Section : 03.01
Site 20903-5640 (White Oak)
Doc. #: 0001
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Halliburton NUS
CORPORATION

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N60921.AR.000036
NSWC WHITE OAK
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C-49-5-5-118

May 11, 1995

Project Number 2295

Mr. David Mills
Engineering Field Activity, Chesapeake
901 M Street, SE
Washington Navy Yard, Building 212
Washington, DC 20374-5018

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order No. 0180

Subject: Naval Surface Warfare Center - White Oak
Sites 2 and 4, Silver Spring, Maryland
Additional Field Investigation

Dear Mr. Mills:

As discussed in our preliminary findings letter of April 10, 1995, Halliburton NUS has identified the need to complete additional field investigation work at the Naval Surface Warfare Center, White Oak, in order to more completely define the extent of soil and/or sediment contamination at two sites at the facility. It is believed that both Site 2 (Apple Orchard Landfill) and Site 4 (Chemical Disposal Area) require further investigation. The scale of the investigation envisioned is minor and should not adversely impact the budget. The nature of the contamination found during the implementation of the Design Verification Sampling and Analysis Plan (DVSAP) are summarized below along with the proposed additional investigation to be conducted at each site.

SITE 2 - APPLE ORCHARD LANDFILL, PCB CONTAMINATION

PCB Contamination was found during the RI conducted at Site 2 in 1992, within the stream sediments located adjacent to and downstream of the site and along the landfill face. The samples collected along the western side of the landfill contained the greatest concentration of PCBs (up to 140 ppm). This area was suspected to be in the vicinity of the PCB contaminant source.

During the implementation of the DVSAP, the extent of the PCB contamination was investigated to better define the removal/remediation needs. PCB contamination was discovered in the stream sediments to a distance approximately 400 feet downstream of the eastern edge of the landfill as well along the western face of the landfill. The concentrations appeared to increase towards the west of the landfill, within the upstream portions of the stream (up to 47 ppm). These locations also correspond to the most upstream sampling points on the property. PCB contamination was greatest along the western face of the landfill, above the stream floodplain (143 ppm). Therefore there is insufficient data to exclude the presence of an upstream source of PCBs, or that the landfill is the only source of PCB contamination in the stream sediments. While the presence of PCB contamination at this location would not be expected to originate upstream of the site (as the upstream area is residential), the existence of a second contaminant source could not be discounted.

To date, the PCB sampling conducted has not extended beyond the limits of the facility. In order to determine if a second source of the PCB contamination is present upstream of the landfill on the adjacent property, additional sampling shall be conducted off-site. The sampling will be conducted at the locations identified on Figure 1. Owner approval to conduct this activity will need to be obtained by EFACHES/NSWC prior to sampling. All samples collected will be analyzed for PCBs at a fixed based laboratory.

SITE 4 - CHEMICAL DISPOSAL AREA

The need for additional subsurface soil sampling has been identified through the analysis of the data collected during the implementation of the DVSAP (see Attachment 1). Additional data requirements have been identified in Disposal Areas 1, 2 and 4 (Refer to Figure 2 for the area designations within Site 4). The need for additional information at the Disposal Areas can be addressed through the implementation of the following activities:

- Areas 1 and 2 - Semi-volatile and inorganic contamination has been identified within Disposal Areas 1 and 2 as described in Attachment 1. The contamination appears to be confined within the borders of Perimeter Road and the unimproved road to the south of the Disposal Areas. Subsurface soil sampling and analysis has delineated contamination to the north of the site, but has not fully defined the limits of waste disposal to the east, south and west of the site. To fully define waste disposal and the presence of contaminated soil, four additional borings are proposed. One additional soil boring is proposed at the site east of Disposal Area 2 (between 04-SB14 and 04-SB15). Two additional borings will be placed south of Disposal Area 2 (one between 04-SB12 and 04-SB13 and one between 04-SB07 and 04-SB12), and one additional boring is proposed west of Disposal Area 2 (between 04-SB08 and 04-SB07). Refer to Figure 2 for the location of the proposed soil borings. As appropriate, soil borings may be replaced by test pits if required by drilling rig access restrictions. Subsurface soil samples will be collected utilizing the same procedures as outlined in DVSAP, and analyzed for semi-volatile and inorganics at a fixed based lab.

- Area 4 - TCE contamination and trace semi-volatile contamination was identified in the vicinity of Disposal Area 4. The contamination was found west of the suspected disposal area adjacent to the telephone pole storage area. The extent of soil contamination was not identified to the south of the site, due to site access constraints, and was not defined to the west of the site due to the presence of telephone poles in this area. To fully define site contamination, the placement of five additional borings is proposed. The borings will be placed in the area presently used for telephone pole storage and to the south of Soil Boring 04-SB20. Refer to Figure 2 for the proposed location of the additional soil borings. As appropriate, soil borings may be replaced by test pits as drilling rig access restrictions require. Subsurface soil samples will be collected utilizing the same procedures as outlined in DVSAP, and analyzed for TCE at a fixed based lab.

IMPLEMENTATION SCHEDULE AND COSTS

A schedule has been provided below, detailing the proposed supplementary field investigation actions at Sites 2 and 4. Subcontract costs obtained for the previous phase of the work will be used for the implementation of the additional site investigation. The work to be performed will be conducted within the original budget for the project.

Subcontractor Selection/Administration	May 15 - May 24
Field Investigation	
Mobilization	May 30
Site 4 Sampling	May 31 - June 1
Site 2 Sampling	June 2
Sample Analysis	June 5 - June 9
Data Review and Validation	June 12 - June 23

As appropriate the sampling, equipment decontamination, investigation derived waste handling, base access, and base safety protocols established during the DVSAP will be followed during the supplementary site sampling. A Halliburton NUS unexploded ordnance (UXO) specialist shall screen the areas to be sampled to ensure that no UXO hazards are present. The UXO specialist shall remain onsite to assist in sampling and UXO screening as needed for the duration of the work.

Halliburton NUS will continue to develop the design plans for the project in accordance with the revised schedules. It is believed that the additional information obtained during this additional sampling will allow for further definition of the project requirements at both Site 2 and Site 4. Please feel free to contact me at 412-921-8616 with your thoughts and/or comments regarding this sampling effort, at your earliest convenience.

Very truly yours,

Don Olmstead

Donald G. Olmstead, P.E.
Project Manager

DGO/SAN/

Attachment

cc: Mr. Roger Boucher, NORTHDIV (w/o attachment)
Mr. Dorn Carlson, NSWC
Mr. Bill Spicer, NSWC
Mr. Heath Wells, EFACHES
Mr. Steve Hiortdahl, USGS
Mr. John Trepanowski, Halliburton NUS
Mr. Daryl Hutson, Halliburton NUS (w/o attachment)
Mr. Scott Nesbit, Halliburton NUS
Project File 2295

ATTACHMENT 1
SITE 4 FIELD INVESTIGATION RESULTS

ATTACHMENT 1
SITE 4 FIELD INVESTIGATION RESULTS

DESIGN VERIFICATION SAMPLING AND ANALYSIS PLAN IMPLEMENTATION

The following testing was conducted by Halliburton NUS to obtain more complete information with respect to the sites, for purposes of preparation of a bid package.

Geophysical Investigation

An electromagnetic (EM) survey of Site 4 was completed by Halliburton NUS to determine the location of buried wastes and buried containers. The survey was conducted across the entire site. The survey grid was approximately 320 feet long by 80 feet wide, with grid spacings of 10 feet. A Geonics EM-31 Terrain Conductivity Meter was used to measure the ground conductivity in the immediate vicinity of the instrument to a depth of approximately 10 feet. Readings from this instrument were recorded at positions at each grid point (with the EM-31 pointing north-south and again pointing east-west). Any anomalous readings point between grid points were noted and investigated further with the EM instrument.

Soil Boring/Subsurface Sample Collection

Twenty soil borings were advanced at Site 4 within and around the four distinct disposal cells identified in the RI (See Figure 2). The findings identified at the site include:

- Areas 1 and 2 - Areas 1 and 2 are adjacent and contiguous. Nine soil borings were placed in and around Disposal Areas 1 and 2. Soil Borings 04-SB07, 04-SB12, and 04-SB15 were advanced using a drilling rig. Each boring was advanced to a depth of 16 feet. Each boring was continuously sampled using a split-spoon sampler, and each sample collected was screened with a photoionization detector (PID) to identify zones of contamination. Soils which were believed to be contaminated through PID readings or through visual analysis were analyzed for VOAs, semi-VOAs, metals, nitroaromatics, nitrosamines, pH, cyanide and total Kjheldal-nitrogen. The analytical results are included herein. The depths between which the samples were collected are identified with the analytical results.

  Five soil borings were advanced with a powered hand auger to depths ranging between 5 and 10 feet. The hand auger borings were advanced in areas where waste, drums or containers were suspected to be present, or where drilling rig access was not possible due to the presence of overhead utilities. Soil borings 04-SB08, 04-SB09, 04-SB10, 04-SB11, 04-SB13, and 04-SB14, were advanced in this manner in Areas 1 and 2. The sample screening and analytical methods described above were used in the collection of samples from these borings.

  Soil borings 04-SB09, 04-SB11, and 04-SB13 were placed in areas believed to contain waste. The locations of soil borings 04-SB08, 04-SB10, and 04-SB14 were adjusted due to difficulties advancing the soil boring equipment. Neither the powered auger nor hand auger could be advanced in areas where course grained soils were encountered. These borings were moved closer to the disposal areas 1 and 2. Refer to Figure 2 for the locations of these soil borings.

- Area 3 - Six borings were placed in around Disposal Area 3. Soil borings 04-SB01, 04-SB02, 04-SB03, 04-SB04, 04-SB05, and 04-SB06 were advanced using a drilling rig to a depth of sixteen feet. Soil borings 04-SB03 and 04-SB04 were placed in areas where waste was believed to be disposed. Each boring was continuously sampled using a split-spoon sampler, and each sample collected was screened with a photoionization detector (PID) to identify zones of contamination. Soils which were believed to be contaminated through PID readings or through visual analysis were analyzed for VOAs, semi-VOAs, metals, nitroaromatics, nitrosamines, pH, cyanide and total Kjheldal-nitrogen. The analytical results are included herein.

ATTACHMENT 1
SITE 4 FIELD INVESTIGATION RESULTS
(Continued)

- Area 4 - Five borings were placed in around Disposal Area 4. Soil borings 04-SB16, 04-SB17, 04-SB18, and 04-SB19, were advanced using a drilling rig to a depth of sixteen feet. Soil boring 04-SB18 was placed in an area where waste was believed to have been disposed. Each boring was continuously sampled using a split-spoon sampler, and each sample collected was screened with a photoionization detector (PID) to identify zones of contamination. Soils which were believed to be contaminated through PID readings or through visual analysis were analyzed for VOAs, semi-VOAs, metals, nitroaromatics, nitrosamines, pH, cyanide and total Kjheldal-nitrogen. The analytical results are included herein.

  Soil boring 04-SB20 was advanced with a powered hand auger to a depth of 10 feet. The powered hand auger was used in this location due to rig access restrictions (telephone pole storage area). The sample screening and analytical methods described above were used in the collection of the sample from this boring.

Analytical Results

- Areas 1 and 2 - Analytical results for the soil samples collected within areas 1 and 2 are attached. The soil contamination and waste disposal is limited to the areas south of perimeter road as soil borings 04-SB08, 04-SB10 and 04-SB14 did not contain contamination. However, Soil Borings 04-SB11, and 04-SB13 did contain contaminated soil and/or waste with elevated concentrations of both organic and inorganic compounds. Soil Boring 04-SB09 also contained trace concentrations of organic and inorganic contaminants. It also appears that Soil Borings 04-SB07, 04-SB12 and 04-SB15 define the southern limit of contamination in Areas 1 and 2, as only trace concentrations of organic compounds were found in soil samples collected at these three locations.

- Area 3 - The results of the soil sampling and analytical testing are attached. These results indicate that very little if any soil contamination is present in this area. The analytical results for soil samples collected in soil borings 04-SB01, 04-SB02, 04-SB03, 04-SB04, 04-SB05, and 04-SB06 did not indicate the presence of any organic or inorganic contamination consistent with a disposal pit. The review of the soil boring logs for this area does not indicate that soil contamination was visually observed or identified with the PID. It appears that either this area was not used for waste disposal, the waste disposed within this area has been removed, or the Area 3 disposal pit is located elsewhere at Site 4.

- Area 4 - From a review of the analytical results for soil samples collected in and around Area 4 of Site 4, trichloroethene (TCE) contamination is evident in the soils in this area. TCE contamination was identified in borings 04-SB17, 04-SB19, and 04-SB20, with a trace concentration of TCE found in Soil Boring 04-SB16. TCE contamination appears to increase beyond the suspected limits of Area 4, towards the northwest and Area 1 and the telephone pole storage area.

CTO 180 NSWC, WHITE OAK – SITE 4 ANALYTICAL RESULTS

SAMPLE LOCATION:	SB-01		SB-02		SB-03		SB-04		SB-05	
SAMPLE ID:	04-SB01-1216		04-SB02-1216		04-SB03-1214		04-SB04-1214		04-SB05-0406	
VOLATILES(ug/Kg)										
METHYLENE CHLORIDE	8.15	J	11.0	J	9.20	J	2.00	JB	14.9	B
ACETONE	ND		ND		ND		ND		ND	
1,2-DICHLOROETHENE(TOTAL)	ND		ND		ND		ND		ND	
CHLOROFORM	ND		ND		ND		ND		ND	
1,1,1-TRICHLOROETHANE	ND		ND		ND		ND		ND	
TRICHLOROETHENE	ND		ND		ND		ND		ND	
1,1,2-TRICHLOROETHANE	ND		ND		ND		ND		ND	
BENZENE	ND		ND		ND		ND		ND	
TETRACHLOROETHENE	ND		ND		ND		ND		ND	
1,1,2,2-TETRACHLOROETHANE	ND		ND		ND		ND		ND	
TOLUENE	ND		ND		ND		ND		ND	
CHLOROBENZENE	ND		ND		ND		ND		ND	
ETHYLBENZENE	ND		ND		ND		ND		ND	
XYLENES (TOTAL)	ND		ND		ND		3.17	J	ND	
SEMIVOLATILES(ug/Kg)										
NAPHTHALENE	ND		ND		ND		ND		ND	
2-METHYLNAPHTHALENE	ND		ND		ND		ND		ND	
DIETHYLPHTHALATE	ND		ND		ND		ND		ND	
FLUORENE	ND		ND		ND		ND		ND	
PHENANTHRENE	ND		ND		ND		ND		ND	
ANTHRACENE	ND		ND		ND		ND		ND	
CARBAZOLE	ND		ND		ND		ND		ND	
DI-n-BUTYLPHTHALATE	51.7	J	46.2	J	ND		35.9	J	ND	
FLUORANTHENE	ND		ND		ND		ND		ND	
PYRENE	ND		ND		ND		ND		ND	
BENZO[a]ANTHRACENE	ND		ND		ND		ND		ND	
CHRYSENE	ND		ND		ND		ND		ND	
BIS(2-ETHYLHEXYL)PHTHALATE	ND		53.0	J	ND		ND		ND	
BENZO[b]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[k]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[a]PYRENE	ND		ND		ND		ND		ND	
INDENO[1,2,3-cd]PYRENE	ND		ND		ND		ND		ND	
BEZO[g,h,i]PERYLENE	ND		ND		ND		ND		ND	
EXPLOSIVES (ug/Kg)	ND		ND		ND		ND		ND	
PESTICIDES/PCBS (ug/Kg)										
AROCLOR 1260	NA		NA		NA		NA		NA	
METALS(mg/Kg)										
ALUMINUM	980		1,130.0		1,670		506		2,860	
ANTIMONY	ND		1.68		ND		0.255		ND	
ARSENIC	0.513		3.85		0.642		0.339		1.54	
BARIUM	2.31		3.86		3.31		3.73		8.78	
BERYLIUM	0.198		0.349		0.252		0.364		0.530	
CADMIUM	ND		ND		0.263		ND		ND	
CALCIUM	ND		ND		ND		ND		ND	
CHROMIUM	2.15		16.3		4.06		2.51		8.20	
COBALT	1.81		1.75		1.80		1.83		2.51	
COPPER	1.03		21.7		1.98		1.59		3.00	
IRON	1,010		5,280		2,110		588		5,770	
LEAD	1.82		2.14		2.46		0.551		2.36	
MAGNESIUM	6.05		53.4		22.2		ND		53.8	
MANGANESE	1.47		ND		5.66		1.99		4.66	
MERCURY	ND		0.106		ND		ND		0.061	
NICKEL	ND		ND		ND		2.90		ND	
POTASSIUM	22.6		96.4		22.5		28.0		59.6	
SELENIUM	ND		10.5		ND		ND		ND	
SILVER	ND		ND		ND		ND		ND	
SODIUM	30.4		ND		ND		20.2		59.2	
VANADIUM	2.83		24.6		4.34		2.19		15.7	
ZINC	1.66		1.76		2.14		ND		2.11	
MISC										
TOTAL CYANIDE (mg/Kg)	ND		ND		ND		ND		ND	
TOTAL KJELDAHL NITROGEN (mg/Kg)	11.1		74.4		7.29		8.60		221	
pH (S.U.)	4.06		4.33		3.83		5.10		4.61	
PERCENT SOLIDS (%)	95.5		86.1		95.7		96.1		86.3	

ND: NOT DETECTED, NA: NOT ANALYZED
B: BLANK CONTAMINATION, J: ESTIMATED

CTO 180 NSWC, WHITE OAK – SITE 4 ANALYTICAL RESULTS

SAMPLE LOCATION:	SB-06		SB-07		SB-08		SB-08		SB-09	
SAMPLE ID:	04-SB06-0408		04-SB07-1822		04-SB08-0809		04-SB08-0809-D		04-SB09-0809	
VOLATILES (ug/Kg)										
METHYLENE CHLORIDE	6.71	J	2.04	JB	6.59	BJ	5.84	BJ	6.86	BJ
ACETONE	7.64	J	ND		ND		ND		ND	
1,2-DICHLOROETHENE(TOTAL)	ND		ND		ND		ND		ND	
CHLOROFORM	ND		ND		ND		ND		ND	
1,1,1-TRICHLOROETHANE	ND		ND		ND		ND		ND	
TRICHLOROETHENE	ND		1.26	J	ND		ND		ND	
1,1,2-TRICHLOROETHANE	ND		ND		ND		ND		6.12	J
BENZENE	ND		ND		ND		ND		ND	
TETRACHLOROETHENE	ND		ND		ND		ND		ND	
1,1,2,2-TETRACHLOROETHANE	ND		ND		ND		ND		ND	
TOLUENE	ND		ND		ND		ND		ND	
CHLOROBENZENE	ND		ND		ND		ND		ND	
ETHYLBENZENE	ND		ND		ND		ND		ND	
XYLENES (TOTAL)	ND		ND		ND		ND		4.87	J
SEMIVOLATILES(ug/Kg)										
NAPHTHALENE	ND		294.0	J	ND		ND		ND	
2-METHYLNAPHTHALENE	ND		2,100		ND		ND		ND	
DIETHYLPHTHALATE	ND		ND		ND		ND		ND	
FLUORENE	ND		ND		ND		ND		ND	
PHENANTHRENE	ND		1,120		ND		ND		ND	
ANTHRACENE	ND		ND		ND		ND		ND	
CARBAZOLE	ND		ND		ND		ND		ND	
DI-n-BUTYLPHTHALATE	ND		ND		ND		109.0	J	ND	
FLUORANTHENE	ND		ND		ND		ND		ND	
PYRENE	ND		ND		ND		ND		ND	
BENZO[a]ANTHRACENE	ND		ND		ND		ND		ND	
CHRYSENE	ND		ND		ND		ND		ND	
BIS(2-ETHYLHEXYL)PHTHALATE	ND		ND		ND		ND		ND	
BENZO[b]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[k]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[a]PYRENE	ND		ND		ND		ND		ND	
INDENO[1,2,3-cd]PYRENE	ND		ND		ND		ND		ND	
BEZO[g,h,i]PERYLENE	ND		ND		ND		ND		ND	
EXPLOSIVES (ug/Kg)	ND		ND		ND		ND		ND	
PESTICIDES/PCBS (ug/Kg)										
AROCLOR 1260	NA		NA		NA		NA		239	
METALS(mg/Kg)										
ALUMINUM	4,720		4,740		13,600		12,400		13,400	
ANTIMONY	0.356		ND		ND		ND		0.333	
ARSENIC	0.647		1.17		2.48		2.79		1.98	
BARIUM	9.63		8.74		28		28.2		44.7	
BERYLIUM	0.457		0.500		0.371		0.329		0.425	
CADMIUM	ND		ND		0.648		0.520		0.288	
CALCIUM	ND		53.8		141		142		109	
CHROMIUM	10.1		6.35		18.4		16.2		17.7	
COBALT	3.36		2.35		2.36		2.31		4.17	
COPPER	3.53		3.60		14.1		10.0		13.6	
IRON	6,270		4,880		17,800		19,800		17,800	
LEAD	1.50		4.37		3.03		2.69		2.06	
MAGNESIUM	89.2		85.9		618		528		1,080	
MANGANESE	21.7		7.57		58.8		67.8		71.5	
MERCURY	0.084		ND		0.177		0.144		0.565	
NICKEL	ND		ND		5.31		4.96		8.23	
POTASSIUM	107		116		383		300		501	
SELENIUM	ND		ND		1.14		1.07		0.488	
SILVER	ND		0.440		ND		ND		ND	
SODIUM	43.2		59.2		56.3		56.7		46.0	
VANADIUM	12.2		11.0		36.1		32.7		31.8	
ZINC	4.02		4.25		12.2		10.4		20.5	
MISC										
TOTAL CYANIDE (mg/Kg)	ND		2.28		ND		ND		2.13	
TOTAL KJELDAHL NITROGEN (mg/Kg)	25.5		31.0		124		146		169	
pH (S.U.)	4.47		5.40		4.95		5.04		5.71	
PERCENT SOLIDS (%)	93.8		86.3		85.8		85.2		82.5	

ND: NOT DETECTED, NA: NOT ANALYZED
B: BLANK CONTAMINATION, J: ESTIMATED

CTO 180 NSWC, WHITE OAK – SITE 4 ANALYTICAL RESULTS

SAMPLE LOCATION:	SB-10		SB-11		SB-12		SB-13	SB-14	
SAMPLE ID:	04-SB10-0708		04-SB11-0809		04-SB12-1012		04-SB13-0506	04-SB14-0506	
VOLATILES(ug/Kg)									
METHYLENE CHLORIDE	6.61	BJ	9.63	BJ	7.60	J	ND	6.01	J
ACETONE	ND		ND		ND		ND	ND	
1,2-DICHLOROETHENE(TOTAL)	ND		ND		ND		ND	ND	
CHLOROFORM	ND		ND		ND		ND	ND	
1,1,1-TRICHLOROETHANE	ND		ND		ND		ND	ND	
TRICHLOROETHENE	ND		ND		1.13	J	1.87	ND	
1,1,2-TRICHLOROETHANE	ND		ND		ND		ND	ND	
BENZENE	1.24	J	19.4	J	ND		ND	ND	
TETRACHLOROETHENE	ND		ND		ND		ND	ND	
1,1,2,2-TETRACHLOROETHANE	ND		ND		ND		ND	ND	
TOLUENE	ND		ND		ND		ND	ND	
CHLOROBENZENE	5.71	J	45.8	J	ND		ND	ND	
ETHYLBENZENE	ND		ND		1.49	J	ND	ND	
XYLENES (TOTAL)	4.25	J	ND		ND		ND	ND	
SEMIVOLATILES(ug/Kg)									
NAPHTHALENE	40.2	J	3,200		ND		ND	ND	
2-METHYLNAPHTHALENE	138	J	18,000		ND		ND	ND	
DIETHYLPHTHALATE	ND		ND		ND		ND	ND	
FLUORENE	ND		2,030		ND		ND	ND	
PHENANTHRENE	ND		6,030		ND		ND	ND	
ANTHRACENE	ND		841		ND		ND	ND	
CARBAZOLE	ND		180	J	ND		ND	ND	
DI-n-BUTYLPHTHALATE	ND		50.4	J	ND		107.0	58.0	J
FLUORANTHENE	ND		1,610		ND		515.0	ND	
PYRENE	ND		1,430		ND		ND	ND	
BENZO[a]ANTHRACENE	ND		554.0		ND		313.0	ND	
CHRYSENE	ND		800		ND		333.0	ND	
BIS(2-ETHYLHEXYL)PHTHALATE	ND		1,170		ND		ND	ND	
BENZO[b]FLUORANTHENE	ND		382	J	ND		247.0	ND	
BENZO[k]FLUORANTHENE	ND		550		ND		366.0	ND	
BENZO[a]PYRENE	ND		666		ND		343.0	ND	
INDENO[1,2,3-cd]PYRENE	ND		ND		ND		137.0	ND	
BEZO[g,h,i]PERYLENE	ND		406		ND		221.0	ND	
EXPLOSIVES (ug/Kg)	ND		ND		ND		ND	ND	
PESTICIDES/PCBS (ug/Kg)									
AROCLOR 1260	NA		NA		NA		NA	NA	
METALS(mg/Kg)									
ALUMINUM	11,200		5,670		4,880		8,560	23,600	
ANTIMONY	0.293		3.61		ND		3.19	0.587	
ARSENIC	1.99		1.66		0.887		3.15	3.00	
BARIUM	55.6		48.7		7.10		89.3	39.2	
BERYLIUM	0.440		0.259		0.114		0.539	1.14	
CADMIUM	0.529		1.36		0.445		2.36	0.790	
CALCIUM	371		23,200		42.4		11,500	ND	
CHROMIUM	14.9		15.5		9.16		23.9	20.8	
COBALT	3.80		3.81		ND		6.62	7.98	
COPPER	8.50		130.0		7.24		743	12.0	
IRON	12,300		12,500		4,730		23,300	20,800	
LEAD	1.84		85.7		2.96		242	6.40	
MAGNESIUM	1,130		4,750		149		2,300	462	
MANGANESE	68.5		136		12.8		444	40.7	
MERCURY	0.120		0.774		0.151		6.12	0.164	
NICKEL	5.74		11.2		ND		17.4	6.86	
POTASSIUM	452		351		160		753	397	
SELENIUM	0.451		ND		ND		ND	0.342	
SILVER	ND		2.41		ND		7.15	ND	
SODIUM	57.9		82.9		52.6		30.1	70.8	
VANADIUM	22.4		18.4		11.7		20.3	41.4	
ZINC	20.7		372		3.80		517	14.2	
MISC									
TOTAL CYANIDE (mg/Kg)	ND		ND		ND		ND	ND	
TOTAL KJELDAHL NITROGEN (mg/Kg)	399		278		66.6		235	50.6	
pH (S.U.)	5.90		6.75		5.53		7.48	4.91	
PERCENT SOLIDS (%)	83.4		83.1		91.7		75.8	87.0	

ND: NOT DETECTED, NA: NOT ANALYZED
B: BLANK CONTAMINATION, J: ESTIMATED

CTO 180 NSWC, WHITE OAK – SITE 4 ANALYTICAL RESULTS

SAMPLE LOCATION:	SB-15		SB-16		SB-17		SB-18		SB-19	
SAMPLE ID:	04-SB15-0812		04-SB16-1012		04-SB17-1214		04-SB18-1012		04-SB19-1012	
VOLATILES(ug/Kg)										
METHYLENE CHLORIDE	13.6	B	ND		40.1	BJ	5.33	BJ	3.76	BJ
ACETONE	ND		ND		ND		ND		ND	
1,2-DICHLOROETHENE(TOTAL)	ND		ND		41.8	J	ND		ND	
CHLOROFORM	ND		ND		ND		ND		ND	
1,1,1-TRICHLOROETHANE	ND		ND		19.8	J	ND		ND	
TRICHLOROETHENE	ND		2.90	J	3,170.0		ND		45.7	
1,1,2-TRICHLOROETHANE	ND		ND		20.2	J	ND		ND	
BENZENE	ND		ND		31.4	J	ND		ND	
TETRACHLOROETHENE	ND		ND		ND		ND		ND	
1,1,2,2-TETRACHLOROETHANE	ND		6.37	J	12,700.0		ND		5.57	J
TOLUENE	ND		ND		ND		ND		ND	
CHLOROBENZENE	ND		ND		45.6	J	ND		ND	
ETHYLBENZENE	ND		ND		ND		ND		ND	
XYLENES (TOTAL)	ND		ND		ND		ND		ND	
SEMIVOLATILES(ug/Kg)										
NAPHTHALENE	ND		ND		ND		ND		ND	
2-METHYLNAPHTHALENE	ND		ND		483.0	J	ND		ND	
DIETHYLPHTHALATE	3,660		ND		ND		ND		ND	
FLUORENE	ND		ND		ND		ND		ND	
PHENANTHRENE	ND		ND		ND		ND		ND	
ANTHRACENE	ND		ND		ND		ND		ND	
CARBAZOLE	ND		ND		ND		ND		ND	
DI-n-BUTYLPHTHALATE	47.3	J	79.5	J	119.0	J	ND		ND	
FLUORANTHENE	ND		ND		ND		ND		ND	
PYRENE	ND		ND		ND		ND		ND	
BENZO[a]ANTHRACENE	ND		ND		ND		ND		ND	
CHRYSENE	ND		ND		ND		ND		ND	
BIS(2-ETHYLHEXYL)PHTHALATE	ND		ND		ND		38.1	J	ND	
BENZO[b]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[k]FLUORANTHENE	ND		ND		ND		ND		ND	
BENZO[a]PYRENE	ND		ND		ND		ND		ND	
INDENO[1,2,3-cd]PYRENE	ND		ND		ND		ND		ND	
BEZO[g,h,i]PERYLENE	ND		ND		ND		ND		ND	
EXPLOSIVES (ug/Kg)	ND		ND		ND		ND		ND	
PESTICIDES/PCBS (ug/Kg)										
AROCLOR 1260	NA		NA		NA		NA		NA	
METALS(mg/Kg)										
ALUMINUM	6,750		1,800		2,110		2,550		1,180	
ANTIMONY	0.369		.381		.322		ND		ND	
ARSENIC	1.72		.776		1.04		ND		ND	
BARIUM	21.5		5.25		6.28		175.0		ND	
BERYLIUM	0.964		.230		.310		ND		0.101	
CADMIUM	ND		ND		ND		0.606		0.373	
CALCIUM	1,310		32.5		43.3		35.1		15.8	
CHROMIUM	20.8		4.14		31.2		6.90		15.2	
COBALT	6.06		ND		ND		ND		ND	
COPPER	11.7		8.72		6.70		6.66		5.52	
IRON	9,010		2,020		2,170		3,380		1,410	
LEAD	4.35		1.38		3.06		1.59		0.751	
MAGNESIUM	290		103		35.7		172.0		40.4	
MANGANESE	27.9		1.79		1.36		5.92		3.22	
MERCURY	0.099		0.147		0.177		ND		ND	
NICKEL	9.90		ND		ND		ND		ND	
POTASSIUM	233		63.0		79.9		135		67.7	
SELENIUM	0.443		ND		ND		ND		ND	
SILVER	ND		ND		ND		ND		ND	
SODIUM	68.2		ND		ND		53.4		30.3	
VANADIUM	20.6		5.22		23.3		8.96		4.98	
ZINC	9.10		ND		ND		2.91		3.23	
MISC										
TOTAL CYANIDE (mg/Kg)	ND		ND		ND		ND		ND	
TOTAL KJELDAHL NITROGEN (mg/Kg)	40.3		12.8		31.7		19.1		41.8	
pH (S.U.)	5.49		5.05		4.55		5.93		4.54	
PERCENT SOLIDS (%)	90.4		90.1		86.0		90.4		91.1	

ND: NOT DETECTED, NA: NOT ANALYZED
B: BLANK CONTAMINATION, J: ESTIMATED

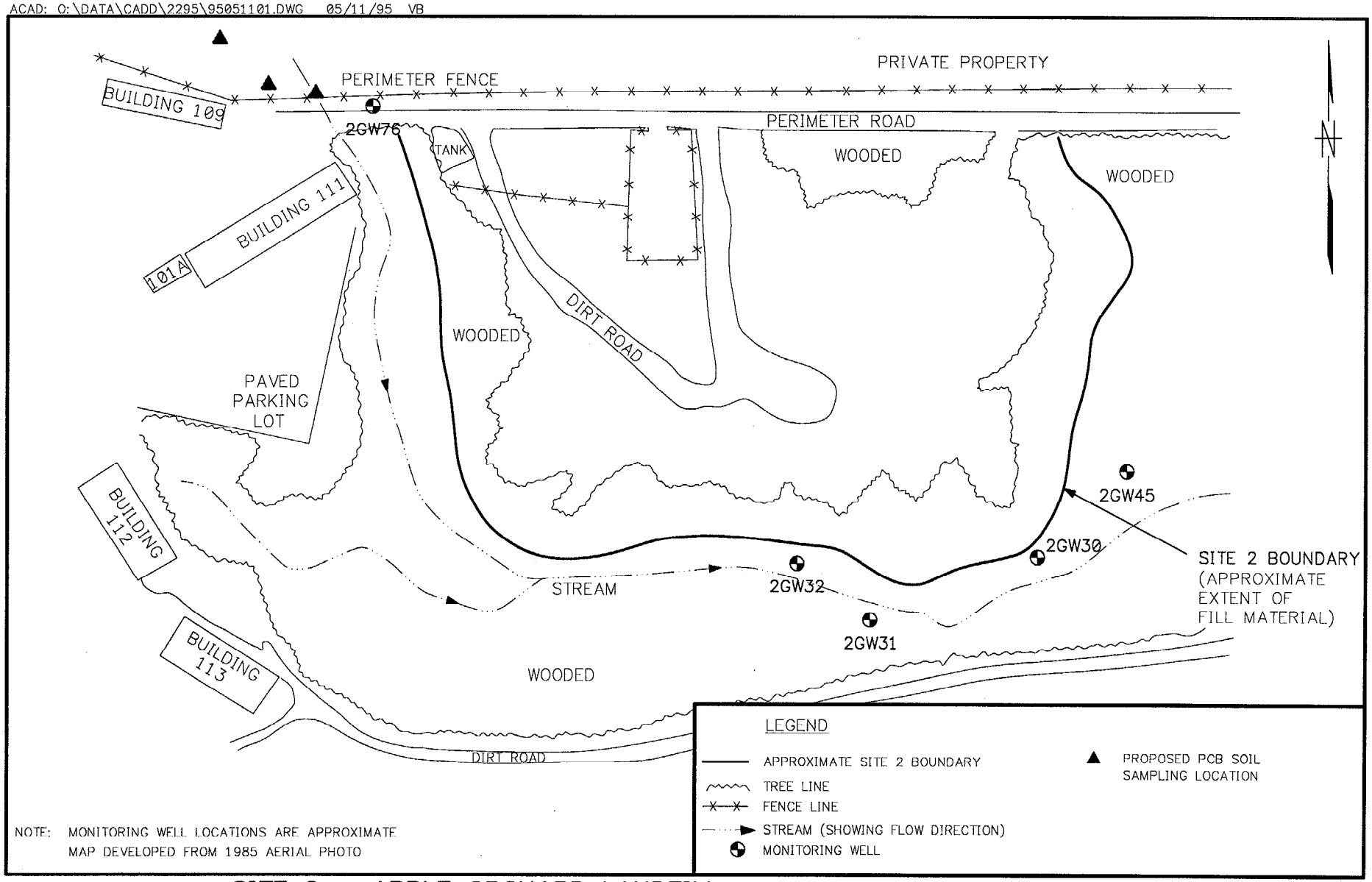
CTO 180 NSWC, WHITE OAK – SITE 4 ANALYTICAL RESULTS

SAMPLE LOCATION:	SB-20		SB-20	
SAMPLE ID:	04-SB20-0607		04-SB20-0607D	
VOLATILES (ug/Kg)				
METHYLENE CHLORIDE	38.4	BJ	40.0	BJ
ACETONE	ND		ND	
1,2-DICHLOROETHENE (TOTAL)	ND		ND	
CHLOROFORM	30.7	J	25.9	J
1,1,1-TRICHLOROETHANE	ND		ND	
TRICHLOROETHENE	4,390.0		2,600.0	
1,1,2-TRICHLOROETHANE	ND		ND	
BENZENE	ND		ND	
TETRACHLOROETHENE	ND		6.19	J
1,1,2,2-TETRACHLOROETHANE	37.7	J	ND	
TOLUENE	9.69	J	8.61	J
CHLOROBENZENE	ND		ND	
ETHYLBENZENE	10.8	J	9.84	J
XYLENES (TOTAL)	ND		ND	
SEMIVOLATILES (ug/Kg)				
NAPHTHALENE	ND		ND	
2-METHYLNAPHTHALENE	797.0		566.0	
DIETHYLPHTHALATE	ND		ND	
FLUORENE	ND		ND	
PHENANTHRENE	ND		ND	
ANTHRACENE	ND		ND	
CARBAZOLE	ND		ND	
DI-n-BUTYLPHTHALATE	ND		ND	
FLUORANTHENE	ND		ND	
PYRENE	ND		ND	
BENZO[a]ANTHRACENE	ND		ND	
CHRYSENE	ND		ND	
BIS(2-ETHYLHEXYL)PHTHALATE	ND		ND	
BENZO[b]FLUORANTHENE	ND		ND	
BENZO[k]FLUORANTHENE	ND		ND	
BENZO[a]PYRENE	ND		ND	
INDENO[1,2,3-cd]PYRENE	ND		ND	
BEZO[g,h,i]PERYLENE	ND		ND	
EXPLOSIVES (ug/Kg)	ND		ND	
PESTICIDES/PCBS (ug/Kg)				
AROCLOR 1260	NA		NA	
METALS (mg/Kg)				
ALUMINUM	5,820		5,300	
ANTIMONY	0.316		ND	
ARSENIC	1.87		1.74	
BARIUM	11.1		10.8	
BERYLIUM	0.432		0.467	
CADMIUM	ND		ND	
CALCIUM	46.6		58.4	
CHROMIUM	11.6		10.6	
COBALT	ND		ND	
COPPER	11.2		10.5	
IRON	6,670		5,360	
LEAD	3.82		4.94	
MAGNESIUM	136.0		133	
MANGANESE	7.04		6.82	
MERCURY	0.200		0.198	
NICKEL	6.24		6.77	
POTASSIUM	188		234	
SELENIUM	ND		ND	
SILVER	0.172		ND	
SODIUM	ND		ND	
VANADIUM	41.5		48.2	
ZINC	3.91		3.75	
MISC				
TOTAL CYANIDE (mg/Kg)	ND		ND	
TOTAL KJELDAHL NITROGEN (mg/Kg)	73.6		57.8	
pH (S.U.)	4.61		4.61	
PERCENT SOLIDS (%)	87.5		90.8	

ND: NOT DETECTED, NA: NOT ANALYZED
B: BLANK CONTAMINATION, J: ESTIMATED

FIGURES

ACAD: O:\DATA\CADD\2295\95051101.DWG 05/11/95 VB



NOTE: MONITORING WELL LOCATIONS ARE APPROXIMATE
MAP DEVELOPED FROM 1985 AERIAL PHOTO

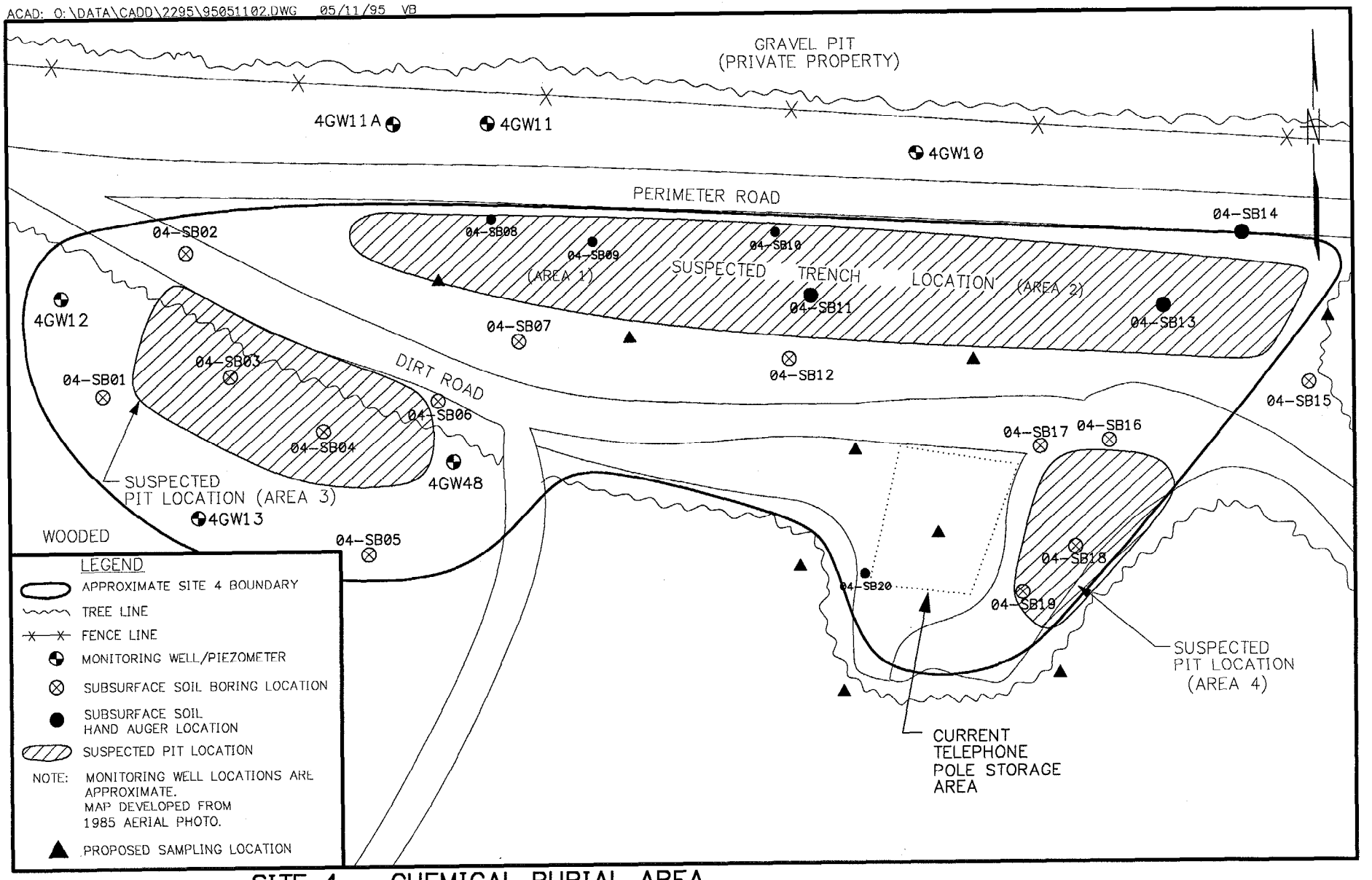
SITE 2 – APPLE ORCHARD LANDFILL
OFFSITE PCB SAMPLING LOCATIONS
NSWC WHITE OAK

0 125 250
APPROXIMATE SCALE IN FEET

FIGURE 1

Halliburton NUS CORPORATION

ACAD: O:\DATA\CADD\2295\95051102.DWG 05/11/95 VB



SITE 4 – CHEMICAL BURIAL AREA
SAMPLING LOCATIONS
NSWC WHITE OAK

0 40 80
APPROXIMATE SCALE IN FEET

FIGURE 2

Halliburton NUS
CORPORATION