former sludge drying beds. The former sludge drying bed/soil stockpile area is also the area where PCBs in soils at concentrations greater than 10,000 ug/kg were previously excavated in accordance with the ROD.

Arsenic at concentrations of 8.5 and 9.7 mg/kg in two sample locations (BP-S2-257 and -258) was the only metal to exceed both the NYSDEC TAGM 4046 and the U.S. EPA Region IX PRGs. The PRG is 6.6 mg/kg and is based on an incremental risk that considers the site background concentration of 3.6 mg/kg. These two locations will also be addressed for PAHs and/or PCBs contamination.

Based on this current surface soil analytical data as well as historic subsurface soil analytical data, except for the area north of the cemetery, a deed restriction is recommended for the entire site. In addition, a 6-inch permeable cover is required for the road and the former sludge drying bed area. Additional detail is provided in Section 4.0.

3.2 Site 3 - Salvage Storage Area

Ten surface soil samples were collected at Site 3 and analyzed for SVOCs, Pesticides, PCBs, and inorganic constituents. Positive detections were noted in each of these groups of constituents, see Table 3-2 and Figure 3-2. Most locations had at least one exceedance of a NYSDEC TAGM 4046 and ROD PRGs, indicating that a deed restriction for future use of the site will be required. However, exceedances were minor and noted for only two chemicals, benzo(a)pyrene - a PAH and arsenic.

Benzo(a)pyrene is commonly found in asphalt, tars, vehicle exhaust, and fuels and may be present at the site because of these anthropogenic sources. Benzo(a)pyrene was detected in all ten samples at concentrations ranging from 130 ug/kg to 660 ug/kg. The ROD PRG (330 ug/kg) and the U.S. EPA Region IX PRG (290 ug/kg) are similar for benzo(a)pyrene. The average benzo(a)pyrene concentration at the site is 316 ug/kg, which is less than the ROD PRG and is only slightly greater than the U.S. EPA Region IX PRG. Therefore, potential site risks associated with benzo(a)pyrene would be at the approximate 1E-06 incremental risk level.

Benzo(a)pyrene is partially volatile and biodegradable, with a reported half life in soils of 2 to 17 months, indicating that even the location with the highest concentration would be at or below the ROD PRGs in approximately 17 months if no action is taken and no new PAHs are deposited at the site. However, motor vehicles and road maintenance are expected to continue in the area and represent future sources of benzo(a)pyrene, which may effect the attenuation rate.

Arsenic is commonly found in combustion off gases, rodent poisons, and is a natural mineral. Therefore, arsenic may be present at the site because of these anthropogenic and natural sources. Arsenic was detected in all ten samples at concentrations ranging from 2.8 mg/kg to 10.4 mg/kg. The ROD PRG (5.4 mg/kg) and the U.S. EPA Region IX PRG (6.6 mg/kg) are similar for arsenic. The facility background concentration from samples collected in 1991 is 3.6 mg/kg. The average arsenic concentration at Site 3 is 6.3 mg/kg, which is less than the U.S. EPA Region IX PRG and is only slightly greater than the ROD PRG. Therefore, site risks associated with arsenic would be at the approximate 1E-06 incremental risk level.

Based on this current surface soil analytical data as well as historic subsurface soil analytical data, a deed restriction is recommended for all of Site 3. Even though individual minor exceedences of arsenic and benzo(a)pyrene, with conservative industrial use criteria were noted for Site 3, the average Site 3 concentrations are less than these criteria, indicating that a soil cover is not necessary. The scrapping and removal of metal fragments from the soil and placement of 2 inches of cover soil in the late 1990s likely resulted in the noted decreases in site risks from those estimated in the ROD.

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 1 OF 6

PARAMETER	BP-S2-250	BP-S2-251	BP-S2-252	BP-S2-253	BP-S2-254	BP-S2-255	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Semivolatile Organic Compounds (µg/kg)										
2-METHYLNAPHTHALENE	ND	ND	ND	ND	ND	ND	189000[7]	36400	NA	330
ACENAPHTHENE	ND	ND	380 J	87 J	ND	69 J	38000000	50000	NA	NA
ANTHRACENE	ND	ND	580 J	140 J	ND	140 J	100000000	50000	NA	NA
BENZO(A)ANTHRACENE	110 J	74 J	***5600 J***	*2100 J*	*370 J*	*2200 J*	3000	224	NA	330
BENZO(A)PYRENE	100 J	84 J	***5500 J***	***2500 J***	***430 J***	***2500 J***	330[5]	61	NA	330
BENZO(B)FLUORANTHENE	150 J	110 J	***5900 J***	***3000 J***	*490 J*	*2600 J*	3000	1100	NA	330
BENZO(GHI)PERYLENE	ND	ND	*1300 J*	*1100 J*	140 J	*800 J*	54000000[6]	50000	NA	330
BENZO(K)FLUORANTHENE	120 J	85 J	*2200 J*	*1900 J*	*430 J*	*1300 J*	29000	1100	NA	330
BIS(2-ETHYLHEXYL) PHTHALATE	450	210 J	48 J	ND	61 J	49 J	176000	50000	NA	NA
BUTYL BENZYL PHTHALATE	40 J	ND	ND	ND	64 J	ND	100000000	50000	NA	NA
CARBAZOLE	ND	ND	450 J	140 J	ND	88 J	123000	NA	NA	NA
CHRYSENE	130 J	100 J	*6700 J*	*2700 J*	*480 J*	*2500 J*	289000	400	NA	330
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	ND	ND	88000000	8100	NA	NA
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	ND	ND	10000000	50000	NA	NA
DIBENZ(A,H)ANTHRACENE	ND	ND	***830 J***	***490 J***	60 J	***430 J***	290	14	NA	330
DIBENZOFURAN	ND	ND	58 J	ND	ND	ND	5000000	6200	NA	NA
FLUORANTHENE	210 J	170 J	9500 J	3600 J	730 J	2700 J	30000000	50000	NA	NA
FLUORENE	ND	ND	190 J	ND	ND	ND	33000000	50000	NA	NA
INDENO(1,2,3-CD)PYRENE	64 J	57 J	*2300 J*	*1600 J*	210 J	*1200 J*	3000	3200	NA	330
PHENANTHRENE	56 J	64 J	3000 J	810 J	230 J	630 J	54000000[6]	50000	NA	NA
PYRENE	200 J	130 J	9700 J	2900 J	570 J	2700 J	54000000	50000	NA	NA
Pesticides/PCBs (µg/kg)										
4,4'-DDD	ND	ND	ND	ND	ND	ND	17000	2900	NA	NA
4,4'-DDE	210	22	ND	ND	ND	ND	12000	2100	NA	NA
4,4'-DDT	650 J	11 J	ND	2.6 J	ND	ND	12000	2100	NA	NA
ALPHA-CHLORDANE	2.6 J	4.1 J	ND	1.4 J	4.8 J	0.92 J	11000	540	NA	206
ALDRIN	ND	ND	ND	ND	7.6 J	ND	150	41	NA	NA
AROCLOR 1248	87 J	260	28 J	120 J	450 J	51 J	1000	1000	NA	1000
AROCLOR 1254	ND	ND	ND	ND	160 J	35 J	1000	1000	NA	1000
AROCLOR 1260	ND	ND	ND	20 J	ND	ND	1000	1000	NA	1000
DIELDRIN	ND	ND	ND	ND	1.9 J	ND	150	44	NA	3.3
ENDOSULFAN I	ND	ND	ND	ND	ND	ND	5000000	900	NA	NA
ENDOSULFAN II	ND	2.5 J	ND	ND	ND	ND	5000000	900	NA	NA
ENDRIN	ND	ND	ND	ND	ND	ND	264000	100	NA	NA
ENDRIN ALDEHYDE	ND	ND	ND	ND	ND	ND	264000	100	NA	NA
GAMMA-CHLORDANE	ND	1.6 J	ND	ND	ND	ND	11000	540	NA	206
HEPTACHLOR	ND	ND	ND	ND	ND	ND	500	100	NA	8

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 2 OF 6

PARAMETER	BP-S2-250	BP-S2-251	BP-S2-252	BP-S2-253	BP-S2-254	BP-S2-255	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Inorganics (mg/kg)										
ALUMINUM	6520	7430	9890	7670	5780	4180	100000	SB	NA	NA[5]
ANTIMONY	0.96 J	0.91 J	1.2 J	0.84 J	ND	0.47 J	820	SB	2.75	NA[5]
ARSENIC	4.7	*6.1*	1.8	1.7	4.6	2.1	6.6[9]	7.5 or SB	3.63[10]	5.4
BARIUM	*23.4*	*22*	*28.1*	16.2	*20.3*	*19.5*	100000	300 or SB	18.4	NA[5]
BERYLLIUM	0.23	0.26	0.34	0.15	0.27	0.14	2200	0.16 or SB	0.44	1
CADMIUM	ND	*1.3 J*	ND	*0.69 J*	ND	ND	1000	1 or SB	0.54	NA[5]
CALCIUM	1070	1540	15800	8640	1070	3010	NC[11]	SB	NA	NA[5]
CHROMIUM	10.4	*21.5*	*24.1*	8.3	*16.4*	10.6	64	10 or SB	12.7	NA[5]
COBALT	2.9	2.8	16.9	13.4	3.3	6.6	100000	30 or SB	NA	NA[5]
COPPER	9.4 J	14 J	*85.1 J*	*46.8 J*	14 J	*82.1 J*	76000	25 or SB	NA	NA[5]
IRON	*8360*	*11200*	*26800*	*26100*	*9240*	*10800*	100000	2000 or SB	NA	NA[5]
LEAD	*37.3 J*	*43.2 J*	*20.1 J*	*13.3 J*	*21.9 J*	6.1 J	1000	SB	7.8	NA[5]
MAGNESIUM	775	992	8270	5470	951	2430	NC[11]	SB	NA	NA[5]
MANGANESE	103	112	*383*	*287*	110	113	32000	SB	167	142
MERCURY	ND	0.068	ND	ND	ND	ND	613	0.1	0.075	NA[5]
NICKEL	*5.9*	*7.6*	*8.4*	*4.1*	*4.6*	*4.6*	41000	13 or SB	2.8	NA[5]
POTASSIUM	286	306	204	261	238	510	NC[11]	SB	NA	NA[5]
SELENIUM	ND	ND	0.97	0.64	0.74	0.89	10000	2 or SB	NA	NA[5]
SILVER	*1.1*	*0.98*	ND	*0.7*	ND	ND	10000	SB	0.13	NA[5]
SODIUM	29	35.9	487	423	33.4	151	NC[11]	SB	NA	NA[5]
THALLIUM	ND	ND	ND	*1.9 J*	ND	ND	143	SB	0.36	NA[5]
VANADIUM	13.6	16.7	49.7	57	12.7	22.2	14000	150 or SB	NA	NA[5]
ZINC	*36.6 J*	*47.5 J*	*334 J*	*37 J*	*27.3 J*	*20.3 J*	100000	20 or SB	NA	NA[5]

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 3 OF 6

PARAMETER	BP-S2-256(AVG)	BP-S2-257	BP-S2-258	BP-S2-259	BP-S2-260	BP-S2-261	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Semivolatile Organic Compounds (µg/kg)										
2-METHYLNAPHTHALENE	ND	75 J	ND	ND	ND	ND	189000[7]	36400	NA	330
ACENAPHTHENE	175 J	ND	ND	120 J	56 J	190 J	38000000	50000	NA	NA
ANTHRACENE	355 J	47 J	58 J	300 J	110 J	270 J	100000000	50000	NA	NA
BENZO(A)ANTHRACENE	***3350 J***	320 J	*360 J*	*1100*	*640*	*1100*	3000	224	NA	330
BENZO(A)PYRENE	***4050 J***	***340 J***	***360 J***	***1000***	***710***	***1000***	330[5]	61	NA	330
BENZO(B)FLUORANTHENE	***5100 J***	*410*	*470*	*1100*	*880*	*1300*	3000	1100	NA	330
BENZO(GHI)PERYLENE	*1850 J*	220 J	190 J	*410 J*	*350 J*	*530 J*	54000000[6]	50000	NA	330
BENZO(K)FLUORANTHENE	*2750 J*	*360 J*	*370 J*	*980*	*710*	*1100*	29000	1100	NA	330
BIS(2-ETHYLHEXYL) PHTHALATE	60 J	45 J	90 J	180 J	78 J	140 J	176000	50000	NA	NA
BUTYL BENZYL PHTHALATE	ND	ND	86 J	ND	57 J	210 J	100000000	50000	NA	NA
CARBAZOLE	260 J	39 J	40 J	190 J	84 J	210 J	123000	NA	NA	NA
CHRYSENE	*4200 J*	*440*	*480*	*1200*	*850*	*1400*	289000	400	NA	330
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	ND	2000	88000000	8100	NA	NA
DI-N-OCTYL PHTHALATE	ND	ND	ND	1300	ND	ND	10000000	50000	NA	NA
DIBENZ(A,H)ANTHRACENE	***725 J***	57 J	64 J	140 J	110 J	180 J	290	14	NA	330
DIBENZOFURAN	ND	ND	ND	ND	ND	92 J	5000000	6200	NA	NA
FLUORANTHENE	6050 J	830	880	2700	1700	3000	30000000	50000	NA	NA
FLUORENE	55 J	ND	ND	110 J	46 J	150 J	33000000	50000	NA	NA
INDENO(1,2,3-CD)PYRENE	*2550 J*	220 J	270 J	*600 J*	*490*	*730 J*	3000	3200	NA	330
PHENANTHRENE	1750 J	410	400	1500	780	1900	54000000[6]	50000	NA	NA
PYRENE	5000 J	520	610	1600	1100	2000	54000000	50000	NA	NA
Pesticides/PCBs (µg/kg)										
4,4'-DDD	ND	3.2 J	11	6.4 J	5 J	ND	17000	2900	NA	NA
4,4'-DDE	5.1 J	9.3	36 J	5.8 J	14 J	6.9 J	12000	2100	NA	NA
4,4'-DDT	6.5 J	8.5 J	16 J	28	12 J	5 J	12000	2100	NA	NA
ALPHA-CHLORDANE	6.3 J	6.1 J	44	18	18 J	5.3 J	11000	540	NA	206
ALDRIN	ND	ND	ND	ND	ND	ND	150	41	NA	NA
AROCLOR 1248	485 J	180 J	***5100***	ND	***1300 J***	520	1000	1000	NA	1000
AROCLOR 1254	131 J	130 J	840	ND	360 J	140 J	1000	1000	NA	1000
AROCLOR 1260	ND	ND	ND	ND	ND	ND	1000	1000	NA	1000
DIELDRIN	ND	ND	ND	*4.1 J*	ND	ND	150	44	NA	3.3
ENDOSULFAN I	ND	ND	ND	ND	ND	ND	5000000	900	NA	NA
ENDOSULFAN II	1 J	3.3 J	13	ND	5.4 J	ND	5000000	900	NA	NA
ENDRIN	3.3 J	ND	12 J	ND	7.6 J	2.5 J	264000	100	NA	NA
ENDRIN ALDEHYDE	2.3 J	2.4 J	14	ND	6.9 J	ND	264000	100	NA	NA
GAMMA-CHLORDANE	ND	3.7 J	ND	15	ND	3.2 J	11000	540	NA	206
HEPTACHLOR	ND	ND	ND	0.99 J	ND	ND	500	100	NA	8

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 4 OF 6

PARAMETER	BP-S2-256(AVG)	BP-S2-257	BP-S2-258	BP-S2-259	BP-S2-260	BP-S2-261	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Inorganics (mg/kg)										
ALUMINUM	3645	4330	6030	5680	5660	2810	100000	SB	NA	NA[8]
ANTIMONY	0.8 J	ND	ND	1.2 J	0.94 J	ND	820	SB	2.75	NA[8]
ARSENIC	3.2	*8.5*	*9.7*	3	4.3	3.2	6.6[9]	7.5 or SB	3.63[10]	5.4
BARIUM	*27*	*38.4*	*23.1*	*102*	*25*	12.5	100000	300 or SB	18.4	NA[8]
BERYLLIUM	0.41	0.37	0.23	0.3	0.23	0.17	2200	0.16 or SB	0.44	1
CADMIUM	*0.78 J*	*0.99 J*	*1.4 J*	ND	*1.4 J*	*0.76 J*	1000	1 or SB	0.54	NA[8]
CALCIUM	9020	10700	3280	8910	1760	46200	NC[11]	SB	NA	NA[8]
CHROMIUM	11.3	*16.6*	*43.1*	*17.3*	*60.3*	*54*	64	10 or SB	12.7	NA[8]
COBALT	4.0	3.8	3.4	5	3.4	3.1	100000	30 or SB	NA	NA[8]
COPPER	*60 J*	*30.3 J*	*38.5 J*	*27.1 J*	*33.1 J*	*34.3 J*	76000	25 or SB	NA	NA[8]
IRON	*8960*	*7260*	*9190*	*11200*	*9500*	*6940*	100000	2000 or SB	NA	NA[8]
LEAD	*31 J*	*39.5 J*	*44.6 J*	*106 J*	*39.6 J*	*25 J*	1000	SB	7.8	NA[8]
MAGNESIUM	2830	2540	1900	2750	1280	26900	NC[11]	SB	NA	NA[8]
MANGANESE	140	87.7	139	*202*	104	93.7	32000	SB	167	142
MERCURY	ND	0.092	*0.54*	*0.18*	*0.22*	*0.11*	613	0.1	0.075	NA[8]
NICKEL	*5*	*6.7*	*6.5*	*12.3*	*5.8*	*3.6*	41000	13 or SB	2.8	NA[8]
POTASSIUM	287	318	464	911	370	273	NC[11]	SB	NA	NA[8]
SELENIUM	0.77	ND	ND	ND	0.72	ND	10000	2 or SB	NA	NA[8]
SILVER	*0.31*	*1*	*1.5*	ND	*1.6*	ND	10000	SB	0.13	NA[8]
SODIUM	150	206	45.6	178	68.9	59.3	NC[11]	SB	NA	NA[8]
THALLIUM	ND	ND	ND	ND	ND	ND	143	SB	0.36	NA[8]
VANADIUM	13.1	18.9	15.5	19	14.9	13.3	14000	150 or SB	NA	NA[8]
ZINC	*330 J*	*55.1 J*	*47.1 J*	*108 J*	*39.1 J*	*61.3 J*	100000	20 or SB	NA	NA[8]

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 5 OF 6

PARAMETER	BP-S2-262	BP-S2-263	BP-S2-264	BP-S2-265(AVG)	BP-S2-266	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Semivolatile Organic Compounds (µg/kg)									
2-METHYLNAPHTHALENE	ND	ND	42 J	ND	ND	189000[7]	36400	NA	330
ACENAPHTHENE	470 J	170 J	290 J	ND	ND	38000000	50000	NA	NA
ANTHRACENE	710 J	270 J	520 J	ND	ND	100000000	50000	NA	NA
BENZO(A)ANTHRACENE	***4400***	*1600*	***4300 J***	99 J	91 J	3000	224	NA	330
BENZO(A)PYRENE	***4600***	***1700***	***4800 J***	116 J	100 J	330[5]	61	NA	330
BENZO(B)FLUORANTHENE	***5800***	*2200*	***5300 J***	140 J	120 J	3000	1100	NA	330
BENZO(GHI)PERYLENE	*1900*	*740*	*1300 J*	29 J	57 J	54000000[6]	50000	NA	330
BENZO(K)FLUORANTHENE	*3500*	*1400*	*2200 J*	120 J	110 J	29000	1100	NA	330
BIS(2-ETHYLHEXYL) PHTHALATE	ND	83 J	98 J	104 J	39 J	176000	50000	NA	NA
BUTYL BENZYL PHTHALATE	ND	ND	52 J	23 J	ND	100000000	50000	NA	NA
CARBAZOLE	560 J	210 J	360 J	ND	ND	123000	NA	NA	NA
CHRYSENE	*5600*	*2000*	*5300 J*	140 J	130 J	289000	400	NA	330
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	ND	88000000	8100	NA	NA
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	ND	10000000	50000	NA	NA
DIBENZ(A,H)ANTHRACENE	***710 J***	260 J	***690 J***	ND	ND	290	14	NA	330
DIBENZOFURAN	210 J	ND	86 J	ND	ND	5000000	6200	NA	NA
FLUORANTHENE	10000	4000	7800 J	250 J	240 J	30000000	50000	NA	NA
FLUORENE	360 J	110 J	180 J	ND	ND	33000000	50000	NA	NA
INDENO(1,2,3-CD)PYRENE	*2700*	*1000*	*2000 J*	64 J	67 J	3000	3200	NA	330
PHENANTHRENE	5500	1700	2900 J	91 J	97 J	54000000[6]	50000	NA	NA
PYRENE	7700	2800	7900 J	185 J	170 J	54000000	50000	NA	NA
Pesticides/PCBs (µg/kg)									
4,4'-DDD	ND	6.2	ND	ND	ND	17000	2900	NA	NA
4,4'-DDE	12 J	13 J	16 J	5.2 J	ND	12000	2100	NA	NA
4,4'-DDT	6.8 J	12	13 J	3.7 J	4.9	12000	2100	NA	NA
ALPHA-CHLORDANE	11	11	20 J	2.3 J	1.3 J	11000	540	NA	206
ALDRIN	ND	ND	ND	ND	ND	150	41	NA	NA
AROCLOR 1248	510	640	***3700 J***	82 J	150	1000	1000	NA	1000
AROCLOR 1254	190 J	ND	480 J	ND	ND	1000	1000	NA	1000
AROCLOR 1260	ND	ND	ND	43 J	74	1000	1000	NA	1000
DIELDRIN	2.6 J	ND	ND	ND	ND	150	44	NA	3.3
ENDOSULFAN I	ND	ND	ND	ND	ND	5000000	900	NA	NA
ENDOSULFAN II	ND	3 J	6.1 J	ND	ND	5000000	900	NA	NA
ENDRIN	4.5	ND	10 J	ND	ND	264000	100	NA	NA
ENDRIN ALDEHYDE	4.8 J	ND	6.2 J	3.4 J	2.5 J	264000	100	NA	NA
GAMMA-CHLORDANE	5.4 J	ND	ND	ND	ND	11000	540	NA	206
HEPTACHLOR	ND	ND	ND	ND	ND	500	100	NA	8

TABLE 3-1

ANALYTICAL RESULTS
SITE 2 - RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK
PAGE 6 OF 6

PARAMETER	BP-S2-262	BP-S2-263	BP-S2-264	BP-S2-265(AVG)	BP-S2-266	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Inorganics (mg/kg)									
ALUMINUM	5490	5280	2150	2260	3990	100000	SB	NA	NA[8]
ANTIMONY	0.75 J	ND	0.68 J	0.77 J	ND	820	SB	2.75	NA[8]
ARSENIC	***6.8***	4.2	4.6	3.3	2.1	6.6[9]	7.5 or SB	3.63[10]	5.4
BARIUM	*22*	*32*	*23*	6.6	11.6	100000	300 or SB	18.4	NA[8]
BERYLLIUM	0.24	0.37	0.17	0.14	0.17	2200	0.16 or SB	0.44	1
CADMIUM	*0.81 J*	ND	*0.7 J*	ND	ND	1000	1 or SB	0.54	NA[8]
CALCIUM	2680	9430	3060	87.5	179	NC[11]	SB	NA	NA[8]
CHROMIUM	*22.1*	*13.8*	10.8	*13.6*	*31.3*	64	10 or SB	12.7	NA[8]
COBALT	3.4	3.1	2.6	1.4	2.2	100000	30 or SB	NA	NA[8]
COPPER	*30.1 J*	*32.5 J*	*31.6 J*	10.5 J	8.3 J	76000	25 or SB	NA	NA[8]
IRON	*8170*	*8300*	*6340*	*4620*	*6050*	100000	2000 or SB	NA	NA[8]
LEAD	*37.3 J*	*30.2*	*27.8 J*	*55.6 J*	*8.9 J*	1000	SB	7.8	NA[8]
MAGNESIUM	1410	3670	970	313	555	NC[11]	SB	NA	NA[8]
MANGANESE	115	129	64.1	51	86.4	32000	SB	167	142
MERCURY	*0.096*	0.058	ND	0.074	ND	613	0.1	0.075	NA[8]
NICKEL	*5.1*	*3.8*	*5*	1.9	*2.9*	41000	13 or SB	2.8	NA[8]
POTASSIUM	285	269	194	93.0	174	NC[11]	SB	NA	NA[8]
SELENIUM	ND	ND	1	ND	0.76	10000	2 or SB	NA	NA[8]
SILVER	*0.75*	ND	*0.58*	*0.5*	ND	10000	SB	0.13	NA[8]
SODIUM	97.8	120	134	20.5	25	NC[11]	SB	NA	NA[8]
THALLIUM	*1.4 J*	ND	ND	ND	ND	143	SB	0.36	NA[8]
VANADIUM	15.2	11.5	7.8	15.8	7.1	14000	150 or SB	NA	NA[8]
ZINC	*54.9 J*	*38 J*	*39.5 J*	15.6 J	*30.7 J*	100000	20 or SB	NA	NA[8]

Only detected analytes are shown.

1. U.S. EPA Region IX, Preliminary Remediation Goals, 2000.
2. New York State Department of Environmental Conservation, Technical and Administrative Guidance Memorandum #4046, January 24, 1994.
3. Halliburton NUS, Feasibility Study Report for NWIRP Bethpage, New York, March 1994.
4. NORTHDIVNAVFACENGCOM and NYSDEC, Record of Decision for Sites 1, 2 and 3, NWIRP Bethpage, New York, May 1995.
5. Region IX PRG for benzo(a)pyrene criteria value of 290µg/kg less than the CRDL of 330 µg/kg. Therefore, the CRDL value used for screening.
6. Pyrene used as surrogate.
7. Naphthalene used as surrogate.
8. NYSDEC TAGM values used if no ROD PRGs exist.
9. U.S. EPA Region IX PRG for arsenic is 3 mg/kg. The value used for screening purposes was revised to represent incremental risks associated with arsenic, i.e. mean background concentration (3.6 mg/kg) plus Region IX PRG (3 mg/kg) = 6.6 mg/kg.
10. Inorganic background levels for arsenic represent the 95% upper confidence level (UCL) of the mean concentration.
11. No criteria values established for macronutrients.

Italicized values exceed ROD PRGs.
Bold values exceed U.S. EPA Region IX PRGs.
J = Estimated value. NC = No Criteria SB = Soil Background.
NA = Not available. ND = Not Detected.

TABLE 3-2

ANALYTICAL RESULTS
SITE 3 - SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK
PAGE 1 OF 4

PARAMETER	BP-S3-350	BP-S3-351	BP-S3-352	BP-S3-353	BP-S3-354	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Semivolatile Organic Compounds (µg/kg)									
ACENAPHTHENE	ND	ND	ND	ND	ND	38000000	50000	NA	NA
ACENAPHTHYLENE	ND	ND	ND	88 J	ND	189000	41000	NA	NA
ANTHRACENE	ND	55 J	ND	85 J	84 J	100000000	50000	NA	NA
BENZO(A)ANTHRACENE	220 J	*350 J*	120 J	*520 J*	*500*	3000	224	NA	330
BENZO(A)PYRENE	200 J	320 J	140 J	***660 J***	***550***	330[5]	61	NA	330
BENZO(B)FLUORANTHENE	310 J	*440*	170 J	*780*	*740*	3000	1100	NA	330
BENZO(GHI)PERYLENE	260 J	290 J	65 J	260 J	210 J	54000000[6]	50000	NA	330
BENZO(K)FLUORANTHENE	250 J	*360*	170 J	*650 J*	*460*	29000	1100	NA	330
BIS(2-ETHYLHEXYL) PHTHALATE	260 J	200 J	100 J	150 J	230 J	176000	50000	NA	NA
BUTYL BENZYL PHTHALATE	150 J	160 J	ND	ND	72.0 J	100000000	50000	NA	NA
CARBAZOLE	ND	65 J	ND	ND	ND	123000	NA	NA	NA
CHRYSENE	310 J	*460*	160 J	*670 J*	*620*	289000	400	NA	330
DI-N-BUTYL PHTHALATE	100 J	68 J	ND	ND	ND	88000000	8100	NA	NA
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	56 J	10000000	50000	NA	NA
DIBENZ(A,H)ANTHRACENE	65 J	83 J	ND	86 J	64 J	290	14	NA	330
FLUORANTHENE	510	1100	280 J	970	1000	30000000	50000	NA	NA
FLUORENE	ND	ND	ND	ND	ND	33000000	50000	NA	NA
INDENO(1,2,3-CD)PYRENE	280 J	*360*	100 J	300 J	270 J	3000	3200	NA	330
PHENANTHRENE	180 J	630	82 J	280 J	460	54000000[6]	50000	NA	NA
PYRENE	440	770	180 J	700 J	750	54000000	50000	NA	NA
Pesticides/PCBs (µg/kg)									
4,4'-DDD	5.3	3.5 J	14	ND	19 J	17000	2900	NA	NA
4,4'-DDE	14	7.3 J	23	27 J	34 J	12000	2100	NA	NA
4,4'-DDT	31	16	32	23	56	12000	2100	NA	NA
AROCLOR 1248	ND	ND	ND	430 J	ND	1000	1000	NA	1000
AROCLOR 1254	83 J	110	ND	180 J	600 J	1000	1000	NA	1000
ALPHA-CHLORDANE	13	6	22	29	37	11000	540	NA	206
DIELDRIN	*3.5 J*	2.1 J	*4*	*11 J*	*20*	150	44	NA	3.3
ENDOSULFAN I	ND	ND	ND	ND	ND	5000000	900	NA	NA
ENDOSULFAN II	ND	2 J	ND	ND	ND	5000000	900	NA	NA
ENDRIN	2.3 J	3.3 J	ND	ND	30	264000	100	NA	NA
ENDRIN ALDEHYDE	ND	3.6 J	ND	ND	ND	264000	100	NA	NA
ENDRIN KETONE	ND	ND	ND	4.5	ND	264000	NA	NA	NA
GAMMA-CHLORDANE	8.9	3.1 J	15	24	32	11000	540	NA	206
HEPTACHLOR	ND	ND	ND	1.3 J	ND	500	100	NA	8
HEPTACHLOR EPOXIDE	*2 J*	ND	*1.9 J*	ND	*8.1 J*	270	20	NA	1.7

TABLE 3-2

ANALYTICAL RESULTS
SITE 3 - SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK
PAGE 2 OF 4

PARAMETER	BP-S3-350	BP-S3-351	BP-S3-352	BP-S3-353	BP-S3-354	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Inorganics (mg/kg)									
ALUMINUM	5660	4400	7150	5080	6560	100000	SB	NA	NA[7]
ANTIMONY	0.97 J	0.46 J	1 J	0.85 J	1.3 J	820	SB	2.75	NA[7]
ARSENIC	4.7	3.2	3.5	5	7	6.6[8]	7.5 or SB	3.63[8]	5.4
BARIUM	20.4	17.1	18.7	29	29	100000	300 or SB	18.4	NA[7]
BERYLLIUM	0.18	0.14	0.61	0.25	0.35	2200	0.16 or SB	0.44	1
CADMIUM	10.7 J	17.1 J	1.6 J	3.2 J	5.1 J	1000	1 or SB	0.54	NA[7]
CALCIUM	5380	5700	4250	34400	9640	NC[10]	SB	NA	NA[7]
CHROMIUM	11.5	10.9	5.6	11.1	20.2	64	10 or SB	12.7	NA[7]
COBALT	7.3	7.3	9.6	3.4	3.8	100000	30 or SB	NA	NA[7]
COPPER	52.6	53.5	36.2	50.2	50.3	76000	25 or SB	NA	NA[7]
IRON	15500	13800	19300	9460	11600	100000	2000 or SB	NA	NA[7]
LEAD	43	35.1	23.7	42.7	53.9	1000	SB	7.8	NA[7]
MAGNESIUM	4250	4130	2700	7990	2290	NC[10]	SB	NA	NA[7]
MANGANESE	140	122	210	130	116	32000	SB	167	142
MERCURY	0.058	ND	ND	0.068	0.069	613	0.1	0.075	NA[7]
NICKEL	7.4	5.2	6.1	10.3	14.1	41000	13 or SB	2.8	NA[7]
POTASSIUM	513	338	246	350	441	NC[10]	SB	NA	NA[7]
SELENIUM	0.85 J	ND	0.84 J	ND	0.67 J	10000	2 or SB	NA	NA[7]
SILVER	1	0.65	0.61	0.63	ND	10000	SB	0.13	NA[7]
SODIUM	166	200	464	110	101	NC[10]	SB	NA	NA[7]
THALLIUM	ND	ND	1.4 J	ND	ND	143	SB	0.36	NA[7]
VANADIUM	22.4	32.5	40.8	17.6	21.5	14000	150 or SB	NA	NA[7]
ZINC	70.8	70.6	40.2	98.9	127	100000	20 or SB	NA	NA[7]

TABLE 3-2

ANALYTICAL RESULTS
SITE 3 - SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK
PAGE 3 OF 4

PARAMETER	BP-S3-355	BP-S3-356	BP-S3-357	BP-S3-358(AVG)	BP-S3-359	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Semivolatile Organic Compounds (µg/									
ACENAPHTHENE	ND	ND	ND	35 J	ND	38000000	50000	NA	NA
ACENAPHTHYLENE	ND	ND	ND	ND	ND	189000	41000	NA	NA
ANTHRACENE	51 J	ND	ND	110 J	ND	100000000	50000	NA	NA
BENZO(A)ANTHRACENE	*340 J*	140 J	120 J	*400 J*	140 J	3000	224	NA	330
BENZO(A)PYRENE	***420***	160 J	130 J	***425 J***	150 J	330[5]	61	NA	330
BENZO(B)FLUORANTHENE	*550*	260 J	160 J	*530 J*	210 J	3000	1100	NA	330
BENZO(GHI)PERYLENE	140 J	58 J	82 J	170 J	150 J	54000000[6]	50000	NA	330
BENZO(K)FLUORANTHENE	*490*	230 J	140 J	*455 J*	200 J	29000	1100	NA	330
BIS(2-ETHYLHEXYL) PHTHALATE	180 J	120 J	96 J	120	120 J	176000	50000	NA	NA
BUTYL BENZYL PHTHALATE	43 J	58 J	ND	ND	ND	100000000	50000	NA	NA
CARBAZOLE	40 J	ND	ND	37 J	ND	123000	NA	NA	NA
CHRYSENE	*470*	210 J	150 J	*525 J*	210 J	289000	400	NA	330
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	ND	88000000	8100	NA	NA
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	ND	10000000	50000	NA	NA
DIBENZ(A,H)ANTHRACENE	48 J	ND	ND	41 J	ND	290	14	NA	330
FLUORANTHENE	870	380	250 J	950 J	320 J	30000000	50000	NA	NA
FLUORENE	ND	ND	ND	27 J	ND	33000000	50000	NA	NA
INDENO(1,2,3-CD)PYRENE	180 J	76 J	96 J	275 J	150 J	3000	3200	NA	330
PHENANTHRENE	330 J	130 J	100 J	490 J	120 J	54000000[6]	50000	NA	NA
PYRENE	590	260 J	170 J	685 J	240 J	54000000	50000	NA	NA
Pesticides/PCBs (µg/kg)									
4,4'-DDD	20	20 J	2.3 J	26	17	17000	2900	NA	NA
4,4'-DDE	41	36 J	7.4 J	46	36	12000	2100	NA	NA
4,4'-DDT	70	66 J	13	81	54	12000	2100	NA	NA
AROCLOR 1248	ND	240 J	310 J	ND	ND	1000	1000	NA	1000
AROCLOR 1254	ND	140 J	150	ND	ND	1000	1000	NA	1000
ALPHA-CHLORDANE	20	20 J	6.1	30	29	11000	540	NA	206
DIELDRIN	*11 J*	*16 J*	ND	*15 J*	*6.7 J*	150	44	NA	3.3
ENDOSULFAN I	ND	9.8 J	ND	1.9 J	1.1 J	5000000	900	NA	NA
ENDOSULFAN II	6.8	ND	ND	8.1 J	ND	5000000	900	NA	NA
ENDRIN	ND	ND	3 J	ND	2.3 J	264000	100	NA	NA
ENDRIN ALDEHYDE	ND	ND	3.5 J	ND	3.3 J	264000	100	NA	NA
ENDRIN KETONE	ND	5.2 J	ND	ND	ND	264000	NA	NA	NA
GAMMA-CHLORDANE	17	16 J	3.4 J	23	19	11000	540	NA	206
HEPTACHLOR	ND	ND	ND	ND	ND	500	100	NA	8
HEPTACHLOR EPOXIDE	ND	*6.5 J*	ND	*4.3 J*	*3.5 J*	270	20	NA	1.7

TABLE 3-2

ANALYTICAL RESULTS
SITE 3 - SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK
PAGE 4 OF 4

PARAMETER	BP-S3-355	BP-S3-356	BP-S3-357	BP-S3-358(AVG)	BP-S3-359	U.S. EPA Region IX PRGs (Industrial)[1]	NYSDEC TAGM Recommended Soil Cleanup Objectives[2]	Inorganic Background Levels[3]	ROD Soil PRGs[4]
Inorganics (mg/kg)									
ALUMINUM	5390	6280	7370	7010	7910	100000	SB	NA	NA[7]
ANTIMONY	*19 J*	*4.4 J*	1.2 J	2.6 J	1.4 J	820	SB	2.75	NA[7]
ARSENIC	***8.8***	***7.2***	2.8	***10.4***	***10.4***	6.6[8]	7.5 or SB	3.63[9]	5.4
BARIUM	*26*	*28.2*	*22.6*	*30.2*	*28*	100000	300 or SB	18.4	NA[7]
BERYLLIUM	0.27	0.23	0.27	0.35	*2.9*	2200	0.16 or SB	0.44	1
CADMIUM	*2.1 J*	*1.3 J*	*3.5 J*	ND	*6 J*	1000	1 or SB	0.54	NA[7]
CALCIUM	6410	5010	9700	4825	3540	NC[10]	SB	NA	NA[7]
CHROMIUM	11.7	9.1	10.1	*13.25*	*13.2*	64	10 or SB	12.7	NA[7]
COBALT	3.2	6.4	9.7	4.8	9.6	100000	30 or SB	NA	NA[7]
COPPER	*28.7*	*36*	*38*	22.1	*35.2*	76000	25 or SB	NA	NA[7]
IRON	*9530*	*16000*	*20400*	*13565*	*17800*	100000	2000 or SB	NA	NA[7]
LEAD	*731*	*72.2*	*73.7*	*64.5*	*40*	1000	SB	7.8	NA[7]
MAGNESIUM	1530	2430	5450	1935	2180	NC[10]	SB	NA	NA[7]
MANGANESE	125	*221*	*198*	*145*	*239*	32000	SB	167	142
MERCURY	*0.17*	0.07	ND	0.065	0.061	613	0.1	0.075	NA[7]
NICKEL	*7.5*	*6.8*	*6.9*	*7*	*9.7*	41000	13 or SB	2.8	NA[7]
POTASSIUM	430	257	193	421	293	NC[10]	SB	NA	NA[7]
SELENIUM	ND	1 J	0.63 J	0.99 J	1 J	10000	2 or SB	NA	NA[7]
SILVER	*0.92*	*1*	*0.64*	*0.49*	*0.89*	10000	SB	0.13	NA[7]
SODIUM	97	174	248	80	295	NC[10]	SB	NA	NA[7]
THALLIUM	ND	ND	ND	ND	ND	143	SB	0.36	NA[7]
VANADIUM	14.1	24.1	36.3	21.1	34.8	14000	150 or SB	NA	NA[7]
ZINC	*86.2*	*62.1*	*75*	*62.4*	*48.9*	100000	20 or SB	NA	NA[7]

Only detected analytes are shown.

1. U.S. EPA Region IX, Preliminary Remediation Goals, 2000.
2. New York State Department of Environmental Conservation, Technical and Administrative Guidance Memorandum #4046, January 24, 1994.
3. Haliburton NUS, Feasibility Study Report for NWIRP Bethpage, New York, March 1994.
4. NORTHDIVNAVFACENGCOM and NYSDEC, Record of Decision for Sites 1, 2 and 3, NWIRP Bethpage, New York, May 1995.
5. Region IX PRG for benzo(a)pyrene criteria value of 290µg/kg less than the CRDL of 330 µg/kg. Therefore, the CRDL value used for screening.
6. Pyrene used as surrogate.
7. NYSDEC TAGM values used if no ROD PRGs exist.
8. U.S. EPA Region IX PRG for arsenic is 3 mg/kg. The value used for screening purposes was revised to represent incremental risks associated with arsenic, i.e. mean background concentration (3.6 mg/kg) plus Region IX PRG (3 mg/kg) = 6.6 mg/kg.
9. Inorganic background levels for arsenic represent the 95% upper confidence level (UCL) of the mean concentration.
10. No criteria values established for macronutrients.

Italicized values exceed ROD PRGs.
Bold values exceed U.S. EPA Region IX PRGs.
J = Estimated value. NC = No Criteria SB = Soil Background.
NA = Not available. ND = Not Detected.

4.0 DEED RESTRICTION AND PERMEABLE COVER

Based on the historic activities and analytical data from both the RI surface and subsurface testing and recent surface soil testing, deed restrictions are recommended for the areas identified as Installation Restoration Sites 2 and 3. Areas identified for deed restrictions are presented in Figures 4-1 and 4-2. The Record of Decision (ROD) for Operable Unit 1 - Soils, signed by the Navy in July 1995, recognized the fact that some residual chemicals would remain in surface and near-surface soils but that these chemicals, mostly PAHs, are common when in proximity to parking lots and roadways. Recent soil sampling confirmed that the PAHs that will remain are above TAGM 4046 levels (NYSDEC cleanup goals for residential reuse) but below industrial-based cleanup goals for which this property is to be reused. In the quickclaim deed, there will be an overall deed restriction stating that no residential uses are permitted on the Navy's 105-acres.

It was because of the facts presented above, that the Navy decided to install a permeable soil and/or gravel cover over these areas to apply an additional safety factor to these areas by eliminating the direct contact exposure pathway to these residual compounds. The permeable cover will also allow precipitation to infiltrate and flush out the residual compounds over time.

The use of deed restrictions for these areas is also to inform potential future occupants of this property that there are areas that are still considered environmentally sensitive and that any future construction work that may take place over these areas should take appropriate precautions with respect to worker safety and soil handling (especially off-site disposal).

Site workers in contact with the contaminated soils will be required to use appropriate personal protection equipment based on their activities. Excavated soil will need to be properly managed. For example, if the excavated soils are reused at the site, then the soils must be placed in an area with appropriate deed restrictions and under a soil/gravel cover. If the soils are removed from the site, the soils must be tested for proper disposal in a landfill. Use of excavated soils from these areas as clean fill, will require chemical testing for confirmation.

The permeable soil cover is intended to promote natural flushing of residual VOCs in soils to the groundwater capture wells down gradient of the facility and provide a physical barrier to incidental contact with contaminated soils. Also, many of the site contaminants are organics, which are

subject to biological degradation and long term volatilization. A relatively thin permeable cover promotes the natural attenuation of these organic contaminants. Based on the relatively low level of soil contamination found and the absence of site wastes, a 6-inch thick permeable cover was specified in the ROD. The cover would consist of either compacted gravel for roads or vegetated soil for non-road areas. Although not specified in the ROD, a properly maintained asphalt or concrete cover should also be acceptable to normally prevent human contact with site contaminants. The plan is for both gravel roads and a vegetated soil cover to be installed at Site 2 in the areas shown in Figure 4-1. For Site 3, additional soil cover is not anticipated.

The gravel road at Site 2 will be constructed of a compacted angular aggregate a minimum of 6 inches thick. A typical construction would consist of 4 inches of AASHTO No 3 (1 1/2 inch gravel) and 2 inches of No 2, modified with fines to form to cohesive uniform surface. The road is anticipated to be approximately 12 feet wide. Prior to placing the gravel, the road will need to be scrapped smooth and compacted. Also, if extensive truck traffic is anticipated in the future, then a geofabric should be placed prior to the gravel layer, to help reduce rutting.

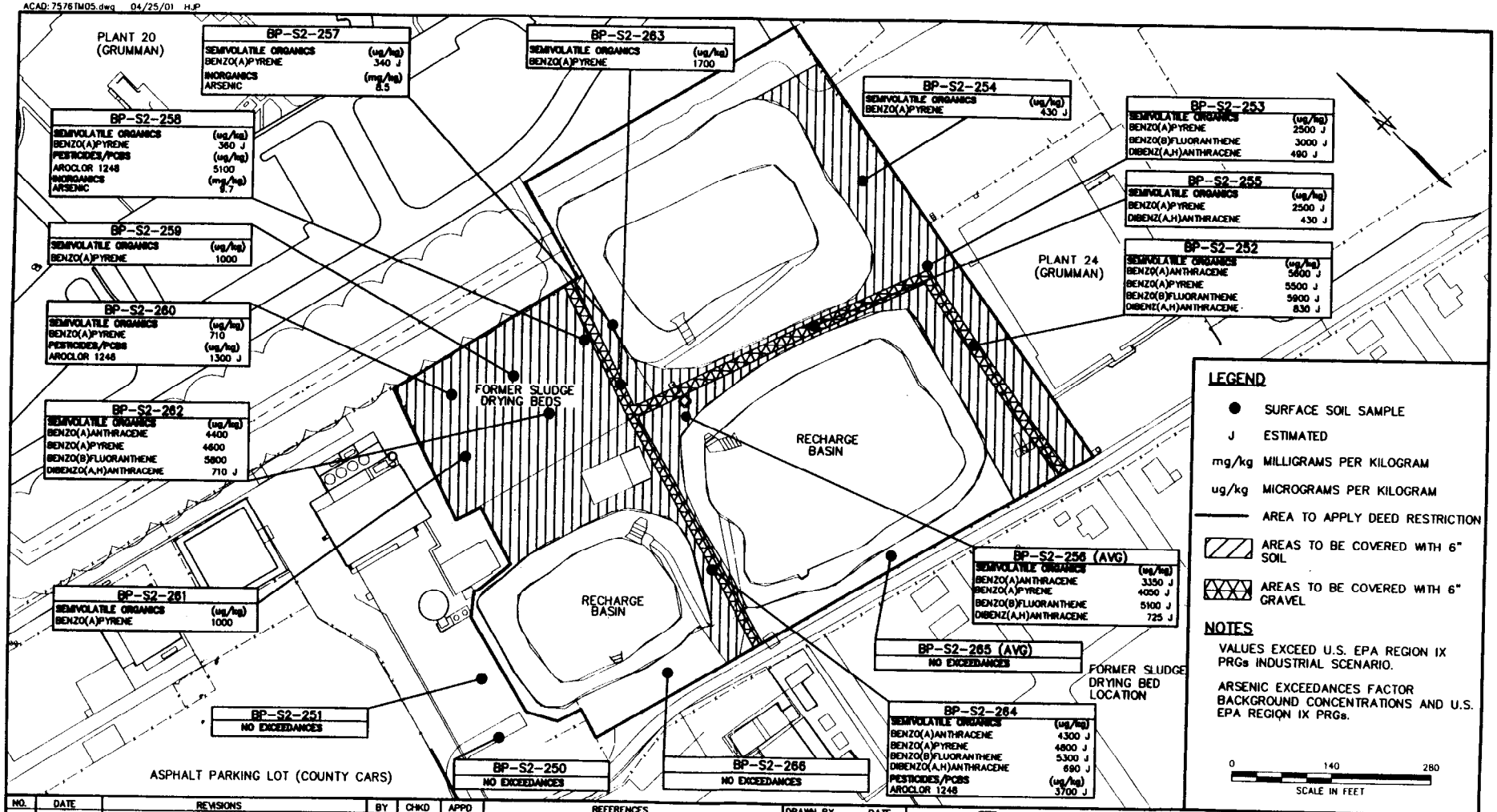
For the balance of Site 2 that is to be covered, the area should be regraded to be a reasonably flat or uniformly sloped surface to enhance the placement of the cover and to serve as a baseline for long term monitoring of the cover. Also, permanent surveyed monuments and temporary markers (during construction) would be installed in these areas to aid in the placement and long term monitoring of the cover. The cover soil should be a mixture of sand, silt, and clays (e.g. loam) conductive to maintenance of vegetation. The cover soil would then be would also be modified with natural organic matter (straw or manure) and nutrients to enhance the initial establishment of the vegetation. A perennial grass would then be planted.

The use of a geo-grid (similar to plastic snow fence) was suggested by NYSDEC for the areas to be covered at IR Site 2. However, the Navy does not recommend that this approach be pursued for the reasons outlined below. Since vegetation root penetration through the 6 inch cover soil into the underlying soil would be encouraged, the use of a continuous geo-fabric would not be considered. The primary functions of the geo-grid would be to provide a marker delineating the boundary between cover soil and the underlying contaminated soil and be used to assess erosion of the cover soil in the future. This material is sometimes employed at sites where erosion is common and difficult to monitor (e.g. irregular sloped landfills). However, Site 2 is relatively flat and permanent monuments and visual inspection are being proposed for regular monitoring of the

cover soil integrity. In addition, since future excavation at these sites is not being prohibited, placement of the plastic snow fence would interfere with the ability to effectively excavate with normal construction equipment and would be difficult to reestablish. Normally, the use of such a barrier is to alert workers that they have penetrated to a depth were excavation is being discouraged. As this is not the case at IR Site 2, the Navy is recommending a marker (such as plastic snow fence) not be used.

Regarding IR Site 3, the Navy is recommending that no additional actions are necessary in light of the fact that during their efforts to vacate the Navy's property, the Northrop Grumman Corporation scraped off several inches of soil to remove metal debris and then covered the area with soil and revegetated the Site. In essence, these activities implemented the requirements of the Navy's 1995 ROD for OU 1 at this area. Soil sampling has confirmed the presence of low concentrations of PAHs in the soils. In addition, the last land reuse plan, as proposed by Nassau County, calls for this area to be used for future motor vehicle parking lot. As such, the material is used for establishment of a parking area will add a layer of additional barrier.

ACAD: 7576TM05.dwg 04/25/01 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 4/12/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

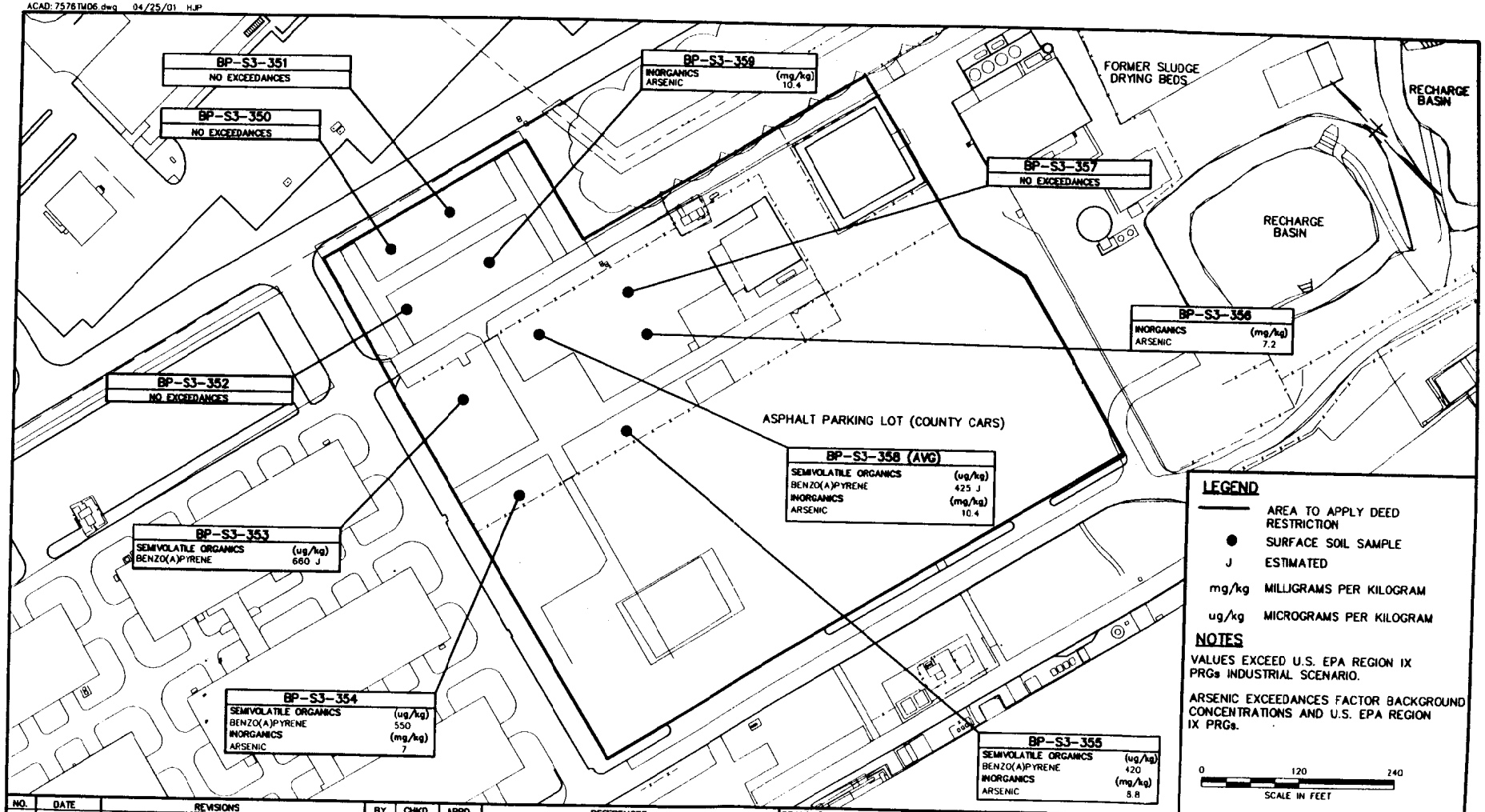
Tetra Tech NUS, Inc.

SURFACE SOIL REMEDIATION
SITE 2 – RECHARGE BASIN AREA
NWIRP BETHPAGE, NEW YORK

CONTRACT NO. 7576
OWNER NO. ---
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4-1
REV. 0

FORM CADD NO. TtNUS_BKDGN - REV 0 - 1/20/98

ACAD: 7576TM06.dwg 04/25/01 HJP



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 4/12/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

SURFACE SOIL REMEDIATION
SITE 3 – SALVAGE STORAGE AREA
NWIRP BETHPAGE, NEW YORK

CONTRACT NO. 7576
OWNER NO. ---
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4-2
REV. 0

FORM CADD NO. TtNUS_BH.DGN - REV 0 - 1/20/98