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Geotechnical Field Investigation Report for Area A Landfill Remedial Design

for

Naval Submarine Base New London

Groton, Connecticut

Northern Division
Naval Facilities Engineering Command

Contract No. N62472-90-D-1298
Contract Task Order 0203

May 1995

Halliburton NUS
CORPORATION

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GEOTECHNICAL FIELD INVESTIGATION REPORT
FOR
AREA A LANDFILL REMEDIAL DESIGN

NAVAL SUBMARINE BASE - NEW LONDON
GROTON, CONNECTICUT

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN)

Submitted to:
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1.0 INTRODUCTION

This reports outlines the activities and results of the Geotechnical Field Investigation performed at the Area A Landfill at Naval Subase-New London, Groton, Connecticut, from February 22, 1995 to March 1, 1995 in support of the remedial design of a landfill cap and under Subtask 1.5 of Contract Task Order (CTO) 203 of Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-90-D-1298.

The Geotechnical Field Investigation included the drilling of test borings, the excavation of test pits, and the collection and geotechnical testing and chemical analysis of soil samples.

All field activities were performed in accordance with the Halliburton NUS Internal Work Plan for Area A Landfill Geotechnical and Methane Emissions Investigations, which is attached to this report as Appendix A.

2.0 FIELD INVESTIGATION ACTIVITIES

Field investigation activities included the drilling of test borings and collection of soil samples from some of these borings, as well as excavation of test pits. Actual surveyed locations of the test borings and test pits are shown on Figure 2-1. A copy of the field activities log book is attached to this report as Appendix B.

2.1 TEST BORINGS

The primary purpose of drilling test borings was to determine the depth of bedrock and landfilled waste materials and/or dredge spoils at strategic locations around the periphery of the Area A Landfill. The secondary purpose of drilling test borings was to collect undisturbed soil samples from the dredge spoils for the landfill for geotechnical testing and in the east end of the landfill for analytical testing.

A total of eight (8) test borings were drilled during the Geotechnical Field Investigation. Four (4) borings (LF-SB01 and LF-SB03 to LF-SB05) were drilled through overburden to bedrock. Two (2) borings (LF-SB02, LF-SB06) were drilled through overburden and bedrock. Two (2) borings (LF-TP01, LF-TP07) were drilled through bedrock at the bottom of existing test pits.

The overburden borings were advanced to auger refusal with 4¼-inch inside diameter (I.D.) hollow-stem augers. Soil samples were collected continuously at 1½-foot intervals for the entire length of the borings with 2-inch outside diameter (O.D.) split-barrel samplers, in accordance with ASTM D1586. A description of the soil, the recovery length, and the number of blows for each sample were recorded on boring logs maintained by Halliburton NUS personnel. Any visible evidence of contamination and HNu organic vapor monitor readings were also recorded on the boring logs. A copy of the test borings logs is attached to this report as Appendix C.

Three soil samples collected from test borings LF-SB03, LF-SB04, and LF-SB05 were analyzed for Target Compound List (TCL) volatiles (VOCs), TCL semivolatiles (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) inorganics and cyanide, to determine if any contamination is present in the soil at the east end of Area A.

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NOTE
1 BASE MAP AND UTILITY INFORMATION FROM MAPS OF NSB-NLON AND PHASE II RI WORK PLAN (ATLANTIC, MAY 1993)

FIGURE 2-1
GEOTECHNICAL INVESTIGATION LOCATIONS
AREA A LANDFILL,
SUBMARINE BASE, NEW LONDON

Halliburton NUS CORPORATION

LEGEND

TP TEST PIT (FEB 95 GEOTECHNICAL INVESTIGATION)

SB SOIL BORING (FEB 95 GEOTECHNICAL INVESTIGATION)

SCALE IN FEET 0 200 400

AREA A WETLAND

ROUTE 12

TRITON ROAD

524

393

373

460

DIKE

OVER BANK DISPOSAL AREA

PROPOSED LIMIT OF FINAL COVER SYSTEM

AREA A LANDFILL

DEPLOYED PARKING

TENNIS COURTS

RACQUET BALL BUILDING

CORSAIR

EAST GATE

LF-TP01
LF-TP02
LF-TP03
LF-TP04
LF-TP05
LF-TP06
LF-TP07
LF-TP08
LF-TP09
LF-TP10
LF-TP11
LF-TP12
LF-TP13
LF-TP14
LF-TP15
LF-TP16
LF-TP17
LF-TP18
LF-TP19
LF-TP20
LF-TP21
LF-SB01
LF-SB02
LF-SB04
LF-SB05
LF-SB06

ACAD O \DATA\CADD\9594\802-200 DWG 05/11/95 MB VIEW=PLOT GEO LAY

Six undisturbed soil samples from the clayey silt unit (i.e., dredge spoils) underlying the landfilled material were collected from four test borings (LF-SB01, LF-SB02, LF-SB03, and LF-SB06) in order to characterize the engineering properties of the unit. The undisturbed soil samples were collected with 3-inch O.D. thin-walled tube samplers (Shelby Tubes) in accordance with ASTM D1587.

All soil samples were analyzed for soil classification (ASTM D2487), particle size (ASTM D422), moisture content (ASTM D2216), and Atterberg Limits (D4318).

The samples collected from boring LF-SB01 at depths 21 to 23.5 feet and 23.5 to 26 feet and from LF-SB02 at depths 19.5 to 22 feet were also analyzed for triaxial compression (ASTM D4767) utilizing consolidated undrained conditions with pore pressure measurements.

Four bedrock cores were collected from two soil borings (LF-SB02 and LF-SB06) and from two test pits (LF-TP01 and LF-TP07) to verify the depth of bedrock and to identify the bedrock lithology and competence. All cores were ten feet in length and were drilled using a 2-inch I.D. (NX) core barrel. Lithology, recovery lengths, and subsurface structure (i.e., fractures, joints, or bedding) were recorded on the boring logs.

All test borings were backfilled with a cement/bentonite grout to the ground surface. All drilling cuttings were collected and containerized in DOT-approved 55-gallon drums and stored on wooden pallets in the decontamination area in Area A.

2.2 TEST PITS

The primary purpose of excavating test pits was to allow for visual observation of subsurface conditions at strategic locations around the periphery of Area A Landfill. In particular, the purpose of excavating test pits was to determine, wherever possible, the type of landfilled materials and the extent of landfilled waste and, along the southern boundary of the landfill, the depth and competence of bedrock.

A total of 20 test pits (LF-TP01 to LF-TP13 and LF-TP15 to LF-TP21) were excavated during the Geotechnical Field Investigation. In addition, although no actual test pit was excavated, the limit of the landfill was visually located at one additional point along the landfill/wetlands boundary (LF-TP14). All test pits were excavated with a backhoe equipped with a 2-foot-wide toothed bucket. Test pits were excavated perpendicularly to the landfill boundary until landfill material was encountered. Along the southern edge of the landfill, test pits were excavated laterally away from the landfill until bedrock was encountered. Soil descriptions, stratigraphy of the soil and/or landfill, and test pit dimensions were

recorded on test pit logs maintained by Halliburton NUS personnel. A copy of the test borings logs is attached to this report as Appendix D. Test pit locations and exposures were photographed. At locations along the landfill/wetlands interface, the extent of the landfill was marked where visible landfill material (i.e., rubble) terminated.

The 11 test pits excavated in the main part of the Area A Landfill (LF-TP01 to LF-TP05, LF-TP07, LF-TP12, LF-TP13, LF-TP15, LF-TP16, and LF-TP21) were generally successful at locating the limit of landfilled materials and several of those excavated along the southern edge of the landfill (LF-TP01 to LF-TP05, LF-TP07, and LF-TP12) also provided a good indication of bedrock depth. However, some of the test pits (particularly in the southeastern portion of the landfill) encountered large boulders that impeded excavation and, in these cases, it was not possible to distinguish between boulders overlying bedrock and actual competent bedrock itself.

Several drums were uncovered by the test pitting activities on the main portion of the Area A Landfill and one of these drums was actually excavated, after which it was overpacked and removed for disposal by NSB-NLON environmental control personnel.

The nine test pits excavated in the east end of Area A (LF-TP06, LF-TP08 to LF-TP11, and LF-TP17 to LF-TP20) did not reveal any evidence of landfilled materials in this area and only uncovered soil fill and small quantities of construction type rubble and debris.

All test pits were backfilled with the landfill material first and covered with the surface soil.

3.0 SAMPLES TESTING RESULTS

3.1 GEOTECHNICAL TESTING

A summary of the results from the geotechnical testing of the soil samples collected from the six overburden test borings is provided on Table 3-1. A detailed testing report is attached as Appendix E.

From these results, it can be concluded that the Area A Landfill dredge spoils exhibit a somewhat greater strength than would normally be anticipated for normally consolidated fine-grained material. It is also judged that this greater-than-anticipated strength is a result of consolidation of the dredge spoils below the landfill due to the weight of overlying materials. These results allowed a favorable revision of the preliminary slope stability analysis based upon earlier assumptions.

3.2 ANALYTICAL TESTING

A summary of the results from the chemical analytical testing of the soil samples collected from the three test borings advanced in the east end of Area A (LF-SB03, LF-SB04, LF-SB05) is provided on Tables 3-2, 3-3, 3-4, and 3-5. Detailed laboratory results and data validation materials are attached as Appendix F.

From these results, it can be concluded that subsurface soils in the sampled locations of the Area A east end are essentially non-contaminated. These results and conclusion are also consistent with earlier results from subsurface soil samples collected near the northwest corner of the tennis courts during the Phase I Remedial Investigation (Atlantic, 1994).

TABLE 3-1

SUMMARY OF SOIL GEOTECHNICAL TESTING RESLULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Boring/Depth	Particle Size - ASTM D422	Triaxial Compression - ASTM D4767			
		Effective Stress		Total Stress	
	% passing 200 mesh screen	Cohesion (psf)	Friction Angle (°)	Cohesion (psf)	Friction Angle (°)
SBO1 21-23.5	92	130	37.5	346	14.8
SBO1 23.5-26	92	216	30.6	389	11.8
SB02 15-18	96	NT	NT	NT	NT
SB02 19.5-22	96	72	35.3	173	14.8
SB03 15-17	93	NT	NT	NT	NT
SB06 12-14	96	NT	NT	NT	NT

Boring/Depth	Classification - ASTM D2487	Moisture (%) - ASTM D2216	Atterberg Limits - ASTM D4318		
			Liquid Limit	Plastic Limit	Plasticity Index
SBO1 21-23.5	MH Elastic Silt	58.4	69	37	31
SBO1 23.5-26	MH Elastic Silt	57.6	70	37	33
SB02 15-18	MH Elastic Silt	70.9	73	38	35
SB02 19.5-22	MH Elastic Silt	71.3	75	39	36
SB03 15-17	MH Elastic Silt	64.3	63	37	26
SB06 12-14	MH Elastic Silt	73.6	72	41	31

NT: Not Tested

DRAFT

TABLE 3-2

SUMMARY OF SOIL TCL VOLATILE ORGANICS ANALYTICAL RESULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Compound	LF-SB03 18.5-20.5	LF-SB04 8.0-10.0	LF-SB05 12.5-14.5
Chloromethane	16 U	11 U	13 U
Bromomethane	16 U	11 U	13 U
Vinyl Chloride	16 U	11 U	13 U
Chloroethane	16 U	11 U	13 U
Methylene Chloride	8 J	2 J	2 J
Acetone	18 J	11 U	13 U
Carbon Disulfide	8 J	11 U	13 U
1,1-Dichloroethene	16 U	11 U	13 U
1,1-Dichloroethane	16 U	11 U	13 U
1,2-Dichloroethene (Total)	16 U	11 U	13 U
Chloroform	16 U	11 U	13 U
1,2-Dichloroethane	16 U	11 U	13 U
2-Butanone	16 U	11 U	13 U
1,1,1-Trichloroethane	16 U	11 U	13 U
Carbon Tetrachloride	16 U	11 U	13 U
Bromodichloromethane	16 U	11 U	13 U
1,2-Dichloropropane	16 U	11 U	13 U
Cis-1,3-Dichloropropene	16 U	11 U	13 U
Trichloroethene	16 U	11 U	13 U
Dibromochloromethane	16 U	11 U	13 U
1,1,2-Trichloroethane	16 U	11 U	13 U
Benzene	16 U	11 U	13 U
Trans-1,3-Dichloropropene	16 U	11 U	13 U
Bromoform	16 U	11 U	13 U
4-Methyl-2-Pentanone	16 U	11 U	13 U
2-Hexanone	16 U	11 U	13 U
Tetrachloroethene	16 U	11 U	13 U
1,1,2,2-Tetrachloroethane	16 U	11 U	13 U
Toluene	16 U	11 U	13 U
Chlorobenzene	16 U	11 U	13 U
Ethylbenzene	16 U	11 U	13 U
Styrene	16 U	11 U	13 U
Xylene (Total)	16 U	11 U	13 U

TABLE 3-3

SUMMARY OF SOIL TCL SEMI-VOLATILE ORGANICS ANALYTICAL RESULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Compound	LF-SB03 18.5-20.5	LF-SB04 8.0-10.0	LF-SB05 12.5-14.5
Phenol	540 UJ	370 U	420 UJ
Bis(2-chloroethyl)ether	540 UJ	370 U	420 UJ
2-Chlorophenol	540 UJ	370 U	420 UJ
1,3-Dichlorobenzene	540 UJ	370 U	420 UJ
1,4-Dichlorobenzene	540 UJ	370 U	420 UJ
1,2-Dichlorobenzene	540 UJ	370 U	420 UJ
2-Methylphenol	540 UJ	370 U	420 UJ
2,2'-Oxybis(1-chloropropane)	540 UJ	370 UJ	420 UJ
4-Methylphenol	540 UJ	370 U	420 UJ
N-Nitroso-di-n-propylamine	549 UJ	370 U	420 UJ
Hexachloroethane	540 UJ	370 U	420 UJ
Nitrobenzene	540 UJ	370 U	420 UJ
Isophorone	540 UJ	370 U	420 UJ
2-Nitrophenol	540 UJ	370 U	420 UJ
2,4-Dimethylphenol	540 UJ	370 U	420 UJ
2,4-Dichlorophenol	540 UJ	370 U	420 UJ
1,2,4-Trichlorobenzene	540 UJ	370 U	420 UJ
Naphthalene	540 UJ	370 U	420 UJ
4-Chloroaniline	540 UJ	370 U	420 UJ
Bis(2-chloroethoxy)methane	540 UJ	370 U	420 UJ
Hexachlorobutadiene	540 UJ	370 U	420 UJ
4-Chloro-3-methylphenol	540 UJ	370 U	420 UJ
2-Methylnaphthalene	540 UJ	370 U	420 UJ
Hexachlorocyclopentadiene	540 U	370 U	420 UJ
2,4,6-Trichlorophenol	540 U	370 U	420 UJ
2,4,5-Trichlorophenol	1300 U	900 U	1000 UJ
2-Chloronaphthalene	540 U	370 U	420 UJ
2-Nitroaniline	1300 U	900 U	1000 UJ
Dimethyl phthalate	540 U	370 U	420 UJ
Acenaphthylene	540 U	370 U	420 UJ
2,6-Dinitrotoluene	540 U	370 U	420 UJ
3-Nitroaniline	1300 U	900 U	1000 UJ
Acenaphthene	540 U	370 U	420 UJ
2,4-Dinitrophenol	1300 U	900 U	1000 UJ

TABLE 3-3 (Continued)
SUMMARY OF SOIL TCL SEMI-VOLATILE ORGANICS ANALYTICAL RESULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Compound	LF-SB03 18.5-20.5	LF-SB04 8.0-10.0	LF-SB05 12.5-14.5
4-Nitrophenol	1300 UJ	900 UJ	1000 UJ
Dibenzofuran	540 U	370 U	420 UJ
2,4-Dinitrotoluene	540 U	370 U	420 UJ
Diethyl-phthalate	540 U	370 U	420 UJ
4-Clorophenyl phenylether	540 U	370 U	420 UJ
Fluorene	540 U	370 U	420 UJ
4-Nitroaniline	1300 U	900 U	1000 UJ
4,6-Dinitro-2-methylphenol	1300 U	900 U	1000 UJ
N-Nitrosodiphenylamine	549 U	370 U	420 UJ
4-Bromophenyl phenylether	540 U	370 U	420 UJ
Hexachlorobenzene	540 U	370 U	420 UJ
Pentachlorophenol	1300 U	900 U	1000 UJ
Phenanthrene	540 U	370 U	420 UJ
Anthracene	540 U	370 U	420 UJ
Carbazole	540 U	370 U	420 UJ
Di-n-butylphthalate	540 U	370 U	420 UJ
Fluoranthene	540 U	370 U	420 UJ
Pyrene	30 J	370 U	420 U
Butylbenzylphthalate	540 U	370 U	420 U
3,3'-Dichlorobenzidine	540 U	370 U	420 U
Benzo(a)anthracene	540 U	370 U	420 U
Chrysene	540 U	370 U	420 U
Bis(2-ethylhexyl)phtalate	540 U	370 U	420 U
Di-n-octyl phtalate	540 U	370 U	420 U
Benzo(b)fluoranthene	540 U	370 U	420 U
Benzo(k)fluoranthene	540 U	370 U	420 U
Benzo(a)pyrene	310 J	370 U	420 U
Indeno(1,2,3-cd)pyrene	540 U	370 U	420 U
Dibenz(a,h)anthracene	540 U	370 U	420 U
Benzo(g,h,i)perylene	540 U	370 U	420 U

TABLE 3-4

SUMMARY OF SOIL PESTICIDES AND PCBs ANALYTICAL RESULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Compound	LF-SB03 18.5-20.5	LF-SB04 8.0-10.0	LF-SB05 12.5-14.5
Alpha-BHC	2.8 UJ	1.9 UJ	2.2 UJ
Beta-BHC	2.8 UJ	1.9 UJ	2.2 UJ
Delta-BHC	2.8 UJ	1.9 UJ	2.2 UJ
Gamma-BHC (Lindane)	2.8 UJ	1.9 UJ	2.2 UJ
Heptachlor	2.8 UJ	1.9 UJ	2.2 UJ
Aldrin	2.8 UJ	1.9 UJ	2.2 UJ
Heptachlor epoxide	2.8 UJ	1.9 UJ	2.2 UJ
Endosulfan I	2.8 UJ	1.9 UJ	2.2 UJ
Dieldrin	5.4 UJ	3.7 UJ	4.2 UJ
4.4'-DDE	5.4 UJ	3.7 UJ	4.2 UJ
Endrin	5.4 UJ	3.7 UJ	4.2 UJ
Endosulfan II	5.4 UJ	3.7 UJ	4.2 UJ
4,4'-DDD	5.4 UJ	3.7 UJ	4.2 UJ
Endosulfan sulfate	5.4 UJ	3.7 UJ	4.2 UJ
4,4'-DDT	5.4 UJ	3.7 UJ	4.2 UJ
Methoxychlor	28 UJ	19 UJ	22 UJ
Endrin ketone	5.4 UJ	3.7 UJ	4.2 UJ
Endrin aldehyde	5.4 UJ	3.7 UJ	4.2 UJ
Alpha-chlordane	2.8 UJ	1.9 UJ	2.2 UJ
Gamma-chlordane	2.8 UJ	1.9 UJ	2.2 UJ
Toxaphene	280 UJ	190 UJ	220 UJ
Arochlor-1016	54 UJ	37 UJ	42 UJ
Arochlor-1221	110 UJ	75 UJ	85 UJ
Arochlor-1232	54 UJ	37 UJ	42 UJ
Arochlor-1242	54 UJ	37 UJ	42 UJ
Arochlor-1248	54 UJ	37 UJ	42 UJ
Arochlor-1254	54 UJ	37 UJ	42 UJ
Arochlor-1260	54 UJ	37 UJ	42 UJ

TABLE 3-5

SUMMARY OF SOIL TAL INORGANICS ANALYTICAL RESULTS
AREA A LANDFILL
NAVAL SUBMARINE BASE NEW LONDON - GROTON, CONNECTICUT

Compound	LF-SB03 18.5-20.5	LF-SB04 8.0-10.0	LF-SB05 12.5-14.5
Aluminum	15200	9780	18400
Antimony	1.3 U	0.87 U	1.0 U
Arsenic	9.0	0.94 J	4.5
Barium	43.3	114	51.2
Beryllium	0.77	0.29 J	0.70
Cadmium	0.32 J	0.22 U	0.26 U
Calcium	8530	1660	1070
Chromium	36.1	17.8	23.3
Cobalt	10.2	8.7	9.5
Copper	13.5	13.1	13.8
Iron	25600	15200	17800
Lead	8.6	8.1	9.6
Magnesium	8069	4750	3790
Manganese	326	298	248
Mercury	0.16 U	0.11 U	0.13 U
Nickel	20.9	9.5	11.2
Potassium	4500	3700	1150
Selenium	2.3	0.81	1.4
Silver	0.64 U	0.44 U	0.52 U
Sodium	7190	99.9	93.7
Thallium	1.8	0.87 U	1.0 U
Vanadium	40.3	29.1	38.2
Zinc	57.3	47.7	38.3
Cyanide	0.80 U	0.54 U	0.65 U

APPENDIX A

HALLIBURTON NUS INTERNAL WORK PLAN FOR AREA A LANDFILL GEOTECHNICAL AND METHANE EMISSIONS INVESTIGATIONS

Internal Work Plan
for
Area A Landfill
Geotechnical and Methane
Emissions Investigations
for
Naval Submarine Base
New London
Groton, Connecticut

Northern Division

Naval Facilities Engineering Command

Contract Number N62372-90-D-1298

Contract Task Order 0203

February 1995

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1.0 INTRODUCTION AND SITE DESCRIPTION

1.1 AUTHORIZATION

The field work described in this plan will be performed under Task 1 Subtask 1.5 and 1.6 of Contract Task Order (CTO) Number 203 of Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62472-90-D-1298.

Task 1: Engineering Services Subtask 1.5 of CTO No. 203 is the geotechnical field investigation of the Area A Landfill at Naval Submarine Base - New London (NSB-NLON) in Groton, Connecticut. Subtask 1.6 is the methane emissions investigation of the Area A Landfill at Naval Submarine Base - New London (NSB-NLON) in Groton Connecticut. This Internal Work Plan describes the sampling and analysis to be performed at the Area A Landfill to provide geotechnical data and methane emission and generation data for the Remedial Design of a low permeability cap to be installed over the landfill area.

Section 1.0 of this Internal Work Plan is a brief introduction and site description. Section 2.0 contains a site-specific sampling plan and describes methods and procedures for the field work activities.

All field activities described in this Internal Work Plan will be conducted in accordance with the existing Health and Safety Plan (HASP) and associated addendum.

1.2 SCOPE AND OBJECTIVES

The primary objective of the geotechnical investigation is to verify waste limits, soil characteristics and bedrock depth and lithology along the northern and southern boundaries and the east end of the Area A Landfill. The primary objective of the methane emissions investigation is to quantify the amount of methane evolving from the Area A Landfill and to assess methane generation, if any, in the appropriate areas of the landfill. Following the data collection phase, a letter report will be generated to present the results of the field investigations and discuss their impact on the design of the impervious cap for the Area A Landfill.

1.3 SITE DESCRIPTION

NSB-NLON consists of approximately 547 acres of land and associated buildings in southeastern Connecticut, in the towns of Ledyard and Groton. NSB-NLON is situated along the eastern bank of the Thames River, approximately 6 miles north of Long Island Sound.

The Area A Landfill is located in the northeastern and north-central section of NSB-NLON. It is approximately seven acres in size. Access is via a dirt road off Wahoo Avenue. The Area A Landfill is a relatively flat area bordered by a steep, wooded hillside that rises to the south, a steep wooded ravine to the west, and the Area A Wetland to the north. Aerial photographs show that the landfill appears to have extended east along the wetland to as far as a recreational area (tennis courts).

According to the Initial Assessment Study (IAS) conducted by Envirodyne Engineers, Inc. in 1982, the landfill opened sometime before 1957. All materials generated by base operations that were not salvageable were disposed in the Goss Cove Landfill located on the Thames River and the Area A Landfill. The base incinerator ceased operations 1963. From 1963 to 1973 all unburned wastes were disposed in the Area A landfill.

The area fill method was reportedly used in landfill operations. New refuse was dumped from the face of previously deposited refuse and covered with earth. The cover material used on the landfill was gravel obtained from the Groton water supply reservoir. Landfilling operations ceased in 1973. After closure, a concrete pad was constructed in the southwest portion of the landfill for aboveground storage of industrial wastes. The remainder of the landfill was not paved. At the time of the IAS, 42 steel drums, 87 transformers (mineral and PCB), and 60 to 80 electrical switches were stored on the pad. Two transformers and several electrical switches were leaking. Past leakage of oil was also evident. Most drums were stacked on wooden pallets and those with PCB labels were covered and bound with plastic sheeting. All of these materials have since been properly disposed offsite.

The IAS report also indicated that refuse, including steel drums, oxygen candles, wood and metal scrap, concrete, and tires, was exposed at the edge of the landfill adjacent to the wetland. The IAS report stated that petroleum compounds had recently been poured from containers and had flowed into the wetland at two locations (northwestern portions of the landfill). The IAS report also stated that when batteries were overhauled, spent sulfuric acid solution was transferred to barrels and transported to Area A for disposal. The acid was poured into trenches dug with a bulldozer and subsequently covered with soil.

Atlantic Environmental Services, Inc., performed an inspection of the Area A Landfill on September 30, 1988. Orange leachate was observed along the toe of the slope of the landfill extending from the dike to the east end of the deployed parking lot. The slope of the landfill had been covered with fill and material in the landfill was not visible.

The vertical extent of landfill material is estimated to range from 10 to 20 feet below ground surface, based on test boring data from Atlantic and Halliburton NUS. Landfill materials encountered included metal, glass, brick, wood, plastic, and ash, intermixed with sand and gravel. A deposit of river dredge spoils (clayey silt) underlies the landfill material and is approximately 12 feet thick. Alluvial deposits of silty sand lie below the dredge spoil deposit and rest on the bedrock surface. The depth to the bedrock surface varies from 13 to 45 feet.

Sand bags and contractors' supplies and equipment have been stored over the former landfill in recent years. Several transformers, excavated underground storage tanks, crane weights, and other equipment are stored on the concrete pad in the southwest portion of the landfill.

2.0 FIELD INVESTIGATIONS

2.1 INTRODUCTION

This section discusses the field work activities for the geotechnical investigations at Area A landfill. An addendum to this Internal Work Plan will be prepared after completion of a desk-top study of methane gas generation for the landfill. The addendum will describe the field activities associated with the methane emissions investigations. The field investigations include drilling an estimated 6 soil borings, excavating an estimated 20 test pits, and sampling soil gas for methane at an estimated 6 locations in the Area A Landfill.

Halliburton NUS (HNUS) Standard Operating Procedures (SOPs) and ASTM Methods will be followed during the field work activities and referenced in the text where applicable. All SOPs and ASTM Methods required for these field investigations are included in the appendix, except the ASTM Methods for geotechnical testing.

2.2 SOIL BORINGS

Six (6) soil borings will be drilled to bedrock in the Area A Landfill, including two (2) along the northern edge and four (4) in the eastern half of the Area A Landfill. Proposed soil boring locations are illustrated in Figure 2-1. The borings will be drilled using hollow stem auger drilling techniques, in accordance with HNUS SOP GH-1.4. The hollow stem augers will have a minimum inside diameter of 4 inches. Two-inch diameter split spoon samples will be collected continuously at 1½-foot intervals from each boring to the bottom of the boring in accordance with HNUS SOP GH-1.3 and ASTM Method D 1586. Soil characteristics and geotechnical information from each split-spoon sample will be recorded on boring logs. Three-inch diameter thin-walled (Shelby) tube samples of the river dredge spoils (clayey silt) unit underlying the landfill will be collected from each soil boring (up to six (6) total samples) where the dredge spoils are encountered. The Shelby tube samples will be collected immediately after the dredge spoils unit is encountered by split-spoon sampling. Additional Shelby tubes may also be collected at the direction of the project engineer. Shelby tube samples will be collected in accordance with ASTM Method D 1587 and packed and transported in an upright position in accordance with ASTM Method D 4220. All Shelby tube samples will be capped and sealed with a paraffin wax. Selected samples will be sent for geotechnical testing based on conversations between the field geologist and project engineer.

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All soil borings will be backfilled with a cement/bentonite (6 to 1 ratio, respectively) grout through the center of the augers with a tremie tube from the bottom of the boring to the ground surface upon completion. All drill cuttings will be containerized in Department of Transportation (DOT)-approved (Specification 17-C), 55-gallon drums and will be labeled and stored on pallets at the decontamination area.

2.3 SOIL CHEMICAL ANALYSES

A total of three (3) split-spoon samples from soil at the eastern half of the Area A Landfill will be selected based on visual evidence of contamination and will be analyzed for full Target Compound List (TCL) organics (VOCs, SVOCs, Pesticides and PCBs) and Target Analyte List (TAL) inorganics (metals) plus cyanide. The selection of samples will be confirmed with the project engineer for submission to the laboratory.

2.4 SOIL GEOTECHNICAL ANALYSES

All Shelby tube samples will be capped and sealed with a paraffin wax after collection. The samples selected for geotechnical testing will be analyzed for soil classification (ASTM Method D 2487), particle size (ASTM Method D 422), moisture content (ASTM Method D 2216), Atterburg Limits (ASTM Method D 4318), and triaxial compression testing (ASTM Method D 4767), as outlined in Table 2-1.

2.5 BEDROCK CORING

Two (2) bedrock core samples will be collected from each of two (2) of the soil borings in order to verify bedrock depth and to describe the bedrock lithology. Diamond bit coring drilling techniques will be used. After the hollow stem augers have been advanced to refusal (i.e., bedrock contact), the hollow stem augers or 4" inside diameter (I.D.) temporary spin casing will be set into the bedrock surface. Five foot long core samples will then be collected. Bedrock characteristics (i.e., lithology, hardness, etc.) will be recorded on the boring logs. The soil borings to be cored will be determined after conversations between the field geologist and project engineer.

Drilling water from bedrock coring activities will be collected and containerized in DOT-approved drums and will be stored on pallets at the decontamination area.

TABLE 2-1

ANALYTICAL PROGRAM-AREA A LANDFILL
NSB-NLON, GROTON, CONNECTICUT

Media	Analysis	Analytical Method	Number of Samples[1]	Equipment Rinsate[2]	Total Samples
Soil	TCL Volatiles	OLM01.8	3	1	4
	TCL Semivolatiles	OLM01.8	3	1	4
	TCL Pesticides	OLM01.8	3	1	4
	TCL PCBs	OLM01.8	3	1	4
	TAL Metals plus Cyanide	ILM02.0	3	1	4
	Soil Classification	ASTM D2487	6	-	6
	Particle Size	ASTM D422	6	-	6
	Moisture Content	ASTM D2216	6	-	6
	Atterberg Limits	ASTM D4318	6	-	6
	Triaxial Compression	ASTM D4767	2	-	2
Soil Gas[3]	Methane		24	-	24

(1) Number of samples includes 1 soil MS/MSD which will be collected with double volume. MS/MSDs will be noted on each sample bottle, the COC, and the sample log sheets.

(2) Equipment Blank: Samples obtained by pouring analyte-free water over sample collection equipment (split-spoon sampler) after decontamination. Assesses the effectiveness of field decontamination procedure.

(3) Includes 4 sampling rounds of 6 samples per round.

DRAFT

2.6 TEST PITS

Approximately twenty (20) test pits will be excavated to bedrock along the southern edge and at the eastern end of the Area A Landfill. Proposed locations for fifteen (15) test pits are illustrated in Figure 2-1. The remaining five (5) test pit locations will be determined in the field after conversations between the field geologist and the project engineer. The test pits will be excavated in accordance with HNUS SOP GH-1.8. The test pits will be excavated perpendicular to the landfill boundary until the limit of landfilled material is encountered. In addition, along the southern limit of the landfill the test pits will be extended laterally away from the landfill until the surface of competent bedrock is exposed. Complete test pit logs will be maintained for each test pit.

Test pits will be backfilled with the excavated material from the associated test pit. Landfilled material will be backfilled first, followed by the overlying surface cover.

2.7 QUALITY CONTROL SAMPLES

In addition to standard sample acquisition, one quality control (QC) sample will be collected during the sampling activities. The QC sample will be an equipment rinsate blank. Table 2-1 presents the analyses that will be performed for the equipment rinsate blank. An equipment rinsate blank is defined as follows:

- **Equipment Rinsate Blank**. An equipment rinsate blank is obtained under representative field conditions by running analyte-free water through sample collection equipment (split-spoon) after decontamination and placing the runoff water in the appropriate sample containers for analysis. The equipment blank will be used to assess the effectiveness of decontamination procedures. The equipment blank will be collected once for the split-spoon samplers. The equipment rinsate blank will be analyzed for the same parameters as the associated samples.

2.8 SAMPLING IDENTIFICATION SYSTEM

Each sample collected will be assigned a unique sample tracking number. The sample tracking number will consist of a four-segment, alpha-numeric code that identifies the site, the sample medium and location, and sample depth (in the case of soil samples). Any other pertinent information regarding sample identification will be recorded in the field log books and sample logsheets.

The alpha-numeric coding to be used in the sample system is explained in the following diagram and the subsequent definitions.

For soil samples:

(AA)	-	(AANN)	-	(NNNN)
(Site)		(Medium and Location)		(Sample depth)

For soil gas samples:

(AA)	-	(AANN)	-	(NN)
(Site)		(Medium and Location)		(Sample Round)

where,

Site:

LF = Area A Landfill

Character Type:

A = Alpha

N = Numeric

Medium:

SB = Soil Sample

ME = Soil Gas Samples

Sample Location:

Soil boring or soil gas location number (numeric, starting with 01 for each medium)

Sample Depth:

For soil samples only = Start and end depth, in feet, of sample

Sample Round:

For soil gas samples only = Number of sampling round

Examples A soil sample taken from the soil boring SB-01 at a depth of 2 to 4 feet would be numbered LF-SB01-0204.

A soil gas sample taken from the soil gas location ME-01 during round 1 of sampling would be numbered LF-ME01-01.

The field quality control (QC) sample will be designated using a coding system. The designation will consist of a two-segment, alpha-numeric code that identifies the QC sample identifier and number. The equipment rinsate blank will be designated RB-01

2.9 SAMPLE PRESERVATION, PACKAGING AND SHIPPING

Samples will be preserved in accordance with SOP SF-1.2. Samples will be packaged and shipped in accordance with Halliburton NUS SOP SA-6.2. The following forms will be completed during the field activity:

- Sample Labels
- Chain-of-Custody Forms
- Chain-of-Custody Seals
- Sample Logsheets
- Overnight Courier Air Bills

2.10 EQUIPMENT CALIBRATION

An organic vapor monitor will be used during field activities. It will be calibrated daily or according to the manufacturer's operating manual.

Calibration will be documented in the field logbook and on calibration logsheets. During calibration an appropriate maintenance check will be performed on the equipment. If damaged or defective parts are identified during the maintenance check and it is determined that the damage could have an impact on the instrument's performance, the instrument will be removed from service until the defective parts are repaired or replaced.

2.10.1 DECONTAMINATION

The equipment involved in field sampling activities will be decontaminated prior to and during drilling or excavation and sampling activities. This equipment includes downhole drilling tools, augers, backhoe buckets, and all non-dedicated sampling equipment. Specific decontamination procedures are discussed in the following subsections.

2.10.2 Major Equipment

All downhole drilling equipment, backhoe buckets, and sampling tools shall be steam cleaned prior to beginning work, between well borings or test pits, any time the drilling rig or backhoe leave the site prior to completing a boring or test pit, and at the completion of the drilling and excavation program.

These decontamination operations will consist of washing the equipment using a high-pressure steam wash. All decontamination activities will take place at the designated decontamination area. Additional requirements for drilling equipment decontamination can be found in Halliburton NUS SOP GH-1.6.

2.10.3 Sampling Equipment

All sampling equipment used for collecting samples (i.e., split-spoons and soil gas sampling equipment) will be decontaminated both prior to field sampling and between samples, in accordance with SOP SF-2.3. The following decontamination steps will be taken for split-spoon samplers and the plunger bar for soil gas sampling:

- Potable water and Alconox or Liquinox detergent wash
- Potable water rinse
- Methanol rinse
- Hexane rinse
- Distilled/Deionized water rinse (analyte free)
- Air dry

Non-dedicated soil gas sampling equipment will be purged with ambient air.

2.11 WASTE HANDLING

All decontamination liquids will be collected, containerized, and stored on site in Department of Transportation (DOT)-approved (Specification 17-C), 55-gallon drums. All drill cuttings will also be collected and stored on site in the DOT-approved drums. All drums will be sealed and labeled with drum contents, boring number, site or origin, volume, and date. The drums will be stored on wooden pallets at the Area A Landfill pending analytical results. Halliburton NUS understands that the Navy will arrange for the waste to be disposed in an appropriate manner based on the analytical results.

2.12 RECORD KEEPING

In addition to the previously mentioned forms, other types of records must be kept. These records include notebooks and logbooks.

A bound/weatherproof field notebook shall be maintained by the field crew. All information related to sampling or field activities will be recorded in the field notebook. This information will include, but is not limited to, sampling time, weather conditions, unusual events, field measurements, descriptions of photographs, etc.

A bound/weatherproof site logbook shall be maintained by the field operations leader (FOL). This book will contain a summary of the day's activities and will reference the field notebooks when applicable.

At the completion of field activities, the FOL shall submit to the Project Manager (PM) all field records, data, field notebooks, logbooks, chain-of-custody receipts, sample logsheet, drilling logs, etc.

2.13 SURVEYING

The locations of all soil borings, test pits, and soil gas survey locations will be surveyed by a licensed surveyor. The horizontal location and ground surface elevation of each will be noted. Elevations will be reported in feet above mean sea level. Surveying will utilize pre-existing reference points and/or existing survey monuments from previous surveying events.

APPENDIX B

HALLIBURTON NUS FIELD LOG BOOKS

B.1 MASTER LOG BOOK

B.2 TEST BORINGS LOG BOOK

B.3 TEST PITS LOG BOOK

B.1 MASTER LOG BOOK

2273

Halliburton NUS
661 Anderson Dr
Foster Plaza #7
Pittsburgh PA 15220
(412) 921-7090

NO.	TABLE OF CONTENTS	PAGE NO.
SUBJECT		
	TE = Tim Evans (HNUS)	
	KS = Keith Simpson (HNUS)	
	MS = Mark Shock (Associated Drilling)	
	RS = Randy Slagle	

TABLE OF CONTENTS

PAGE NI

SUBJECT

TITLE NSB NLON AM cold sunny PROJECT NO. [illegible]

MON 2-13-95 PM cold sunny BOOK 2273

(26°F)

Work continued from Page

On Site: Tim Emms (TE) HNUS
Keith Simpson (KS)

Mark Shock (MS) Associated
Terry Keegan (TK) Drilling

1. Arr on site. Recon drilling & test pit locations in Area A Landfill

2. TE + MS drill LF-SB01-A. Auger refusal ~9-13' in 4 attempts.

3. KS + TK excavate LF-TP01 & LF-TP02. Uncover drum @ LF-TP03. Overpack in barrel. Navy notified (3 total test pits)

For Details see NB 1243 pp 3-5
NB 1244 pp 1

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-13-95

WITNESS DATE

1

Scientific Bindery Productions 1255 S. Wabash Chicago, IL 60605

TITLE [illegible] PROJECT NO. 5082

Tues 2-14-95 PM cold (35°F) sunny BOOK 2273

Work continued from Page

On Site: TE + KS (HNUS)
MS + RS (Assoc)
TK (Keegan)

1. TE + MS, RS drill @ LF-SB02. to 23.5'

2. KS + TK excavate LF TP-03, -04 & -05. (3 total)

3. Waited 0800 to 1000 for HNU to arrive.

For Details see NB 1243 pp 7-10
NB 1244 pp 3

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-14-95

WITNESS DATE

TITLE [illegible] PROJECT NO. 5082

Wed 2-15-95 PM cold (20°F) sunny overcast BOOK 2273

Work continued from Page

On Site: TE + KS (HNUS)
MS + RS (Assoc)
TK (Keegan)

1. TE + Assoc Drill @ LF-SB02. (Completed) BR @ 33'. Dredge 10.5-24.5'

2. KS + Keegan excavate test pits LF-TP06 & 07 (2 total)

For Details see NB 1243 pp 11-13
NB 1244 pp 5

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-15-95

WITNESS DATE

TITLE NSB-NLON AM overcast PROJECT NO. 5082
Thur 2-16-95 PM cold (40°F) overcast BOOK 2273

Work continued from Page

On Site: Tim Evans + Keith Simpson (HWUS)
MS + RS (Assoc)
Keith K (Keegan)

1. TE + Assoc Advanced soil boring LF-SB03 to refusal (70') Bredge 10.9 - 37.3

2. KS + KK excavate test pits LF-TP08, -09, 10, -11, -12, -13, -14 (7 total)

3. TE ~~Send~~ Shelby tubes LF-SB03-15.18 & -19.5 22 ~~to~~ picked up by Geotesting Express

See NB 1243 pp 15-19 for ~~details~~ details
NB 1244 pp 7

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-16-95
WITNESS DATE

4

TITLE NSBNLON AM Cold (36°F) sunny PROJECT NO. 5082
Fri 2-17-95 PM cod (45°F) sunny BOOK 2273

Work continued from Page

On Site: TE + KS (HWUS)
MS + RS (Assoc)
KK (Keegan

1. Drillers TE ~~grout~~ grout LF-SB03 Begin drilling LF-SB04 Augers refusal @ 16' + 12' in two attempts. Collect sample LF-SB04-0810.

2. Stage drums in decon area

3. KS + KK excavate 7 test pits

4. Send soil samples, LF-SB02-___ to SW Lab of OK via FedEx

See NB 1243 pp 19-21 for Details
1244 pp 9 For Details

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-17-95
WITNESS DATE

5

TITLE NSB LON AM Sunny PROJECT NO 5082

Sat 2-18-95 PM cool (42°F) sunny BOOK 1273

Work continued from Page

On Site: TE + KS (HNUS)
John H + Earl H (Assoc)

1. Finish drilling @ LF-SB04
2. Begin drilling @ LF-SB05
3. KS IV for Pgh
4. Collect sample LF-SB05-

See NB 1243 pp 23-25 for details
NB 1244 pp 11 for details

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Timothy S. [illegible] DATE 2-18-95

WITNESS DATE

TITLE NSB LON AM Sunny PROJECT NO 5082

SUN 2-19-95 PM cool (44°F) sunny BOOK 1243

Work continued from Page

Onsite: TE (HNUS)
MS (Assoc)

1. Finish drilling LF-SB05
2. Grout LF-SB05

See NB 1243 pp 27 for details

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Timothy S. [illegible] DATE 2-19-95

WITNESS DATE

TITLE NSB NLON AM 36°F, sunny PROJECT NO. ~~[illegible]~~ TSE

Mon 2-20-95 PM BOOK 2273

Work continued from Page

On Site: TE (HNUS)
GC, RS MS (Assoc)
↳ George Carabetta

1. Finishing grouting LF-SB05
2. Drill & core @ LF-SB06
~~TD~~ TSE
3. Collect shelby tube LF-SB06-1214'.
4. Ship samples to Sw Lab of OK

See NB 1243 pp 29-31 for details

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 2-20-95

WITNESS

DATE

TITLE NSB NLON AM 35°F, overcast PROJECT NO. 5082

Tue 2-21-95 PM 38°F, sunny BOOK 2273

Work continued from Page

On Site: TE (HNUS)
MS, RS (Assoc

1. Finish coring LF-SB06
2. Grout LF-SB06

See NB 1243 pp 33-35

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 2-21-95

WITNESS

DATE

TITLE LSB NLAN AM 58°F sunny PROJECT NO. 5052
Wed 2-22-95 PM 35°F sunny BOOK 2273

Work continued from Page

On Site: TE (HNUS)
MS, RS (HNUS)

1. Drill LF-SB01
2. Collect sample LF-SB01 - 2123.5 & - 23.526
3. Geotesting Express pickups samples for geotech
4. Drillers will tomorrow a.m.
   - steam equipment
   - grout LF-SB01
   - stage drums

For details see NB 1243 pp 37-39

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-22-95
WITNESS DATE

TITLE NSB NLAN AM 25°C showing PROJECT NO. 5052
Mon 2-27-95 PM 22°C freezing rain BOOK 2273

Work continued from Page

On Site: WB (HNUS)
MS + ___ (Assoc)

1. ~~Core~~ BE WB am site
2. Core @ TP-01

For details see NB 1243 pp 41-43

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 2-27-95
WITNESS DATE

TITLE NSB - NLON AM / PM Cool 40° Rain PROJECT NO. 5082

Tue 2-28-95 BOOK 2273

Work continued from Page

On Site: WB (HNUS)
MS + ___ (ABSOR)

1. Grout TP-01

2. Set casing for coring @ TP-07

For Details NB 1243 pp 45

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 2-28-95

WITNESS

DATE

TITLE NSB NLON AM / PM 40° Cloudy PROJECT NO. 5082

Wed 3-1-95 BOOK 2273

Work continued from Page

On Site: WB (HNUS)
MS + ___ (ABSOR)

1. Core @ TP-07

2. WB W site

For detail See NB 1243 pp 47

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 3-1-95

WITNESS

DATE

B.2 TEST BORINGS LOG BOOK

NSB-NLON

CTO 203

Halliburton NUS

Job No. 5692

1243

Start: February 12, 1992

End:

HALLIBURTON NUS
661 ANDERSON DR
FOSTER PLAZA #7
PITTSBURGH PA 15220
(412) 921-7090

TABLE OF CONTENTS	PAGE No.
Phone #'s	
Area A = Sr Chief Reynolds 449-4498	
Transportation = Dick Shaw 449-4458	
Associated Drilling = (203) 630 - 1073	
Don Gabrielle (NSB NLON Eng) 449-4973	
NSB-NLON Environmental 449-5133	
Geokesting Express (Gary) (508) 635-0424	
Al Briggs (412) 921-8361 (o); (412) 935-3868 (h)	

©SCIENTIFIC BINDERY PRODUCTIONS, 1255 SOUTH WABASH AVENUE, CHICAGO, ILLINOIS 60605

TITLE NSB-NLON AM — PROJECT NO. ~~8052~~ TBE 5082 1

SUN Feb 12, 1995 PM: cold, overcast (16°F) BOOK NO. 1243

Work continued from Page

2050 Arr Pgh airport

2145 Lv Pgh en route to Providence RI

2250 Arr Providence. Proceed to Groton CT

0015 Arr Groton. Check-in to hotel.

VOID 2-12-95 TBE

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SIGNATURE Timothy S Evan DATE 2-12-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

Void
2-12-95

2-12-95

SCIENTIFIC BINDERY PRODUCTS . CHICAGO 60605 MADE IN USA

TITLE NSB-NLON

AM cold (10°F), clear PROJECT NO. ~~[illegible]~~ TJE 5082

MON Feb 13, 1995 PM cold (26°F) clear BOOK NO. 1243

Work continued from Page At site: TE + KS (HNUS)
(Tim Evans) (Keith Simpson)

0700 Arr site. Get car pass

0715 At trailer. Unpack equipment & prep for day.

0800 At Area A Landfill to stake boring & test pit locations

0850 At main gate to meet drillers

0925 Mark Shock (MS) (Assoc. Drilling) on site.

0935 Terry Keegan (TK) (~~Keegan~~ TJE Keegan Construction) on site

Get ~~car~~ TJE car & personal ID. Proceed to Landfill

1030 MS + TE setup at LF-SB01

1055 Begin LF-SB01.

1230 Lunch. Randy Slagle (RS) (Assoc.) on site

1315 Check for HNU @ hotel & trailer. Not arrived yet

1330 At LF-SB01. Continue boring.
Auger refusal @ 13' bgs. Move 2' south

1400 Auger refusal @ 10' bgs Move ~~2' south~~ 3' west

1430 Auger refusal @ 10' bgs Move ~~3' W~~ TJE TSC 2' N

1500 Auger refusal @ 9' bgs

SCIENTIFIC STENDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page 4

SIGNATURE DATE

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

NSB-NLON Job # 5082

Mon Feb 13, 1995 Book # 1243

1520 Call Al Bragg (HNUS). Tell him day's activities. Al suggests to move 25'-50' from 1st bore hole & attempt again.

1530 Drillers grouting up holes for day.

1600 TE shows TK test pits that need track machine to access (north of 2LMW35/01)

1620 Drum (covered) drum encountered @ LF-TP03. See Notebook 1244 for details

1630 Discuss tomorrow's activities:

- continue w/ LF-SS01
- see if Bombadier rig (track mounted) available. If so, send in to wetlands and sample directly from dredge spoils

Drill Items	2-13-95
	SB01
HSA	13' + 10' + 10' + 9' = 42'
2" SS	8

1700 At trailer. Unload equipment.

1715 At lower Base: measure extent of quay wall planking

See figure next page

SCIENTIFIC BINDERY PRODUCTS CHICAGO 63505 MADE IN USA

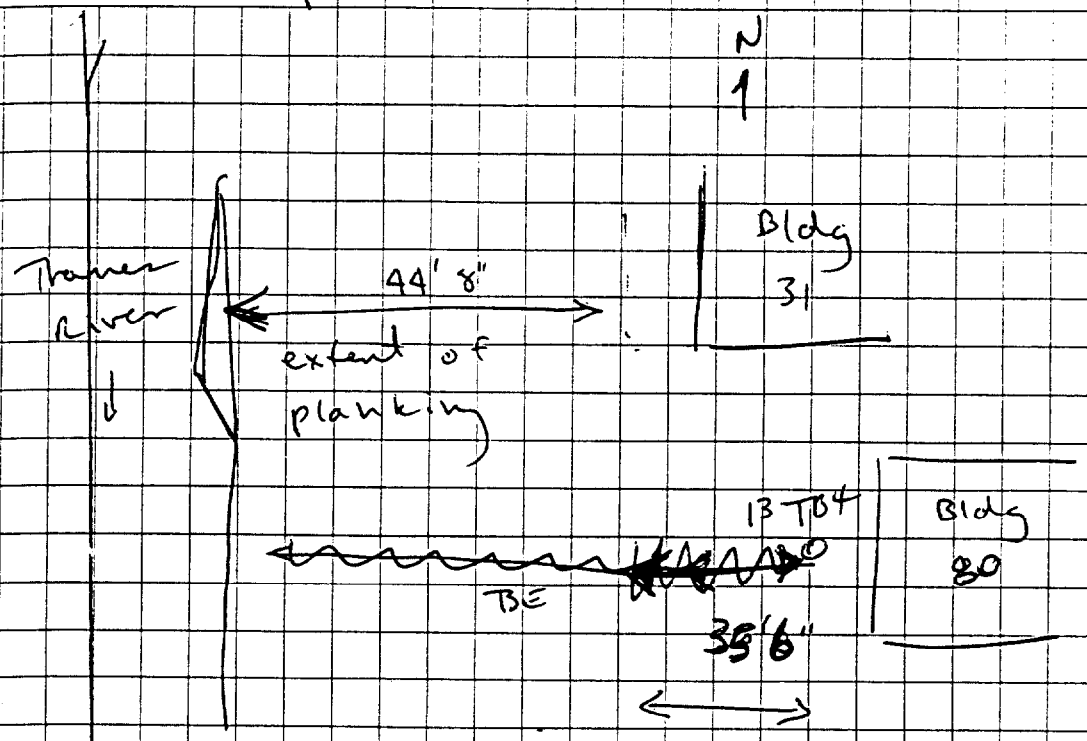
TITLE NSB-NLON

MON Feb 13, 1995

PROJECT NO. 5082

BOOK NO. 1243

Work continued from Page 4



1730 LV site for day

DOTD 2-13-95

BE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60625 MADE IN USA

Work continued to Page

SIGNATURE Timothy S. [illegible]

DATE 2-13-95

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

6

Void
TE
8-14-95

SCIENTIFIC RINDERY PRODUCTS CHICAGO 60615 MADE IN USA

TITLE NSB-NLON AM: Cold (26°) clear sunny PROJECT NO. 5082
Tue 2-14-95 PM: Cold (35°F) clear BOOK NO. 1243

Work continued from Page On Site: TE + KS (HNUS)
MS + RS (Assoc) + TK (Keagan)

0720 On Site.

0805 At Area A Landfill. Discuss w/ drillers
- complete LF-SB01 backfill w/ gravel
- possible use of Bombadier rig in wetlands to collect Shelby Tube

Laidlaw on site. Removing IDW drums (Phase RI)

0840 Drillers go to fill H_2O tanks.

0900 Andy S (Navy) on site to sign manifest for IDW drums & check drum uncovered

0915 TE + KS mark locations for test pits @ western end of Landfill.

Laidlaw lv site + Andy S. lv site.

0945 Call Dick Sharon Transportation (449-4458) to have vehicles moved.
Will send wrecker.

1000 Call Hotel. HNu arrived. Go to get it

1015 Move drill rig BE ~25' W. KS goes to calibrate HNU.

1030 KS returns. Goes to FedEx to pick up other HNU.

1050 Auger @ new location. Refusal @ 1'

SCIENTIFIC ENERGY PRODUCTS CHICAGO 60605 MADE IN USA

Work continued to Page 9

SIGNATURE [signature] DATE 2-14-95

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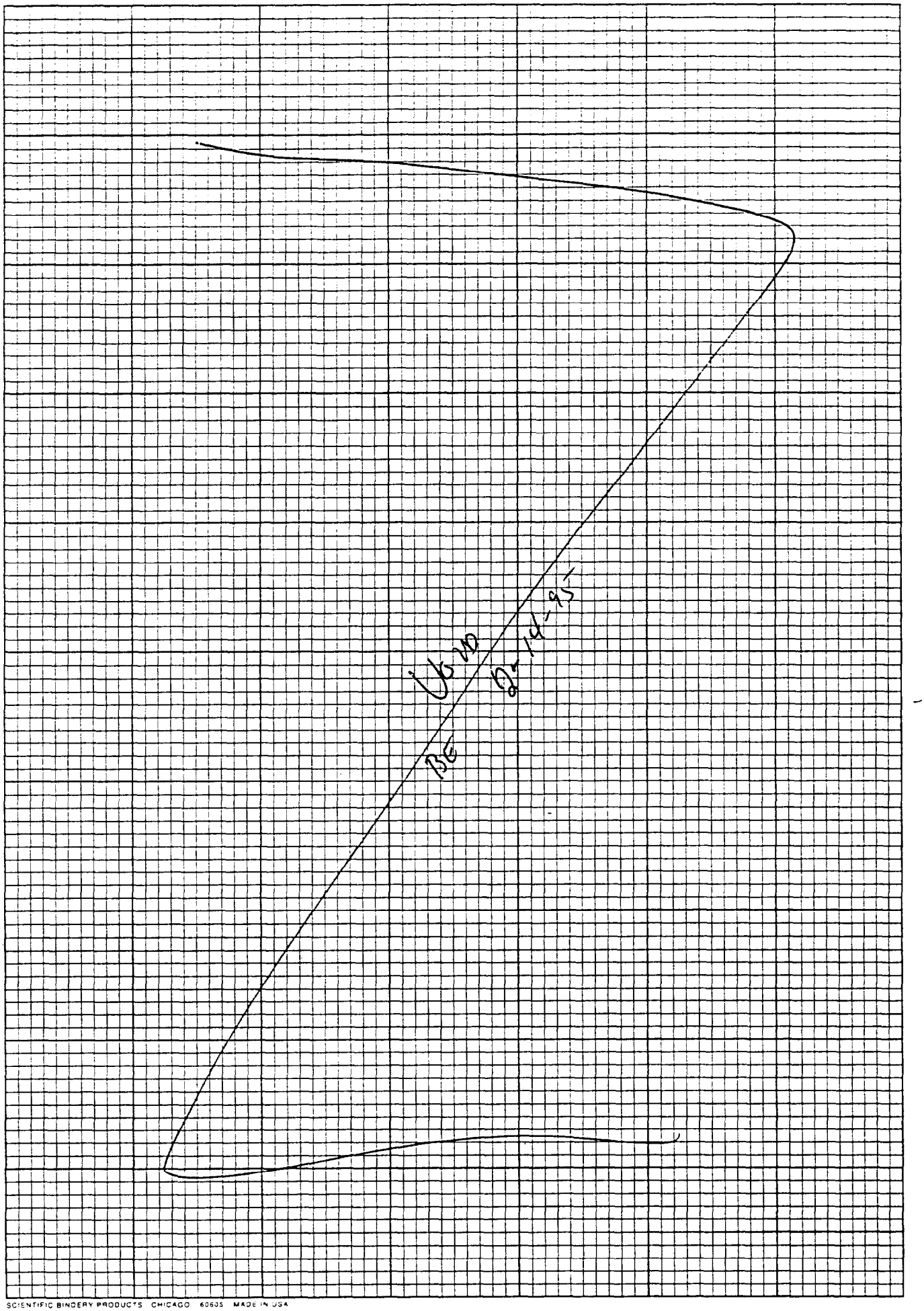
8



SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

TITLE NSB-NLON

Tue 2-14-95

PROJECT NO. 5052

BOOK NO. 1243

Work continued from Page 7

More 5's.

Auger refusal @ 5'.

1100 Move ~50' W.
Auger refusal @ 13'.

1145 Move to LF-SB02 & set up rig.

1230 KS return to site.
TE goes to get lunch

1300 TE returns Begin @ LF-SB02

1423 Encounter dredge spoils. Push Shelby tube 12'-14.5'.

1454 No recovery Auger to 15'

1527 Push another Shelby tube @ 15'

1550 Call Al Briggs. Wants another tube

1606 Collect 2nd Shelby Tube

Seal the Shelby tubes w/ wax.

1615 Drillers do not have enough wax. Will finish tomorrow

1630 Collect 1 more 2" SS. Cleanup for day

1730 Meet KS w/ TK @ last test pit. Drillers in site

1745 TK lv site. KS + TE to trailer to unload equipment

1800 lv site for day

Work continued to Page 10

STOCK FORM 35 MADE IN U.S.A. ACADEMIC BINDERY PRODUCTIONS CHICAGO

SIGNATURE Timothy S. [illegible] DATE 2-14-95

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Pay Items for 2-14-95

	LF-SB01-A ~~2SB01-A~~	LF-SB01-B	LF-SB02
HSA	18	12	23.5
2" SS		1	11
Shelby			3
Drum			1
Standby	Total 4½ hrs		

Void 2-14-95
TW

[illegible] 2-14-95

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60635 MADE IN USA

TITLE NSB-NLON AM cold (13°F) Sunny PROJECT NO. 5082
Wed 2-15-95 PM cold (30°F) overcast BOOK NO. 1243

Work continued from Page

On Site: KS, TE, Doug S (HNUS)
MS, RD (Assoc)
TK (Keegan)

0715 On site @ trailer. Calibrate HNU & prep for day

0730 Calibrate HNUs. HNU (Sensalk) not work properly

0815 Meet drillers & backhoe operator. Will continue drilling @ LF-SB02. Shelby tubes from 2/14 froze overnight.

0845 Continue LF-SB02. Drillers thawing equipment

1000 Core 25'-26.5'. Will advance 4" spin casing & continue

1140 Lunch

1240 On site. Coring 30'-35'

1315 Core 35'-38.5'

1325 Sr Chief Reynolds returned called from Mon.

- gates will be open ~6:30 am to 6-8 pm every day
- call 449-4498 if need anything

1335 TE to trailer. Pack HNU to return to EIS

1415 Return to LF-SB02. Still coring

1450 Complete coring LF-SB02 TD = 38.5

Work continued to Page 13

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN U.S.A.

SIGNATURE Timothy [illegible] DATE 2-15-95

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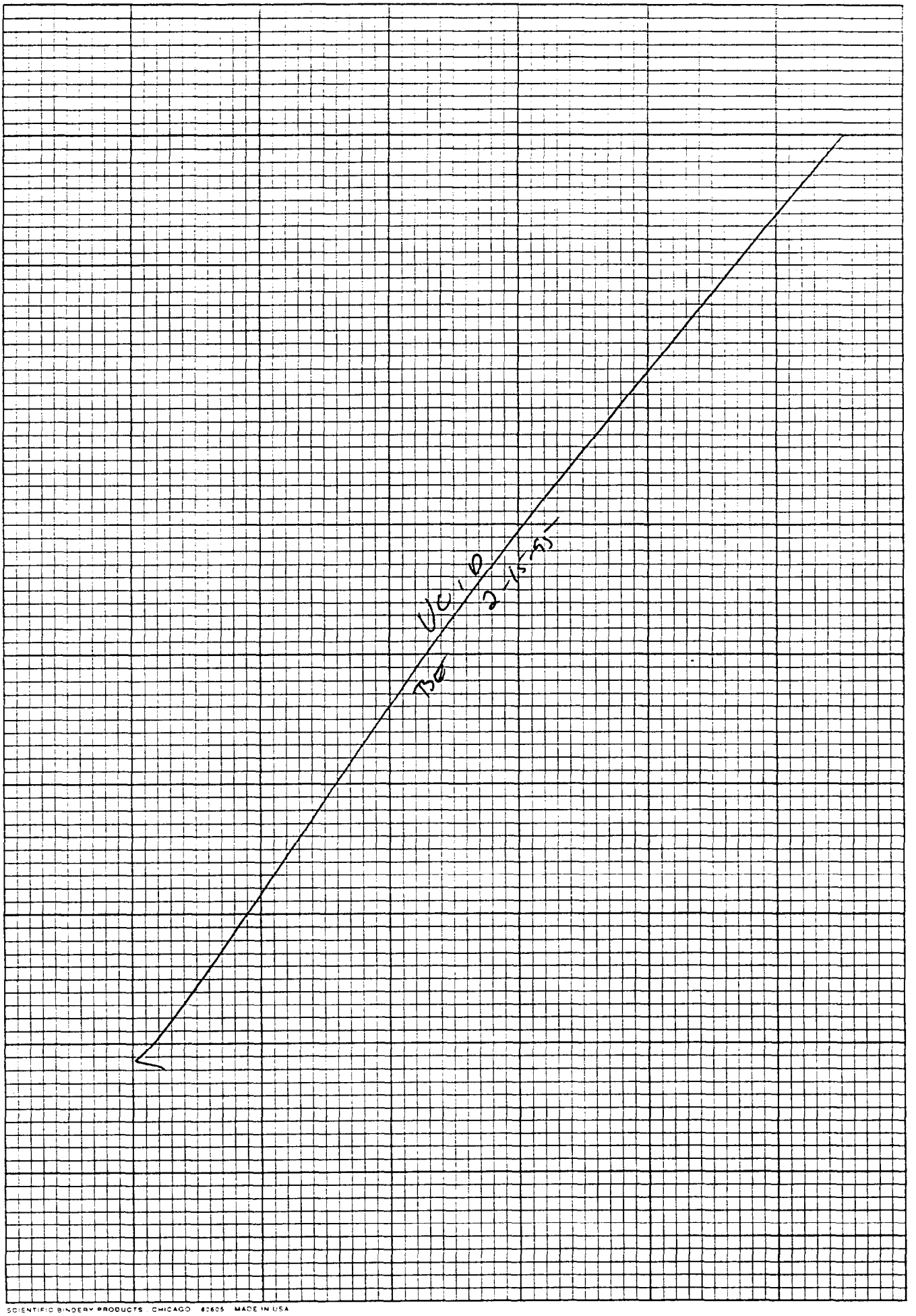


SCIENTIFIC BINDERY PRODUCTS CHICAGO #2605 MADE IN USA

TITLE NSB NLON

Wed 2-15-95

PROJECT NO. 5082

BOOK NO. 1243

Work continued from Page 11

1455 Drillers cleaning & backfill LF-SB02
TE to trailer to send EIS HNu

1515 Return to Landfill. Layout position of next borehole.

1630 TE + KS to trailer. ~~HNu~~ TSE Unload equipment

1645 Leave site for day

VOID
TSE 2-15-95

Pay Items 2-15-95

	HSA	SS	ST	Core
LF-SB02	—	3	—	10'

Work continued to Page

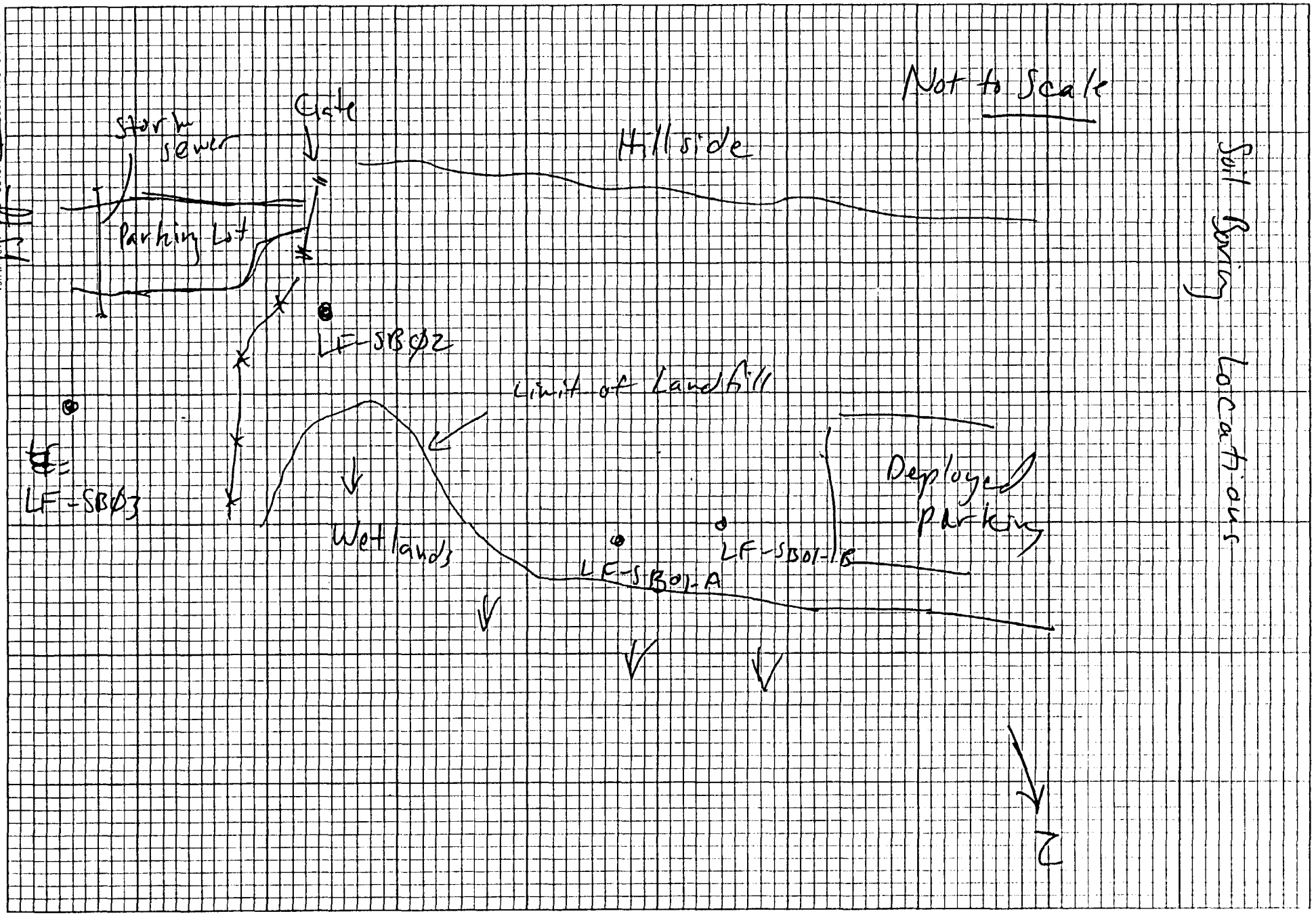
SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SIGNATURE Timothy S. [illegible] DATE 2-15-95

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Soil Boring Locations

Not to Scale



2-16-95

TITLE NSB-NLON AM cold (35°F) overcast PROJECT NO. 5082 15
Thur 2-16-95 PM cold (40°F) overcast BOOK NO. 1243

Work continued from Page

On Site: TE + KS (HNUS)
MS + RS (Assoc)
Keith K (Keagan)

0710 Go to airport to pickup HNUS from EIS

0720 Pickup HNUs & proceed to site

0730 At trailer. Calibrate HNUs for day, collect solvents for chemical sampling

0800 At staging area. Drillers arrive & proceed to setup @ LF-SB03.

0815 Setup @ LF-SB03

0833 Begin drilling @ LF-SB03

1000 TE goes to meet geotesting express @ main gate

1026 TE relinquishes samples LF-SB02 - 15.18 & -19.5-22 to geotesting express

1034 TE returns to LF-SB03

1110 Call Al Briggs (HNUS) after collecting Shelby tube & 1 2"ss below it. He says to continue to refusal & not collect Shelby tube unless lower blow counts per 1' are encountered

1215 Lunch

1250 Get ice, Go to trailer.

1300 Get bottles for rinsate blank & store Shelby tube

DOCUMENTO BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 2-16-95

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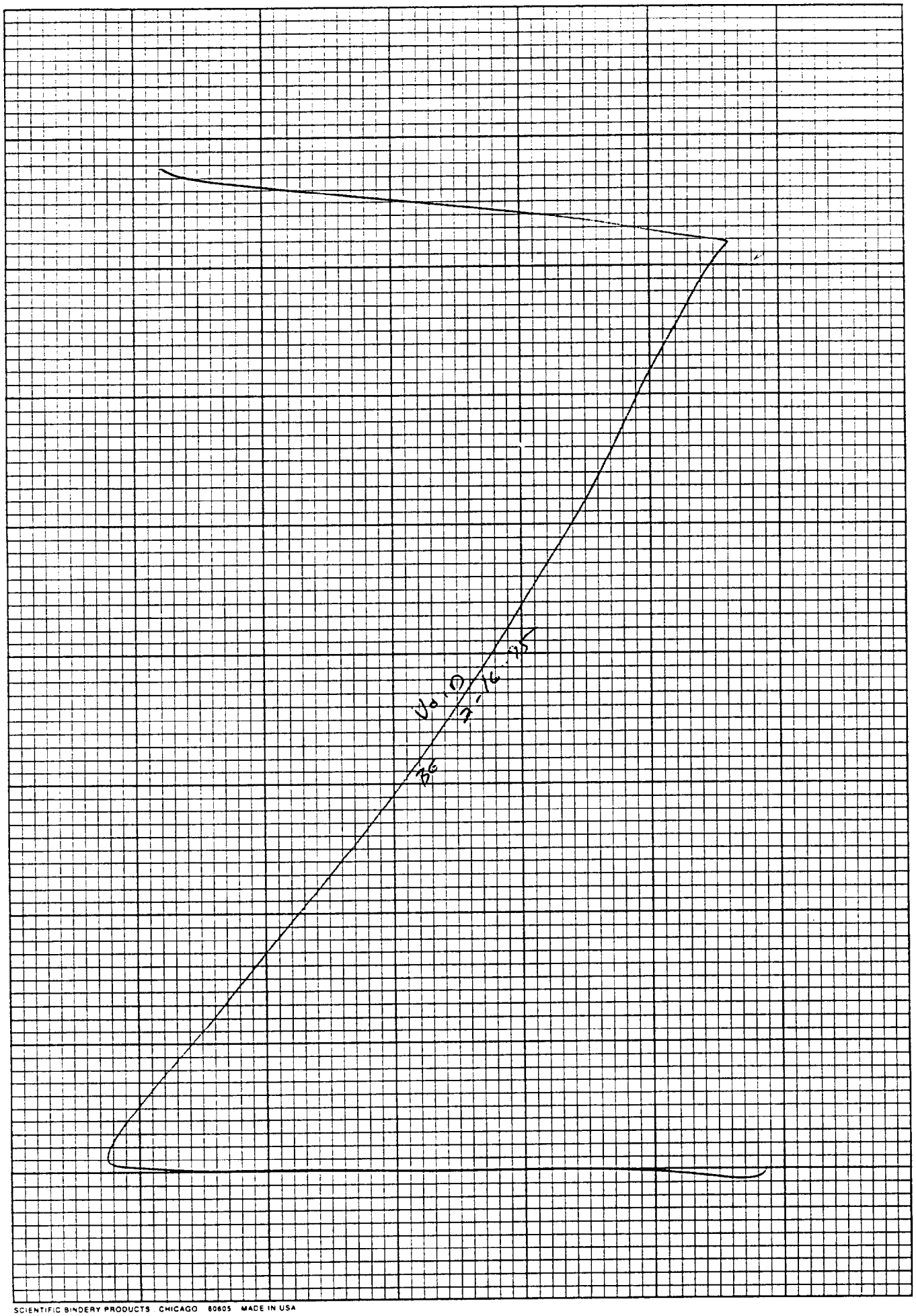

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

NSB-NLON

PROJECT NO. 5252
BOOK NO. 1243

17

THURS 2-16-95

Work continued from Page

Sample @ trailer

1315 Continue drilling @ LF-SBØ3

1350 Collect equipment ~~rins~~ rinsate blank RB-01 from stainless steel split spoon.

1505 Drilled to 50.5' so far. Drillers go to get add'l augers to continue

1700 Auger refusal @ 70' in LF-SBØ3. Drillers breakdown rods & augers. Will grout tomorrow a.m. & move to N side of Racquetball court Bldg

1705 TE + KS go to trailer to pack samples & unload equipment.

1745 LV site

Items

	HSA	2"SS	ST	Stands ~~Steel~~
LF-SBØ3	70'	27	2	1/2

Work continued to Page

SIGNATURE Turell SS

DATE 2-16-95

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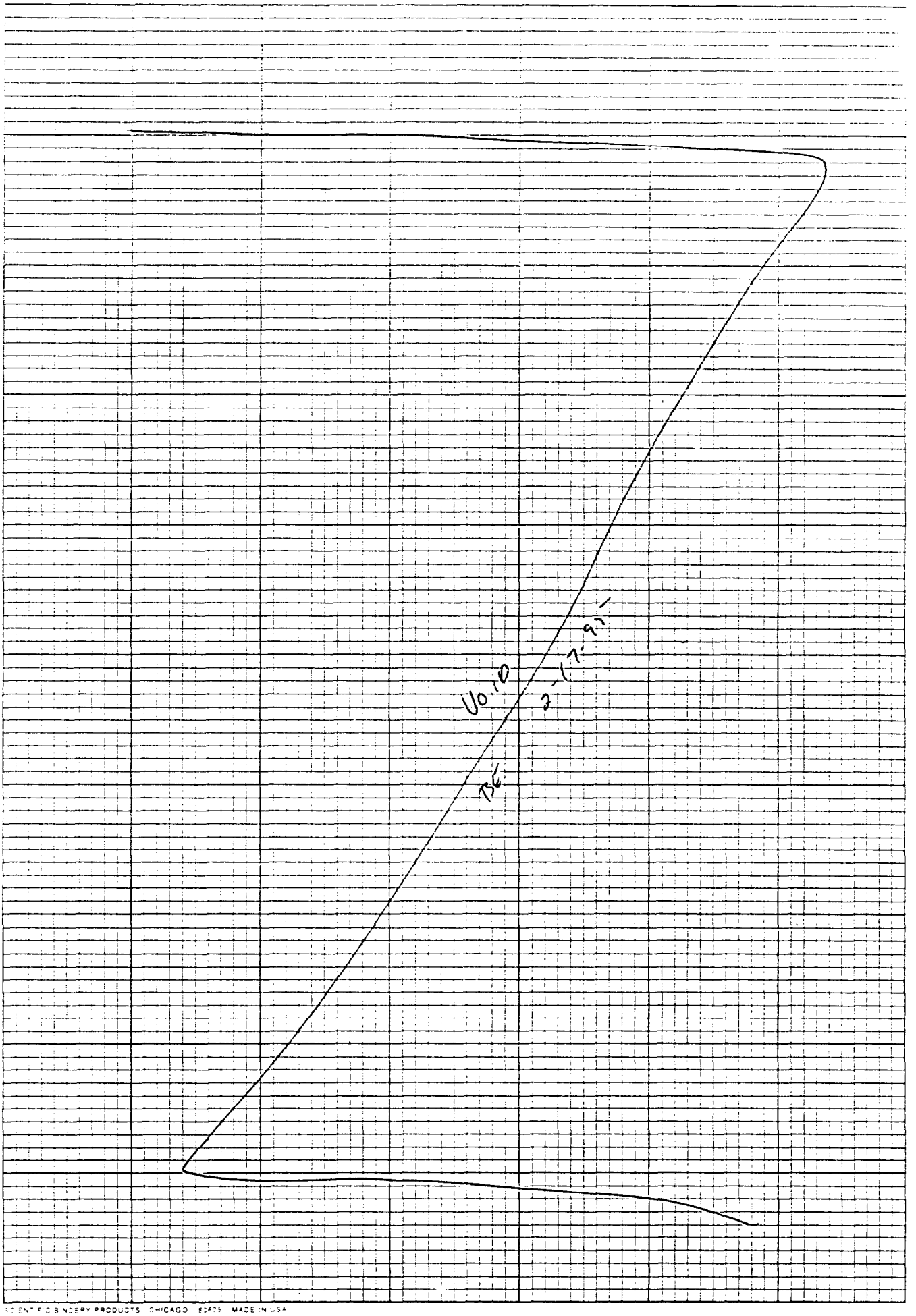

ROSENTHAL BINDERY PRODUCTS CHICAGO 60625 MADE IN U.S.A.

NSB NLON AM cold (36°F) sunny PROJECT NO. 5082 1

FRI 2-17-95 PM cool (45°F) sunny BOOK NO. 1243

Work continued from Page

On Site: TE + KS (HNUS)
MS + RS (Assoc)
KK (Keegan)

0700 Meet KS in hotel lobby. Proceed to site trailer

0715 At site trailer. Pack 1 HNU for shipment, calibrate 2 HNU's, load equipment for day

0800 Meet Keith K @ Area A Landfill. Drillers getting H_2O

0815 KK + KS proceed to west end of landfill to continue w/ test pits
Drillers grout LF-SB03.

0845 Cancel pick up w/ geotesting

0850 Call Al Briggs:

- can replace 2" SS for Shelby tubes for sampling?

  no. in case need to run triaxial compress. test

- will know about methane wells by end of day

1130 Drillers finish grouting LF-SB03. Go to steam clean rig & augers.

TE layouts utilities for LF-SB04

DETACHABLE PUBLICATIONS CO. GRAND RAPIDS, MICH. 49508

Work continued to Page

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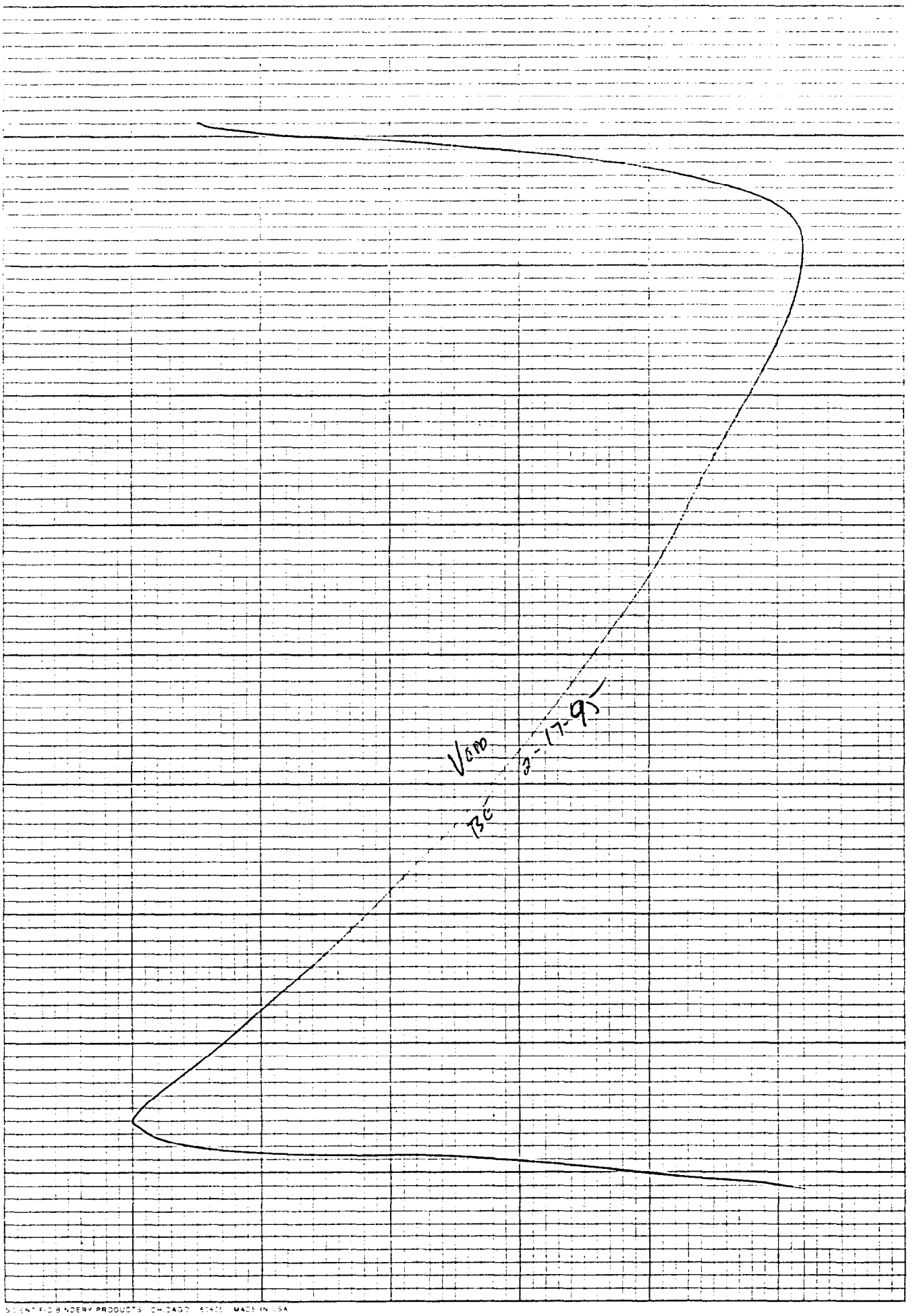


SCIENTIFIC BINDERY PRODUCTS CHICAGO 60610 MADE IN USA

Continued from Page 19

1215 LUNCH.

1310 At site trailer. Get stakes

1315 At Area A Landfill. KS goes w/ KK for test pits. TE goes to LF-SB04

1318 At LF-SB04. Rig setup. Drillers not @ rig.

1330 Drillers arrive @ LF-SB04

1410 Begin drilling @ LF-SB04

1530 Auger refusal @ 16'. Move 5' N.

1610 Auger refusal @ 12'. Set rig up @ ~5' SW will continue tomorrow

1630 LV LF-SB04 to trailer

1640 Unload equipment @ trailer.

1700 Lv site for day

Work continued to Page

SIGNATURE [signature] DATE 2-17-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

VOID

BE 8-18-95

NSB NLON AM cold (26°F) sunny 5082
Sat 2-18-95 PM cool (42°F) sunny 1243

continued from Page On Site: TE + KS (Hnus)
John + Earl H (Assoc)

0700 TE + Ks meet @ hotel

0720 At site trailer: calibrate HNu, load equipment

0800 Go to meet drillers @ LF-SB04. Not arrived yet at Area A Landfill

0805 Drive along perimeter road 100' past 2WMW2S to take photos of Area Wetlands / Landfill boundary near tennis courts

0815 Drillers arrive @ LF-SB04

0820 Begin augering @ LF-SB04 (See boring log LF-SB04)

0900 Auger refusal @ 12'. Move 10' E

0920 Auger refusal @ 7'. Break rig down & move to LF-SB05. Grout LF-SB04

1100 TE picks up rental car @ Newlonon Airport.

1130 On site. Set rig up @ LF-SB04

1200 Lunch

1300 At LF-SB04 Begin drilling

1500 Advance to 19'. Drillers breakdown rig. Must drive home w/ trailer - has no lights. Will continue in a.m.

Work continued to Page 25

SIGNATURE Timothy S. [illegible] DATE 2-18-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

U014
B6
2-18-95

NSB NLON

Sat 2-18-95

PROJECT NO. 5082

BOOK NO. 1243

Work continued from Page 23

1515 KS IV site for Providence airport
TE to trailer to unload equipment &
pack sample from LF-SB05

1600 TE IVs site for day

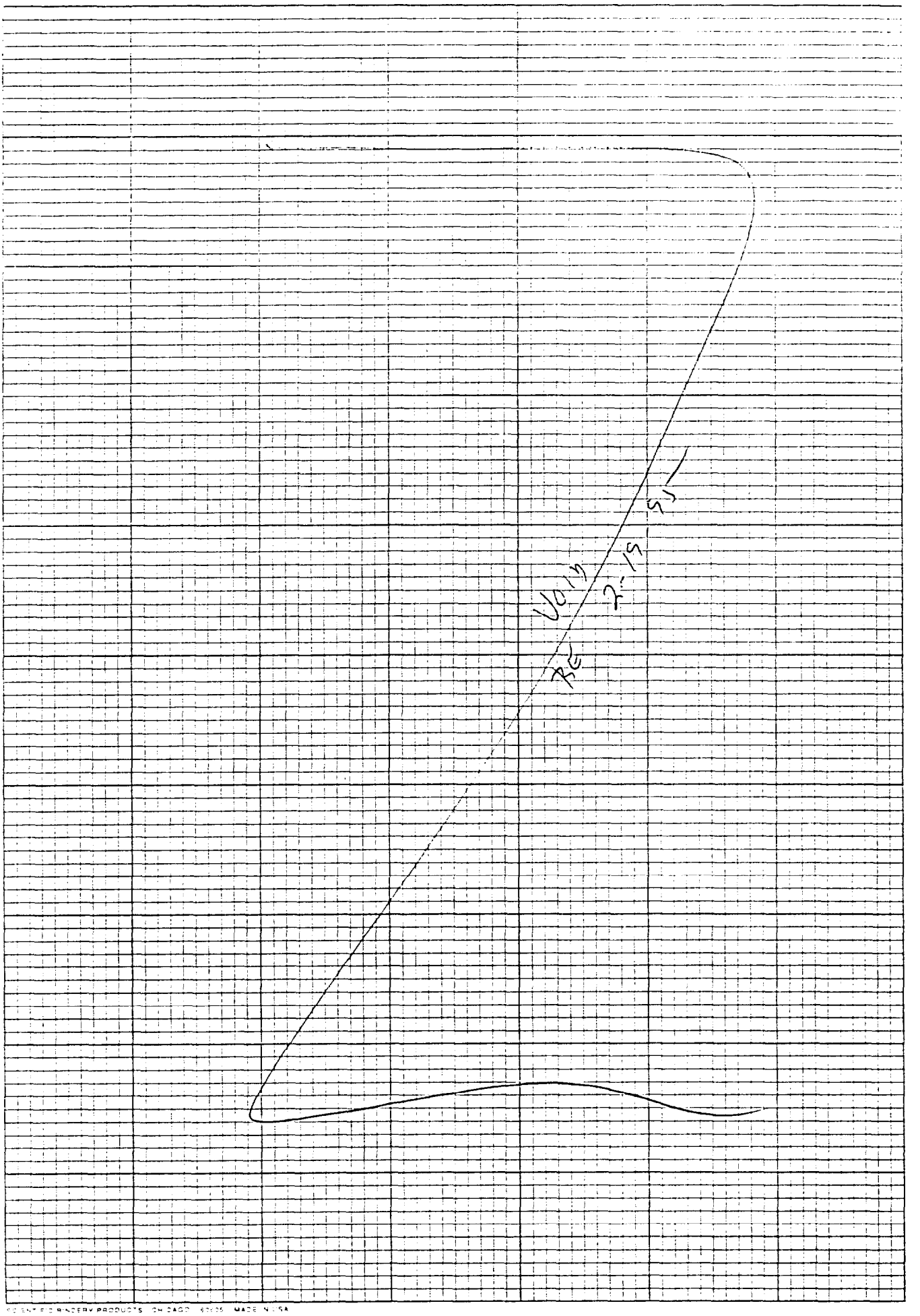
VOID
2-18-95
TE

Work continued to Page

SIGNATURE Timothy K

DATE 2-18-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE



CENTRAL BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

NSB-NLON AM cold (23°F) sunny PROJECT NO. 5082
SUN 2-19-95 PM cool (44°F) sunny BOOK NO. 12+3

Work continued from Page

On Site: TE (HNUS)
MS (Assoc)

0730 Arr site trailer. Calibrate HNu & prep for day's activities.

0800 At LF-SB04. Drillers not arrived yet.

0915 Mark Shock arr.

1000 Begin drilling, ie continue @ LF-SB05

1030 Rig breaks down (short somewhere)

1145 Continue drilling,

1210 Auger refusal @ 8'. Lunch.

1300 On site. Call x4498 to get gate open @ east end of Alpha Area. Will have it opened.

Will backfill LF-SB05 w/ grout then move to LF-SB06 west of deployed parking

1500 Finish grouting LF-SB05 for today. Need more cement to finish. Also need cutter head to drill. Will start tomorrow on LFSB06 after finish grouting LF-SB05.

1505 TE to trailer to put HNu on charge.

1530 Lv site for day

NATIONAL BUSINESS PRODUCTIONS CHICAGO 60601 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 2-19-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

VOID
TSE 2-20-95

SCIENTIFIC SURVERY PRODUCTS CHICAGO MADE IN USA

NSBNLON AM cold (36°F), sunny PROJECT NO. 5082 27

MON 2-20-95 PM BOOK NO. 1243

Work continued from Page On site, TE (4 NUS)
George Caravella + Randy Slagle (Assoc

0730 TE on site. Calibrate HNu & prep for day

0815 At LF-SB05. Discuss costs / drilling w/ George C.

- he's ~~concerned~~ TSU concerned w/ method vs cost. i.e. he's losing $
- propose either day rate or casing / vollerbit method

0830 Call Al – will talk to Jim Briggs of Navy to confirm / approve

0845 Call Denny Brucia to clarify w/ George

0915 Surveyors call. @ trailer TE goes to meet George + Randy grout SB05 call to gate area A gate opened (x4498)

0930 Meet surveyors @ trailer → Bob Crift & assistant. go over locations to be surveyed

0945 Return to SB05. Area A gate not opened. call x 4498 – don't have key. call x3222 – will open gate

0950 Matt C. calls – wants TE to stay until Thurs. for TRC meeting Wed

Work continued to Page 31

SIGNATURE Timothy S. [illegible] DATE 2-20-95

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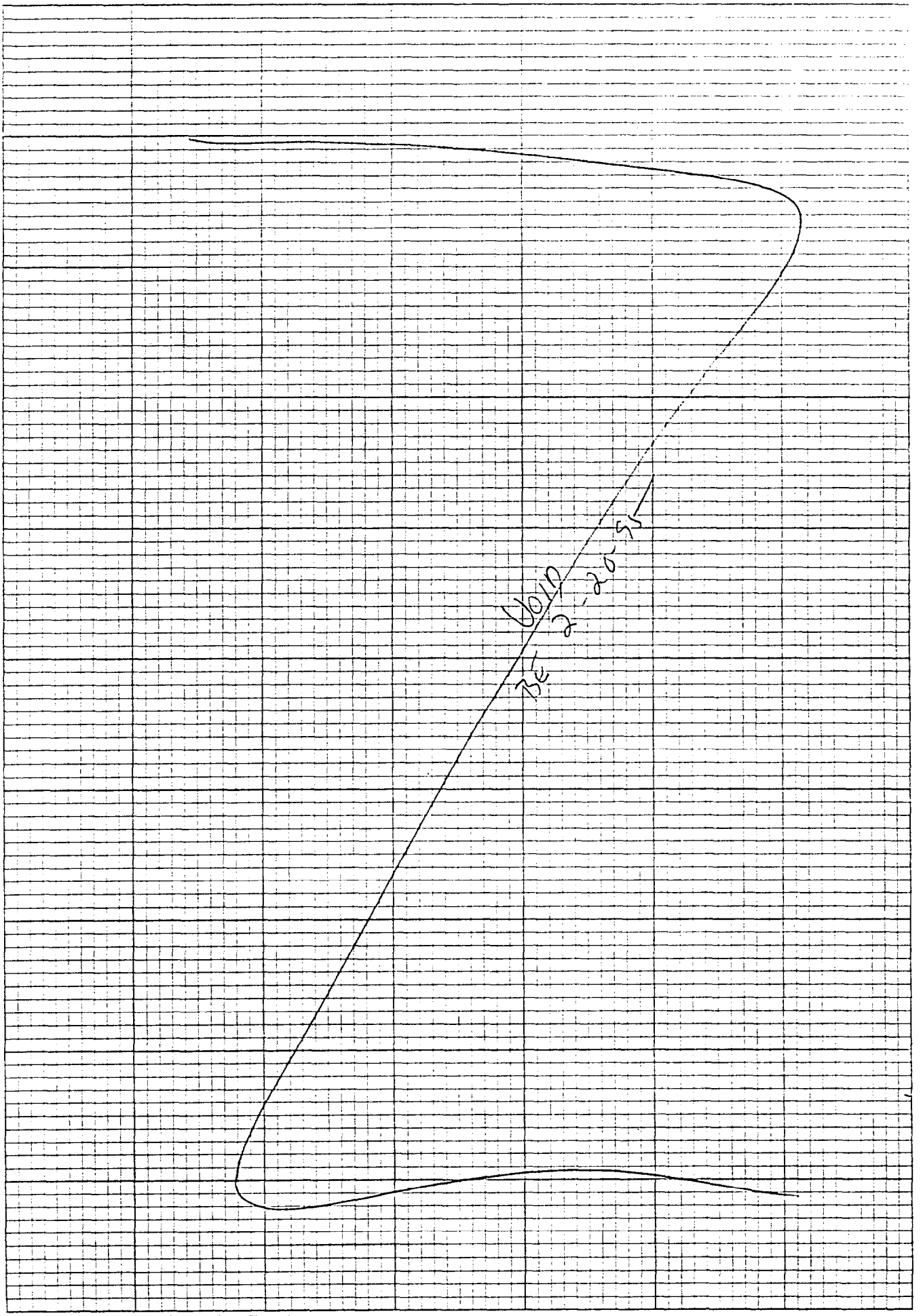

TOLMAN & SINDERS PRODUCTS CHICAGO 60626 MADE IN USA

continued from Page

1120 Call FedEx for pickup (CONA#68)

1130 Still grouting LF-SB05! gate to Alpha Area still not opened

1200 Security finally opens gate to Alpha Area

Drillers finish grouting LF-SB05 (not filled entirely. will wait until grout hardens then backfill w/ pellets

1215 Go to steam augers & setup @ LF-SB06

1220 Lunch

1300 Return to site. Meet drillers

1320 Setup @ LF-SB06.

1346 Begin drilling @ LF-SB06.

1520 Auger refusal @ 22.5'. will core. Drillers go to get H_2O

1600 Core 22.5 - 25.0

1630 End core run ① @ 25'. Drillers Go to get H_2O

1650 Al calls: approved casing/rollerbit method for drilling

1700 Drillers breakdown for day will continue @ 25' in a.m. TE to trailer to put HNU on charge

1715 Lv site for day

Work continued to Page

SIGNATURE Timothy S. DATE 2-20-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

TBE WUID
2-21-95

NSB NLON AM cold (35°F) overcast 5082

TUE 2-21-95 PM Cold (38°F) sunny 1243

On Site: TE (HNUS)
MS + RS (Assoc

0730 At trailer: Calibrate HNU; prep equipment

0830 At LF-SB06: drillers getting H_2O, will continue to core from 25.0 to 32.5'

0907 Begin coring. Surveyors on site. (Bob Clift & assistant) (Frederic)

0914 Change diamond bit

0930 Continue coring.

0937 Out of H_2O. Recire H_2O & get more

1000 Continue coring

1017 Complete run ②. Start run ③

1040 Stop coring. Core barrel stuck in hole/augers. Try to free

1200 Drillers finally free core barrel
Outer barrel still in hole. Drillers try to free it

1230 TE goes to get lunch for drillers

1315 TE back on site. Drillers can't free core barrel. Will grout it up

1352 Schedule pickup by Geotesting Express for Wed 2/22 @ 3:00 pm @ front gate

1430 George C (Assoc) on site to dropoff spin shoe

1450 " " lv site

Work continued to Page

SIGNATURE Timothy S Eva DATE 2-21-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

STANFORD PRODUCTS CHICAGO MADE IN USA

NSB - NLON

PROJECT NO. 5082

BOOK NO. 1243

Tue 2-21-95

Work continued from Page

1515 Finish grouting LF-SB06. Will go steam & setup @ 2F-SB01 (new location)

1545 TE unload HNu @ trailer

1600 TE w/ site

VOID 2-21-95 TE

Work continued to Page

SIGNATURE Timothy Sen

DATE 2-21-95

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

Co 19
BE
8-22-95

NSB NLON AM cold (38°F) sunny 5082
Wed 2.22.95 PM cold (35°F) sunny 1243
On Site: TE (HNUS)
MS + RS (Assoc)

0745 TE @ site trailer. Calibrate HNU

0815 Meet drillers in Alpha Area. Setup rig @ LF-SB01

0845 Begin drilling @ LF-SB01

1030 Al Briggs calls:
- get as many shelby tubes as possible from LF-SB01
- add'l work: ① core 2 test pits
② rollerbit @ LF-SB04 & SB05 to Bedrock

1040 encounter dredge @ 14'. will take shelby tube

1140 Matt C. on site. will meet @ main gate

1150 Al Briggs & Jean-Luc G. call:
- give est. footages for work so far
- estimate work schedule for add'l work for next week

1200 Lunch

1300 On site. continue @ LF-SB01.

1430 TE goes to trailer to collect 2 shelby tubes

1450 TE @ main gate to give 4 shelby tube samples to Geotesting Express (See COC 2-22-95)

Work continued to Page 39

SIGNATURE Timothy S. [illegible] DATE 2-22-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

WO 1D
2-22-97
TSE

NSB-NLON
Wed 2-22-95

PROJECT NO. 5082
PROJECT NO. 1243

Work continued from Page

NSB - NLON

AM - ~25°C snowing
PM ~22°C Freezing Rain

PROJECT NO. 5082
PROJECT NO. 1243

Mon 2/27/95

Work continued from Page

0720 ARRIVE ON-SITE - CALL ANDY STACKPOLE TO GET CLEARANCE ON-BASE

0740 ARRIVE AT TRAILER CALIBRATE HNU AND GET EQUIP FOR THE DAY.

0800 WAITING AT LANDFILL - DRILLERS NOT HERE YET

0900 DRILLERS STILL NOT HERE - CALLED ASSOCIATED - DRILLERS HAD A DELAY - WILL ARRIVE SOON

0935 MARK SHAWK (DRILLER ARRIVES ON-SITE) - STARTS SETTING UP RIG.

1010 DRILLERS MOB TO FILL TANK W/WATER

1050 DRILLERS SETTING UP ON JP-01 HOLE.

1105 START AUGERING & PLACING CASING

1205 DRILLERS HAVE PROBLEMS WITH RIG - WATER/PUMP/LINES CLOGGED

1230 BREAK FOR LUNCH

1300 BACK FROM LUNCH - PROCEE WHEN PARTS FROM ASSOC. DRILLING ARRIVE.

1355 BEGIN CORING - PROBLEM, CORE KEEP BREAKING - ROTARY ~ 6 m

1440 CONTINUE CORING

1600 FINISHED WITH 1st RUN DRILLERS NEED TO GET WATER CALL MATT COLHRAN - DECIDE TO DRILL ONE MORE 5th RUN

Work continued to Page

DATE

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NSD INCOR

MON 2/27/95

PROJECT NO. 5082

BOOK NO. 1243

Work continued from Page

1615 CONTINUE CORING 2nd RUN CORING ~ 10 min/ft.

1700 FINISH CORING TP-01 CORING SECOND RUN CONFIRMS COMPETENT BEDROCK. DECIDE TO GROUT 1st IN THE MORNING - EVERYTHING WET B/C OF RAIN ALSO GETTING DARK

1715 MOB TO TRAILER

1800 ARRIVE AT HOTEL - QUIT FOR THE DAY

2-27-95

Work continued to Page

SIGNATURE

DATE 2/27/95

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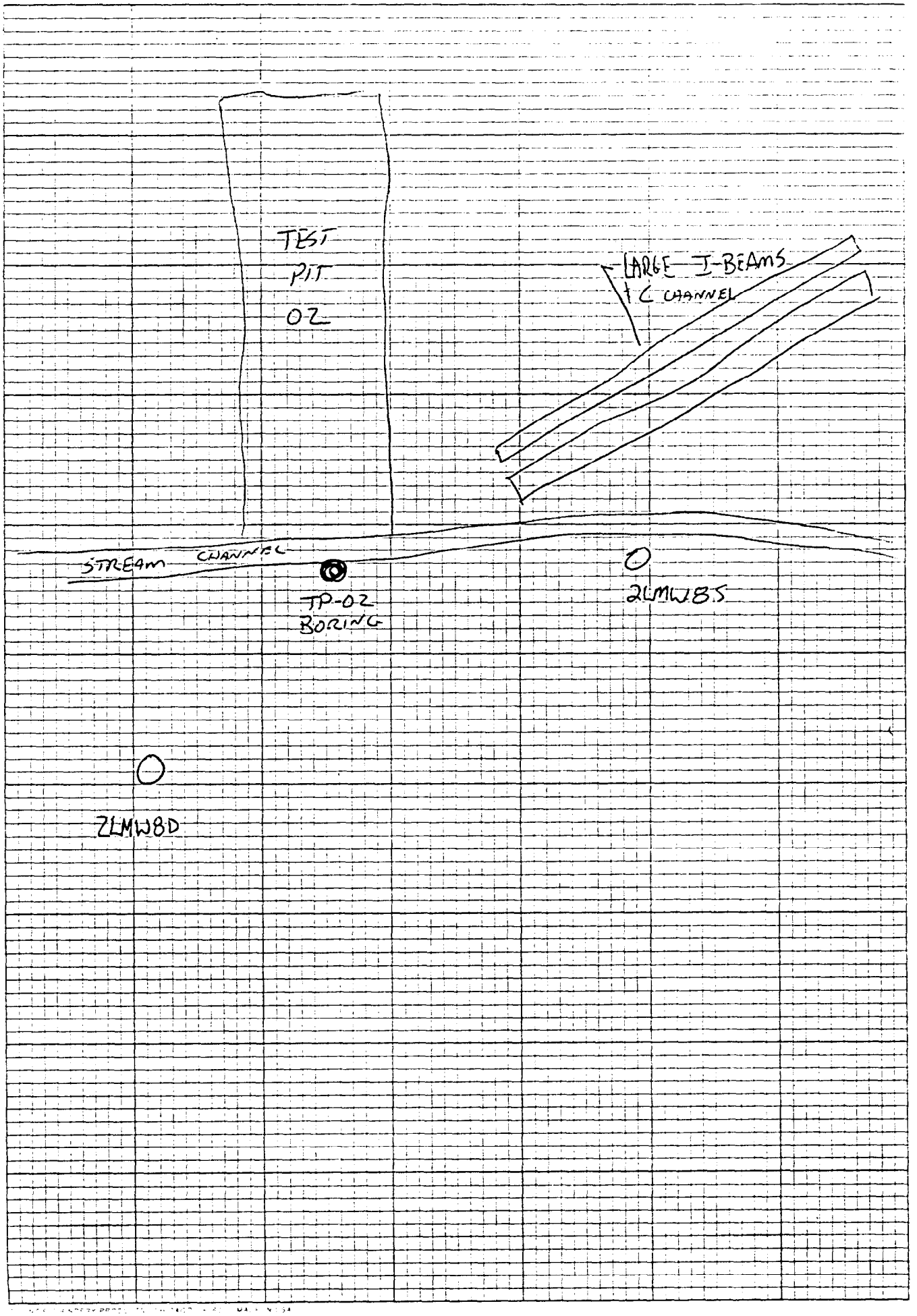
TEST
PIT
02
LARGE I-BEAMS
+ C CHANNEL
STREAM CHANNEL
TP-02
BORING
2LMW8S
2LMW8D

NSB - NLON

AM - Cloudy 40° Heavy Rain All Day
PM

SHEET - 5082
DOCUMENT NO. 1243

TUESDAY 2-28-95

Continued from Page

0700 MOB TO TRAILER - CALIBRATE EQUP - ASSES WHAT SHOULD BE SHIPPED TODAY

0800 ARRIVE AT LANDFILL - DRILLERS NOT HERE YET

0840 DRILLERS ARRIVE W/WATER START GROUTING TP-01 - BORING

0945 DRILLERS SETTING UP ON TP02 - BORING AREA VERY MUDDY & LOOSE FROM TEST PITS - CANNOT COME AS FAR BACK INTO HILSIDE AS WE WANTED TO - CALLED M. COCHRAN HE OK'd BORING NEAR 2L MW-8D IN LANDFILL

1130 STILL PLACING CASING ~ 21.0 FT BGS - BEDROCK OR COBBLE SEEMS HIGHLY FRACTURED

1230 BREAK FOR LUNCH - ROTARY TO APPROX 30 FT - NO BEDROCK FOUND - RUINED CASING BIT DECIDE TO CALL A. BRIGGS

1300 A. BRIGGS & K. SIMPSON DECIDE TO MOVE HOLE TO NEAR TP-07

1400 AFTER RECON HOLE NEAR TP-07 SEEMS UNLIKELY TORPEDO CARTS & VAC-TRUCK IN THE WAY

1530 AL, KIETH & MYSELF DECIDE TO MOOVE HOLE TO TP-07 KEITH ARRANGED TO HAVE TORPEDO CARTS MOOVED AND THE AREA LEVELED. - MOB TO TRAILER

1800 ARRIVE AT HOTEL QUIT FOR THE DAY

Work continued to Page

SIGNATURE [signature] DATE 2-28-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

NEBS BINDERY PRODUCTS CHICAGO 60675 MADE IN USA

NSB NLON AM Cal 40° cloudy PROJECT NO. 5082

3-1 BOOK NO. 1243

WED 2-29-95

Continued from Page

0700 ARRIVE ON BASE - MOB TO TRAILER, PHOTO TB-01 CORE, CALIBRATE EQUIP MOB TO LANDFILL

0740 WAHOO ENTRANCE UNDER CONSTRUCTION GO TO SOUTH GATE ? S.G LOCKED CALL SECURITY.

0745 CALLED SECURITY - WILL SEND SOMEONE TO OPEN GATE

0830 WOODY & HIS HELPER MOVED NECESSARY MATERIAL, BROUGHT IN SAND FOR EASY ACCESS.

0900 TALKED WITH D. CONNANT - WE NEED A TRUCK MOVED FOR ACCESS - WILL CALL BACK ~0915
DRILLERS STARTED AUGERING

1230 FINALLY HIT SOLID ROCK - OR AT LEAST SOLID ENOUGH TO START CORING

1530 FINISH WITH SECOND CORE - SECOND CORE COMES OUT AS 1-5 FOOT SECTION - NO NATURAL FRACTURES

1600 DRILLERS GROUTING BORING - DECIDE TO LET DRILLERS FINISH - MOB TO AIRPORT (PROVIDENCE) TO AVOID STAYING ANOTHER DAY

2000 ARRIVE IN RI-17

2-29-95

Work continued to Page

SIGNATURE

DATE 2-29-95

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

B.3 TEST PITS LOG BOOK

NSP-NUS

[illegible]

Halliburton NUS

Job No. 5492

1244

[illegible]

[illegible]

HALLIBURTON NUS
661 ANDERSEN DR
PGH PA 15220
1800 245 2730

Mailing Address:
41 Totoket Road
North Branford, CT 06471

TRUCK
640-674

Plant:
75 Valley Service Road
North Haven, CT 06473
484-0187 / 239-9248

KEITH
430-6495

EXCAVATING

Washed Sand & Gravel • Asphalt Paving • Equipment Rentals • Top Soil

640 5891
TERRY
KEEGAN

THOS. KEEGAN & SONS INCORPORATED

203-449-4456

FAX 449-4691

Michael J. Grelle Sr.

Crane and Rigging Foreman
Public Works Transportation
Naval Submarine Base Groton, CT

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BASE CONTACT LT RIOS 449-2276	
DICK CONANT 449-5176	
BASE POLICE	3223
ANDY STACKPOLE 449 5191	
ACCESS TO AREA A OFF HRS SUB BASE CMAA 449-4499 OR 3918	
SUBCONTRACTORS:	
LOUIS FEDERICI 401-331-1570	
CLEAN HARBORS DIRK BARRY 203-224-7606	
S.W. LAB DARRYL ALISTAT 918-251-2858 FAX 2599	
BEST WESTERN 203 445 8000 FAX 9173 360 ROUTE 2 06340	
ASSOCIATED DRILLING 203 238 6740	
KEEGAN & SONS (BACKHOE) TERRY KEEGAN 203 484 0197	
GEO TESTING EXPRESS GARY TOROSIAN 508 635 0424	
NORWICH FED EX 800 233 9005 RT 12 TO 395N	
EXIT 82 (NOT RT 82) LEFT AT END OF RAMP, 2ND LIGHT	
RIGHT UP HILL PASS GOLDS GYM FED EX ON LEFT	
AL BRIGGS H 935-3868	
WAREHOUSE TOM P. 412 262 4583	
TONY CULMONE 201 487 0069	
ATLANTIC ERIC NESS 203-537-0751	

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NAVY CLEAN NSB-NLON

CONT. # N62472-90-D-1298 CTO 203

~~LOG BOOK #~~

TE TIM EVANS 1243

MASTER LOG BOOK # KS ~~1243~~ 2273

KS KEITH SIMPSON 1244

PMS

JOB # 5082 0154 GEO TECH FIELD WORK

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TITLE NSB-NION
2.13.95

PROJECT NO. 5082
BOOK NO. 1244

Work continued from Page

2.12.95 SUNDAY TRAVEL FROM PGH TO NSB-NION
LATE FLIGHT TIM EVANS AND KEITH SIMPSON AT
HOTEL 2.13.95 0015

2.13.95 MONDAY COLD 15-25°F SUNNY
0645 TE AND KS AT HOTEL LOBBY LOAD EQUIPMENT IN
RENTAL CAR. TO BASE FOR PASS
0715 AT TRAILER PREP FOR AREA A LANDFILL WORK
AT AREA A LANDFILL LAYING OUT TEST PIT & SOIL BORING
0720 LOCATIONS. TO MAIN GATE WAIT FOR DRILLERS (0900)
0925 MARK FROM ASSOCIATED WITH DRILL RIG, WAITING ON BACK HOE
0930 TERRY KEEGAN ARRIVED WITH BACK HOE
TE, KES ASSOCIATED & KEEGAN TO AREA A TE STARTED
ON SOIL BORINGS KES ON TEST PITS, SEE BORING
AND PIT LOGS
1230 LUNCH
1300 CHECKED ON HNU METER SHOULD HAVE BEEN FED EX TO HOTEL
CALLED SHAWN S. HE WILL GET BACK TO US.
CONTINUED ON TEST PITS COMPLETED TP-01 & TP-02
1520 STARTED ON TP 03 SW END OF DEROYED PARKING
PULLED ≈ 3 BUCKETS OF SOIL AND HIT A 55 GAL STEEL DRUM
RUSTED AND BROKEN OPEN WITH A JELL LIKE MATERIAL IN IT.
(OLD PAINT, GREASE ?) TOTAL MATERIAL IN DRUM ≈ 15 GALLONS.
1545 CALLED FOSTER AND TALKED WITH AL BRIGGS AND DEB
WROBLEWSKI TO INFORM THEM OF THE DRUM. THEN CALLED
ANDY STACKPOLE FROM NSB-NION ENVIRONMENTAL AND HE SEND
A DRIVER TO OUR WORK SITE WITH A OVERPACK DRUM.
THE DRIVER WORKED FOR LINDA McCORD ALSO WITH ENVIRONMENTAL
USING THE BACK HOE WE LOADED THE "OLD" DRUM INTO THE
OVERPACK AND ENVIRONMENTAL WILL PICK IT UP TUESDAY.
1555 TE TOOK THE BACK HOE OPERATER TO TEST PIT LOCATIONS T
DETERMINE WHERE WE MAY NEED A TRACKED BACK HOE
SEE LOG BOOK # 1243 TO TRAILER THEN HOTEL AT 1635

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60505 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 2.13.95

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SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

TUESDAY FEB 14, 95

Work continued from Page WEATHER: SUNNY 17-28°F

0700 AT TRAILE KS & TE PREP FOR AREA WORK AND CHECKING ON HNU METER IT HAS NOT ARRIVED YET.

0800 TE, KS AT AREA A DRILLER & BACK HOE OPERATER ON SITE FILLING SOIL BORINGS SEE LOG BOOK 1243
LAIDLAW REMOVING EMPTY DRUMS FROM DECON AREA

0820 CALLED ANDY STACKPOLE HE'S COMING TO SITE TO TAKE A LOOK AT LF-TP-03 AND DRUM.

0830 CALLED AL BRIGGS DISCUSSED LF TP 03 AND DRUM + CHECKED ON HNU AND IF WE NEED A 2ND HNU (2 CREWS GOING TEST PITS & BORING). I NEED TO WRITE UP A REPORT ON LF TP 03 FOUND DRUM.

0910 LAYED OUT 3 MORE TEST PITS, CALLED TO HAVE EQUIPMENT MOVED FOR BACKHOE ACCESS. WAITING ON WORD ON HNU

1000 HNU PICKED UP AT HOTEL TO TRAILER TO CAL. METER TALKED WITH AL B. NEED TO PICK UP 2ND HNU AT FED EX IN NORWICK. DROPED TIM OFF AT AREA A WITH HNU

1105 TO FED EX AND HARDWARE STORE TO TRAILER AND CAL. 2ND HNU BACK AT AREA A 1220
(LUNCH ON THE FLY)

1230 TALKED WITH TIM THEN BACK TO LF-TP-03 WITH BACKHOE TO CONTINUE DIGGING. FOUND MORE DRUMS IN PIT DID NOT REMOVE THEM CALL MATT COCHRAN AT FOSTER TO DISCUSS DRUMS

1330 HE DECIDED TO ~~REA~~ LEAVE THEM IN THE PIT THERE IN BAD SHAPE RUSTED BENT UP AND COULD NOT ~~BEA~~ BE REMOVED WITH OUT RUPTURING THEM. (SEE ALSO TEST PIT LOG)
WE COVERED THE DRUMS AND MOVED BACKHOE. HNU MAX READING IN AREA OF EXPOSED DRUMS 3000 PPM ALLOWED TO BE CLOSED PE

1520 COMPLETED TEST PIT 03 AND MOVED TO 04 & 05

0730 BOTH COMPLETE BACK TO TRAILER CHARGE HNU UNLOAD CAR

1800 TO HOTEL COMPLETE NOTES & LOG

VOID 2.14.95
KES

Work continued to Page

SIGNATURE K. E. S. DATE 2.14.95

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SCIENTIFIC BINDERY PRODUCTS . CHICAGO 60605 MADE IN USA

TITLE NSB-NLON

PROJECT NO. 5092

BOOK NO. 1244

WED FEB 15, 95

Work continued from Page WEATHER: AM CLOUDS 12°F – PM RAIN/SNOW 34°F

0700 MET DOUG CERVENAK & T E IN HOTEL LOBBY TO PASS & I D THEN TRAILER. CAL. BOTH HNU FAN IS NOT WORKING IN ONE HNU CALL EIS INC. TO TROUBLE SHOT. SENDING METER BACK WILL HAVE A REPLACE-MENT 2.16.95 AT 1000 CALL T. PATTON AND ORDERED A BACK-UP CAL. GAS

0930 CALL AL BRIGGS TO CHECK ON 2 CREWS WITH 1 HNUS ALSO CALLED GEO TESTING EXPRESS FOR PICK-UP LOOK LIKE 2.16.95 IS THE SOONEST THE CAN MAKE IT

1000 SHAWN S. WORKED IT OUT WITH EIS INC. TO HAVE A HNU SENT TO GROTON AIRPORT FOR PICK-UP TODAY CHECKED TEST PITS CLOSE TO TENNIS COURTS FOR ACCESS NEED SOME INPUT FROM DOUG

1040 THERE IS A TEST PIT LOCATION CLOSE TO WHERE T.E. IS DRILLING ≈ 50' WE CAN SHARE HNU FOR ONE PIT.

1055 CALLED GEO TESTING SET UP PICK-UP AT MAIN GATE FOR 2.16.95 BETWEEN 1000–1100

1100 TEST PIT 06 SEE LOGS

1200 LUNCH AT HOTEL

1300 WITH DOUG C. LOCATING REMAINING TEST PITS, TOURED AREA A TO CONFURM TEST PIT LOCATIONS.

1400 COMPLETED TEST PIT 07

1530 BACK FILL 07

LAIDED OUT 3 SOIL BORINGS WITH T.E.

1700 TO TRAILER CHANGE HNU TO HOTEL

EIS RON RAYNER
800 532 7474
FED EX GONA 197

VOIP
KES 2.15.95

SIGNATURE [signature] DATE 2.15.95

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SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

THUR FEB 16, 95

Work continued from Page WEATHER: SUNNY 35-42°F

0700 KS & TE TO GROTON AIRPORT FOR PDQ - HNU PICK-UP (2 UNITS) DID NOT ARRIVE LAST NIGHT BAD WEATHER ON EAST COAST.

0730 AT TRAILER CAL. METERS LOAD CAR

0800 TO AREA A, TEST PITS IN TENNIS COURTS AREA START ON TP 08 & TP 09, BOTH COMPLETE (SEE LOGS)

0930 CALL GEO TESTING EXPRESS CHECKED ON SAMPLE PICK-UP WILL HAVE DRIVER AT MAIN GATE ≈ 1030 TODAY (T.E. WILL MEET DRIVER)

0945 CALL AL B. CHECKED ON SAMPLE PICK-UP PRICE $50.00 AFTER 2ND PICK-UP AND WE SCHEDULED A PICK-UP FOR ≈ 1300 ON FRIDAY 2-17-95. GARY T. FROM GEO TESTING WILL CALL AL B. TODAY TO DISCUSS TEST ON SHELBY TUBES

1045 MOVING BACKHOE TO TP 10, ~~BETWEEN RT 12 & TENNIS COURTS~~ ~~AND RT 12~~ KS 11 AND TP 11, BETWEEN TENNIS COURTS & RT 12

1215 LUNCH KS & TE PICKED UP ICE FOR SAMPLES ALSO PICKED UP SPAN GAS WE HAD SHIPPED TO HOTEL

1310 AT TRAILER DROPPED OF ICE, GAS, SAMPLES & SHELBY TUBE

1320 AREA A LANDFILL MOVED WITH BACKHOE TO WEST END OF LANDFILL TP 12 & 13 SEE LOGS, TEST PIT 14 IS STAKED ONLY AT LIMIT OF LANDFILL WETLAND INTEFACE, THE BACKHOE WAS NOT USED THERE ARE 8 BORINGS INTO WASTE CLOSE BY AND YOU CAN SEE WASTE ON THE SLOPE

1600 CALLED AL B. NEED 2 TO 3 MORE T.P. "BEHIND" TENNIS COURTS DEPENDING ON WHAT WE (FIND LIMIT OF WASTE) WORKING TO E. GATE 2 MORE T.P. ON WEST END OF LANDFILL BACK OFF THE OBDA SLOPE ~~&~~ AND DIG. AFTER WE ARE COMPLETE WITH THE BACK HOE WORK WALK THE AREA NORTH OF THE TENNIS COURTS AND STAKE 4 TO 6 POINTS FOR THE LIMIT OF WASTE

1630 BACKHOE OPERATOR GONE FOR THE DAY

1645 KS, TE TO TRAILER PACK SAMPLES (R.B.) CALLED FED EX FOR 2-17-94 4:30 PM PICK-UP # GONA 13. CHARGE HNU'S

1745 DEPART FOR HOTEL, DROP FILM OFF

FAX MAP TO AL B.

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Work continued to Page

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SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60605 MADE IN USA

TITLE NSB-NION

PROJECT NO. 5082

BOOK NO. 1244

FRIDAY FEB. 17, 95

Work continued from Page WEATHER: SUNNY 28-42°F

0700 MET TE IN LOBBY TO TRAILER CAL. 2 HNU'S PACK 1 HNU FOR RETURN TO RENTAL CO.
PACK SAMPLES FOR SHIPPMENT, CALL GEO TESTING TO CHECK ON PICK-UP TIME

0755 MET BACK HCE OPERATOR KEITH KEEGAN ON LANDFILL

0810 TWO PITS ON WEST END OF LAND FILL

1020 TWO PITS AT TENNIS COURT RT. 12 AREA

1210 LUNCH

1250 ONE PIT AT TENNIS COURT RT 12 AREA
AND ONE BETWEEN HAND BALL CRT. AND RACQUET CRT.

1530 LAST TEST PIT AT WEST END. OF LANDFILL

1600 PACK SAMPLES FOR FED EX

1630 FED EX PICK-UP ONE COOL TO SW LAB AND ON HNU BACK TO EIS

1650 BACK TO LANDFILL STAKE LAST 2 PIT MET TE
BACK TO TRAILER PUT HNU ON CHARGE DEPART

1710 FOR HOTEL
DEPART

7 TEST PITS
SHIPPED SAMPLES TO S
SHIPPED 1 HNU BACK

VOID 2.17.95
RES

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SIGNATURE TE S. Sy

DATE 2.17.95

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DATE

WITNESS

DATE

WEEKLY SUMMARY:

2.12.95 SUNDAY LATE FLT TO T.C. GREEN/HOTEL

2.13/17.95 21 TEST PITS, LF-TP-01 → LF-TP-21

43.5 BACKHOE HRS.

2.18.95 PLACED 8 STAKES LANDFILL WETLANDS INTERFACE FLT TO PGH

SCIENTIFIC BINDERY PRODUCTS . CHICAGO 60605 MADE IN USA

TITLE NSB-NLON

PROJECT NO. 5082

BOOK NO. 1244

SAT. FEB. 18, 95

Work continued from Page WEATHER: SUNNY 23-45°F

0700 MET TE AT LOBBY TO TRAILER CAL HNM PREP. FOR SOIL BORINGS

0900 WALKING AND STAKING S.E. EDGE OF WETLAND FOR SURVEY MONDAY TUES (SEE MAP)

1005 8 STAKES PLACED IN LANDFILL/WETLAND INTERFACE LF-22 THRU LF-29. APPROX. LOCATIONS PLACED. DIRECTIONS & MAP WITH ALL TEST PIT & LOCATION OF S.E. EDGE OF LANDFILL WERE LEFT WITH T.E. ON SITE

1020 TO TRAILER CLEAN OUT RENTAL CAR

1140 T.E. AND K.S. TO HARDWARE STORE (KEY FOR TRAILER) TOOK T.E. TO GROTON AIRPORT TO PICK-UP 2ND RENTAL CAR I WILL RETURN MY CAR EARLY TO T.F. GREEN AIRPORT

1200 LUNCH AND CHECKED OUT OF HOTEL.

1245 AT TRAILER PACK HNM FOR RETURN, CLEAN TRAILER UP DATE PAPER WORK

1530 TO T.F. GREEN AIRPORT RETURN RENTAL CAR

1750 FLT TO PGH

VOID 2-18-95 KES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

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SCIENTIFIC BINDERY PRODUCTS . CHICAGO 60605 MADE IN USA

APPENDIX C

TEST BORINGS LOGS

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CT02Ø3 BORING NO.: LF-SCØ1
PROJECT NO.: 5082 DATE: 2-22-95 DRILLER: Mark Thomas (AES)
ELEVATION: 79.3 FIELD GEOLOGIST: Tim Evans (HNUS)
WATER LEVEL DATA:
(Date, Time & Conditions)

	SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY/SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	Background = 1 ppm REMARKS HNu
0842	S-1 0-2	1.0	7 19 23 30	0.9/2.0	2.0	V Dense	Brn	Sand & Gravel	GW	M-C Gr 1 ppm
0850	S-2 2-4	3.0	13 10 25 20	1.1/2.0		Dense	DGray	Silty Sand Tr Gravel Brick	SW	1 ppm
0854	S-3 4-5.5	5.0	18 10 10 9	0.8/1.5		M Dense				1 ppm
0900	S-4 5.5-7		6 6	0.8/1.5		M Dense				1 ppm
0905	S-5	8.0	8 8	0.4/1.5		Loose		Wood Frags		3 ppm
0916	7.5-9.0 S-6 8.5-9.0	10.0	8 50/.5	0.4/.5	9.0	—	DGray	Silty Sand Tr Plastic, Fibers, Roots	—	2 ppm Rollerbit 9-11.5
								Concrete?		
1074	S-7 11.5-13	12.0	10 6 7	0.3/1.5	11.5	—	Brn	Wood	—	1 ppm
1090	S-8 13-14.5	15.0	7 2 2		14.3	Soft	DGray	Clayey Silt Tr wood shell	ML	3 ppm
1057	ST-9 14.5-16.5			0.0/2.0	Dredge 14.3-25.3					
1108	ST-10 16.5-18.5			1.0/2.0						
	ST-11 18.5-21	20.0		0.0/2.0						S-12 18.5-20.5 WOH, 0.5/2.0 @ 1131 Clayey Silt
1135	ST-12 21-23.5	22.0		2.5/2.5						
1350	ST-14 23.5-26	25.0		2.5/2.5						

REMARKS CME 75 HSA Rig (Truck Mounted)
S = 2" SS (140" Wt 30" Drop Cathead)
ST = Thin-Walled Tube Sampler (3" x 36")

BORING LF-SCØ1

PAGE 1 OF 3

* See Legend on Back

4¼" ID, 8" OD Augers

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB01
PROJECT NO.: 5082 DATE: 2-22-95 DRILLER: Mark Shock (ASOC)
ELEVATION: 79.3 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

	SAMPLE NO. & TYPE	DEPTH (ft) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY/SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
1349	S-15 26-28	26.0		2.0/2.0		Stiff	DGrey	Clayey Silt Tr Shell Roots	ML	H_2S odor
			4 / 4							
1352	S-16 28-30	28.0	6 / 7	2.0/2.0						Max 9 ppm
			4 / 4							Avg 5 ppm
		30.0	5 / 4							
1401	S-17 30-32		2 / 3	2.0/2.0						Saturated
		32.0	2 / 3							
1403	S-18 32-34		4 / 4	2.0/2.0				Plant Tr Stems		
		34.0	5 / 5							
1410	S-19 34-36		4 / 5	2.0/2.0	35.3					
		36.0	5 / 5			Loose	Brn	Sandy Silt Tr Org	SM	Soil
1414	S-20 36-38		2 / 24	1.0/2.0		Dense	Gray/rtb	Silty Sand Tr Schist in Shoe	SP	M-C Gr
		38.0	27 / 34				Tan			VF-F Gr
	S-21 38-40		7 / 9	2.0/2.0						
		40.0	8 / 6							
	S-22 40-42		6 / 6	1.8/2.0						
			7 / 9				Tan	Silty Sand Tr Gravel	SW	M-VC Gr
	S-23 42-44		34 / 27	2.0/2.0						
			33 / 34							
	S-24 44-46	45.0	32 / 24	2.0/2.0						
			34 / 30					Silty Sand	SP	VF-F Gr
	S-25 46-48		6 / 9	1.5/2.0			Gray	Sand Tr Mica	SP	Poorly Graded M-C Gr
			17 / 25							
		50.0								

REMARKS

BORING LF-SB01

PAGE 2 OF 3

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTU 203 BORING NO.: LF-SB01
PROJECT NO.: 5082 DATE: 2-22-95 DRILLER: Mark Shock (Assoc)
ELEVATION: 79.3 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY/ CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
1548 S-26 SD-52	51.0	7 16 100/.3	2.3/2.3	---	V Dense	Grey	Sand	SW	M-VC Gr
	52.0			BR@52'			Schist Frags - Weathered Bed		Orange Staining
				TD 52'					Auger Refusal @ 52'
	55.0								

REMARKS

BORING LF-SB01

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* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB06
PROJECT NO.: 5082 DATE: 2-20-95 DRILLER: Mark Sloch (Assoc)
ELEVATION: 79.4 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

	SAMPLE NO. & TYPE	DEPTH (FL) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.)	SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS Background 1ppm HNU
1346	S-1 0-2	1.0	12 / 12	0.5/2.0	Fill	M Dense	Brn	Sand some Gravel	SW	F-VC Gr 1ppm
		2.0	13 / 14							
1350	S-2 2-4	3.0	12 / 27	0.5/2.0						1 ppm
		4.0	9 / 3							
1402	S-3 4-6	5.0	6 / 12	0.7/2.0						moist 11ppm
		6.0	11 / 15							Oil Staining (Black)
1405	S-4 6-8		12 / 2	0.7/2.0		Loose	D. Grey	Tr Metal Pieces		
		8.0	4 / 5							Oil staining 15ppm
1413	S-5 8-10		6 / 2	0.2/2.0		V Loose		Tr Plastic		Oil Staining 10ppm
		10.0	2 / 2							Poor Recovery
1418	S-6 10-12		2 / 1	2.0/2.0	Dredge 10-14.5'	Soft	DGray	Clayey Silt Tr Shell	ML	10ppm
		12.0	1 / 3							
1432	ST-7 12-14			1.5/2.0			DGray	Clayey Silt Tr Shell	ML	
		14.0						Concrete in bottom		
1443	S-8 14-15.5		10 / 2	0.9/1.5	Natural Sand ~14.5 - 19.5	Loose	Tan/Grey	Silty Sand	SP	VF-F Gr Saturated
		16.0	3 / 3							
1449	S-9 15.5-17	17.0	5 / 5	1.5/1.5						
1453	S-10 17-19		5 / 9	2.0/2.0		M Dense				
		19.0	6 / 18							
1513	S-11 19-20	20.0	10 / 50/.5	1.0/1.0			Black	Schist		
		21.0								
		22.0								
					BR @ 22.5				RL	Auger Refusal @ 22.5'
	X-12		100%	2.1/2.5		Hard	Pinky Grey	Gneiss		
1430		25.0							BR	

REMARKS CME 75 HSA Rig
4¼" ID 8" OD Augers
2" SS (140# WA, 30" Drop, Cathead)
3" Shelby Tube

* See Legend on Back

BORING LF-SB06

PAGE 1 OF 2

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTU2Ø3 BORING NO.: LF-SBØ6
PROJECT NO.: 5082 DATE: 2-21-95 DRILLER: Mark Short (ASC)
ELEVATION: 79.4 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, Ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
2/21	26.0					D Gray	Gneiss	M	
	1								
X-13	②	100%	4.7/5.0		Hard				
	1								
	30.0					Salmon	Granite		Breaks from rig
	③	69%	1.6/2.0					Br	" " "
	32.0					Grey/Pink	Gneiss		
				TD 32.0					Frac @ 32'
							HSA 22.5'		
							10 - 2" ss		
							1 - Shelby Tube		
							10' Core		

REMARKS X = NX Core

BORING LF-SBØ6

PAGE 2 OF 2

* See Legend on Back

Brown & Root Environmental

BORING LOG

PROJECT: 5082 BORING NO.: TP-07 (Boring)
PROJECT NO.: NSB - NLON DATE: 2-29-95 DRILLER: [illegible]
ELEVATION: FIELD GEOLOGIST: W. BROTT
WATER LEVEL DATA:
(Date, Time & Conditions) 2-29-95 Cool ~40° cloudy

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%) RQD	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
									[illegible]
									START ROTARY
							FRACTURE		
									ROTARY
2'									
		3.0	3.8/5.0		[illegible]	PINK GREY	[illegible] - CALCITE	BR	
(1)			76%						[illegible] FRAC ~23'
									[illegible]
									[illegible] FRAC [illegible]
					[illegible]	PINK GREY	[illegible] - CALCITE [illegible]	BR	26-31 [illegible]
		4.5 5.0	4.3/5		[illegible]				[illegible]
(2)		[illegible]	[illegible]		[illegible]				[illegible]
31									

REMARKS CME-75 DRILL RIG

BORING 2

PAGE ____ OF ____

* See Legend on Back

Brown & Root Environmental

BORING LOG

PROJECT: 5082 BORING NO.: TP01 - ROCK CORING

PROJECT NO.: NSB - NLON DATE: 2-27-95 DRILLER: ASSOCIATED - M. SHAWK

ELEVATION: FIELD GEOLOGIST: W. BROTZ

WATER LEVEL DATA:

(Date, Time & Conditions) 2/27/95 COLD ~ 25°C - SNOWING

TIME	SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR RQD (%) Recovery	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
						SOFT	BLK	0-6.5' silty clay		AUGER TO TOP OF
										BEDROCK / COBBLES - SET
										CASING - CORE TO
								HNu - 0 ppm		COMPETENT BEDROCK
										ENCOUNTERED
5										
					BR 6.5 ↓ 7.0			AUGER REFUSAL ~ 6.5'		
1105 6.5										
			4.0	5.0					BR	SET
			80%					(7.7 ft) FRAC		
	1							7.7 - 8.0'		
10	1710									
										Color Uniform
		5.0/5.0	4.5/5.0							
			90%					16.0' 45° FRAC (4 in long)		
15								17.1 60° FRAC (3 in long)		
								17.5 H.F		

REMARKS CME - 75

BORING

PAL

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB01-B
PROJECT NO.: 5082 DATE: 2-14-95 DRILLER: Mark Shock (Assoc)
ELEVATION: Not Surveyed FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS HNU
	1.0						See Boring Log LF-SB01-A		Auger to 9.0'
	2.0						for Litho to 9.0'		
	3.0								
	4.0					DBrn	Silty Sand Tr Pebbles	SW	
	5.0								
	7.0								
	9.6								
S-1 @	10.0	50/.0					wood(?)		Spoon bouncing
1130	10.5								
	12.0								Auger Refusal 1ppm
				TD 12'					Creosote Odor (Background)
							HSA 12.0'		
							1X 2" SS		

REMARKS CME 75 HSA Rig Truck-Mounted
4¼" ID 8" OD Augers
2" SPT, 3" x 36" Shelby tubes

BORING LF-SB01-B

PAGE 1 OF 1

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON (TO 203) BORING NO.: LF-SB01-A
PROJECT NO.: 5082 DATE: 2-13-95 DRILLER: Mark Shock (Assoc)
ELEVATION: Not Surveyed FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions) @1040 sunny cold (10°F)

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY/SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY/CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS *HNu
S-1 @	1.0	28 / 12	0.8/1.5		M. Dense	Brn	Silty Sand Tr org + Gravel	SW	Frozen FILL —
1056 S-2	1.5	14 / 18							F-VC Sand
@ 1100	3.0	25 / 21	0.6/1.5		Dense	D Brn	Sand Some Gravel Pebble	SW	FILL —
S-3 @		11 / 4	0.8/1.5		Loose	D Brn	Sand Some Gravel Asphalt in Tip	SW	FILL —
1112 S-4	4.5	5 / 29	0.7/1.0				Gravel Cobbles w/VC Sand Asphalt in Tip	GW	Moist @ 4.5' FILL —
@ 1115	5.5	100/.5			V Dense	D Brn	- Boulder -		
	7.0								Auger 5.5' to 7.0' H2O @ 6.5'
S-5 @		5 / 6	0.6/1.5		Loose	Brn to Black	Gravel Some Sand	GW	VC Sand —
1140 S-6	8.5	2 / W	0.4/1.5		V Loose	D Gray	↓	↓	
@ 1148	10.0	0 / H							
S-7 @		3 / 5	0.2/1.5		Loose	Black	Silty Sand	SM	
1200 S-8	11.5	5 / 2	0.4/1.5						Re-bar + Concrete in walls w hole
@ 1210	13.0	5 / 6			M Dens	D Gray	No Recovery (Gravel Wash)		① Auger Refusal @ 17'
2/13									② Move 2'S Refusal @ 10'
2/14									③ Move 3'W Refusal @ 10'
									④ Move 2'N Refusal @ 9'
									Call A. Briggs @ 1520
									Backfill ①-④
									2/14 ⑤ Auger to 13' @ 1000 Refusal @ 1'
									⑥ Move 8'S
									(HNu Background 1ppm)
									Refusal @ 5'

REMARKS CME 75 HSA rig
4¼" ID Augers * No Readings Taken
2" SPT, 140# wt 30in drop

BORING LF-SB01-A
PAGE 1 OF 1

* See Legend on Back

2/14 3 hr stand by waiting for HNu

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSR - NLON CTO 203 BORING NO.: LF - SB02
PROJECT NO.: 5082 DATE: 2-14-95 DRILLER: Mark Shock (Assoc)
ELEVATION: 87.3 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA :
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY / SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	SOIL DENSITY/ CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS HNu
S-1 @	1.0	31 / 7	0.4/1.5		M Dense	Tan	Silty Sand Tr Pebbles	SW	FILL VC Sand 0ppm
1323 S-2	1.5	4 / 28		1.5	V Dense	Tan/ Grey	Gneiss Frags	—	FILL Saturated 0ppm
@ 1327	2.5 / 3.0	100/5	0.4/0.5	3.0					
S-3 @		2 / 6	0.7/1.5		Dense	D Brn	Silty Sand 1 Pebble 0.1 ⌀	SP	FILL F Sand 0ppm
1340 S-4	4.5	26 / 16	0.8/			Gray-Brn			0ppm
@ 1350	6.0	19 / 10	/1.5		M Dense				FILL
S-5 @		5 / 14	0.5/1.5		M. Dense		Silty Sand Some Pebbles	SW	Tr glass, Metal, Cloth plastic 0ppm
1352 S-6	7.5	12 / 7	0.9/		M Dense				FILL Tr Plastic 0ppm
@ 1404	9.0	14 / 10	/1.5						FILL Diesel Odor @ ~9'
S-7 @		4 / 4	0.7/		Loose	Gray-Brn	Silty Sand	SP	FILL Tr Plastic, Paper 0ppm
1411 S-8	10.5	1 / 3	1.5/1.5	10.5	M Stiff	Gray-Brn	Clayey Silt Tr Shell	ML	H_2S odor 0ppm
@ 1416	12.0	3 / 2							
★ ST-9 @		1 / 1	0.0/	10.5'-24.5'	V Soft		- No Recovery -		
1459 S-10	12'-14'	1	/3.0						
@ 1520	15.0								
★ ST-11 @			2.0			Gray-Brn	Clayey Silt Tr Shell	ML	
1527			/3.0						
	18.0								
S-12 @		1 / 1	1.5/	Dredge	V Soft				
1547	19.5	1	/1.5						
★ ST-13 @		2.5/ 20s	rec 2.5/						(compressed)
1606	22.0		/2.5						
S-14 @		3 / 2	1.5/		V Soft				
2/14 1623 S-15	23.5 24.0	1	/1.5						
2/15 @ 0845	24.5	6 / 100/1"		24.5	Soft V Dense		Silty Sand Tr Pebbles	SW	

REMARKS CME 75 HSA Rig (Truck-Mounted)
S=2" SS (140# wt, 30" Drop, Cathead)
4 1/4" ID, 8" OD Augers

BORING LF-SB02

PAGE 1 OF 2

1130

* See Legend on Back

ST = 3" OD x 36" Shelby Tube

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB NLON CTO2 ØØ3 BORING NO.: LF-SBØ2
PROJECT NO.: 5082 DATE: 2-15-95 DRILLER:
ELEVATION: 87.3 FIELD GEOLOGIST:
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
1000 X	①	97%	1.5/1.5		Hard	Grey/Pink	Gneiss 45°∡ @ 25.1 30°∡ @ 25.7	BR	Set 4" Spin Casing to 24 ft
1010 S-16 @ 1027	28.0	1 2 1	0.0/1.5				- No Recovery -		Set 4" spin casing to 28'
S-17 @ 1056	30.0	10 14 17 100/.2	0.6/2.0				Weathered Schist		Set 4" spin casing to 30.5'
					Hard	Grey/Pink	Gneiss	VBr	2 min/1 ft
								↓	Drop
X	②	30%	2.2/5.0	Br@33'				↓	Drop
					Hard	Grey/Pink	Gneiss / Granite	BL	7 min/1 ft
							Horiz Frac@35'	↓	
								Br	70° Frac CaCO3 filled
X	③	71%	3.3/3.5				Gneiss (fractured)		20° Fracs Sand filled
				TD 38.5					@ 1450
							Backfill to 38.5' w/grout		
							HSA 24"		
							14 x 2" SS		
							3 x Shelby Tubes		
							10' NX Core		
							Backfill 38.5'		

REMARKS X- NX Core Barrel

BORING LF-SBØ2

PAGE 2 OF 2

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB05
PROJECT NO.: 5082 DATE: 2-18-95 DRILLER: John Holley (Assoc)
ELEVATION: 90.8 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

	SAMPLE NO. & TYPE	DEPTH (FL) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.)	SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS Background 1ppm HNu
1318	S-1 0-2	1.0	32 / 75	1.3/2.0		V Dense	D Brn	Topsoil 4"	Pt	0.0ppm
		2.0	70 / 47				Brn	Silty Sand & Gravel	SW	M-VC Gr Avg ø 0.2"
1320	S-2 2-4	3.0	93 / 33	1.6/2.0		V Dense	↓	↓		Creosote Wood Frags & Odor
		4.0	39 / 56				Tan	Gravelly Sand	SW	M-VC Gr
		5.0								
		6.0								Auger through boulder 4.0 to 7.5
					Fill					
		8.0	16					Gneissic Frags		
1358	S-3 7.5-9.5		23 / 13	0.9/2.0		M Dense	Olive Gray			
		10.0	14				-	Sandy Silt	SM	VC Gr 2.5ppm
1410	S-4 10-12		12 / 3	0.3/2.0		Loose	orange Brn	Silty Sand Tr vc Gr sand	↓	F Gr 2ppm
		12.0	4 / 5					↓	↓	
			1							
1424	S-5 12.5-14.5		2 / 3	0.5/2.0		Loose	orange Brn to	↓	↓	F Gr Wet 3ppm
		15.0	3				Grey	↓	↓	mottled
1430	S-6 15-17		14 / 8	0.4/2.0		M Dense	Grey	Gneiss Frags & Sand	VBr	M-C Gr —
		17.0	6 / 6							max ø 0.15"
1446	S-7 17-19		6 / 4	0.2/2.0	2/18 ▼18.0	Loose	Gray	Gneiss Frags	VBr	H_2O @ 18 —
2/18		19.0	3 / 4							0957
2/19	S-8 19-21		30 / 8	0.7/2.0			-			
		21.0	10 / 11			Stiff	DGray	Silt & Wood Frags Tr mica	ML	Background = 0.5ppm 0.5ppm
1000	S-9 21-22		11 / 100/.5	0.6/2.0		V stiff	↓	↓	↓	0.5ppm
		23.0								Auger Refusal @ 23'
										Move 8'S
										Auger Refusal @ 8' Move 10' NE
										Auger Refusal 4' Move 10' E

REMARKS CME 75 HSA Rig
4 1/4" ID, 8" OD Augers
2" SS (140# WH, 30" Drop, Cathead)

BORING LF-SB05

PAGE 1 OF 1

Refusal @ 6'

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB04
PROJECT NO.: 5082 DATE: 2-17-95 DRILLER: Mark Shock (Assoc)
ELEVATION: 910 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

	SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS HNu
1410	S-1	1.0	7 7	1.4/2.0	1.0	M Dense	DBrn	Topsoil 1' Tr Roots	Pt	0ppm
	0-2	2.0	17 13				Lt Brn	Gravelly Sand Max ø .3"	SW	M-C Gr
1412	S-2 2-4	3.0	7 16	0.1/2.0		M Dense				Poor Recovery –
		4.0	10 8					Wood Frag in shoe		
1424	S-3 4-6	5.0	7 6	1.0/2.0		M Dense				Moist 2ppm
		6.0	5 6							
1426	S-4 6-8		5 8	0.6/2.0		M Dense				Orange Staining 0ppm
		8.0	12 13							
1440	S-5 8-10		33 12	0.1/2.0		Loose		Gneiss Frags		Poor Recovery 0ppm
		10.0	8 2		2/17 ▼ 10.0					
1459	S-6 10-12		1 1	0.1/2.0		V Loose	Lt Brn	Sand & Gravel	SW	Poor Recovery –
		12.0	1 1							
1514	S-7 12-14		1 2	0.8/2.0		M Dense	Brn	Silty Sand Some Gravel	SW	0ppm
		14.0	6 8							
1520	S-8 14-15.5		4 4	0.8/1.5	14.5	V Dense	DGrey	Silty Sand Tr Gravel Pebbles	SM	VF Gr 0ppm
		16.0	50/.5							① Auger Refusal @ 16'
										Move 5' N
										* S-9, @1600 Gravelly Sand 8-10' 40-7-9-7 0ppm
										② Auger Refusal @ 12' Move 5' SW
										2-18-95 Auger Refusal @ 12' Move 10' E 0900, Auger Refusal @ 7' 0930

REMARKS CME 75 HSA Rig
4 1/4" ID 8" OD Augers
2" SS (140# Wt, 30" Drop, Cat Head)

BORING LF-SB04

PAGE 1 OF 1

* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB03
PROJECT NO.: 5082 DATE: 2-16-95 DRILLER: Mark Snoch (Assoc)
ELEVATION: 84.5 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA:
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	SOIL DENSITY/ CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS (HNu)
S-1 @		10 / 8	1.4/1.5	Fill	M Dense	DBrn	Topsoil 1.0' Silty Sand Fr MGr	ML	Background 2 ppm
0833 S-2	1.5	16 / 50	0.6/1.0		V Dense	Tan	Silty Sand Some Gneiss Pebbles	GW	2 ppm
@ 0834	2.5 / 3.0	100/.5							
S-3 @		5 / 16	0.1/2.0		Dense	Gray	Gneiss Frag	BR	—
0908	5.0	16 / 16							
S-4 @		50/.5			V Dense	Tan	Silty Sand Some Pebbles	GW	2 ppm
0910	7.0								
S-5 @		26 / 54	0.0/2.0		Dense		- No Recovery -		
0925	9.0	20 / 9							
S-6 @		14 / 10	1.0/2.0		M Dense	Tan	Silty Sand Some Pebbles	GW	wet 4 ppm
0932	11.0	6 / 5		10.9					
S-7 @		1 / 1	0.5/2.0		Soft	DGray	Clayey Silt Tr Shell	ML	
0936	13.0	2 / 2							
½ Shelby 10-16:30 ST-8 @				Dredge 10.9-13.0	Soft		- No Recovery -		24"/38 sec
0959	15.0								
* ST-9 @			0.5/2.0		Soft	DGray	Clayey Silt Tr Shell	ML	24"/19 sec Sealed w/ paraffin
1044	17.0								
S-10 @		7 / 6	0.4/1.5		Stiff				Poor Recovery
1057 S-11	18.5	8 / 4			M Stiff				19 ppm
@ 1115		2 / 3	2.0/2.0						H_2S odor
	20.5	3 / 3							
S-12 @		4 / 4	2.0/2.0		Stiff				19 ppm
1120	22.5	5 / 1							
S-13 @		2 / 3	2.0/2.0		M Stiff				Breathing zone = 1 ppm, background 15 ppm
1132	24.5	2 / 3							

REMARKS CME 75 HSA 4¼" ID 8" OD Augers
2" SS (140# WH 30" Drop Cathead); 3" Shelby Tube
* S = Sent to SWA lab for TCL VOA, SVOA, P/P, TAL Metals + CN

BORING LF-SB03
PAGE 1 OF 3

* See Legend on Back

* ST-9 = Sent to Geotesting for soil class, moisture, particle size, Atterberg Limits

BORING LOG **HALLIBURTON NUS**

PROJECT: NSB - NLON CTO 203 BORING NO.: LF - SB03
PROJECT NO.: 5082 DATE: 2-16-95 DRILLER: Mark Stock (MS Soil)
ELEVATION: 84.5 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA :
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY / SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS +/N a
S-14 @		2 / 3	2.0/2.0	Dredge	M Stiff	Gray Brn	Clayey Silt	ML	20 ppm
1138 S-15 @	26.5	3 / 7	2.0/2.0						22 ppm
1148		2 / 3							
S-16 @	28.5	3 / 5	2.0/2.0		St Stiff				BZ = 2 ppm 50 ppm
1156		2 / 5							
S-17 @	30.5	6 / 7	2.0/2.0						30 ppm
1200		7 / 8							
S-18 @	32.5	6 / 4	2.0/2.0						
1324		7 / 4							BZ = 2 ppm 7 ppm
S-19 @	34.5	5 / 5	2.0/2.0						
1332		2 / 3							16 ppm
S-20 @	36.5	5 / 3	1.4/2.0						
1340	37.5	100/.3		37.3	—	Lt Gray	Silty Sand, VF Gr wood	SM	
S-21 @	38.5	1 / 4	1.7/2.0	Native			Silty Sand / VF Gr Sandy Silt	SM	0 ppm
1358		4 / 5			Loose				
S-22 @	40.5	9 / 3	1.2/2.0		V Dense				Saturated Rust laminae 0 ppm
1402		23 / 35							
	42.5	29 / 23		43.0		Tan			
S-23 @		9 / 16	1.2/2.0		M Dense		Silty Sand F Gr Tr Biotite Poorly Sorted	SP	2 ppm
1421	44.5	12 / 9							
S-24 @		5 / 5	1.6/2.0		M Dense				
1430	46.5	7 / 8							
S-25 @		3 / 7	2.6/2.0		M Dense				
1437	48.5	10 / 50							
S-26 @		R / 10	1.4/1.5						

REMARKS

BORING LF-SB03

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* See Legend on Back

BORING LOG — **HALLIBURTON NUS**

PROJECT: NSB-NLON CTO 203 BORING NO.: LF-SB03
PROJECT NO.: 5082 DATE: 2-16-95 DRILLER: Mark Shuck (Assoc)
ELEVATION: 84.5 FIELD GEOLOGIST: Tim Evans
WATER LEVEL DATA :
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
1454	50.5	11			M Dense	Tan	Silty Sand Tr Biotite VF Gr	SP	Poorly Graded
									1540 Pullers back
									Auger 50.5' to 55.0'
	55.0								
S-27 @		12 7	1.5/		M Dense	Tan	Silty Sand Tr Biotite VC-VF Gr	SW	
1551	57.0	10 13	2.0					SP	laminated
									Auger to 60.0'
	60.0								
S-28 @		11 13	2.0/		M Dense	Tan	Silty Sand Tr Bio F-VF Gr	SP	laminated
1607	62.0	14 13	2.0						
	65.0								
—	68.0								
S-29 @		9 52	2.0/		V Dense	Tan	Sand M-VC Gr	SW	
1640	70.0	100	2.0						
1700				TD 70'				-	Auger Refusal @ 70'

REMARKS

BORING LF-SB03

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* See Legend on Back

APPENDIX D

TEST PIT LOGS

2.16.95

CALCULATION WORKSHEET Order No. 19116 (01-91)

PAGE ____ OF ____

CLIENT | JOB NUMBER

SUBJECT

BASED ON | DRAWING NUMBER

BY | CHECKED BY | APPROVED BY | DATE

NSB - NLON AREA A LANDFILL TEST PITS

TEST PIT ID	DATE COMPLETED	APPROX. AREA OF LANDFILL	BEDROCK FOUND	LIMIT OF LANDFILL	SURVEY STAKE AT..
LF TP 01	2.13.95	SOUTH	?	YES	L OF L
02	2.13.95	SOUTH	?	YES	L OF L
03	2.14.95	SOUTH	?	YES	L OF L
04	2.14.95	SOUTH	YES	YES	L OF L
05	2.14.95	S.W.	YES	YES	L OF L
06	2.15.95	S.E.	NO	NO	LOCATE PIT ONLY
07	2.15.95	SOUTH	?	YES	L OF L
08	2.16.95	S.E.	NO	NO	LOCATE ONLY
09	2.16.95	S.E.	NO	NO	LOCATE ONLY
10	2.16.95	S.E.	NO	NO	LOCATE ONLY
11	2.16.95	S.E	NO	NO	LOCATE ONLY
12	2.16.95	WEST	NO	YES	L OF L
13	2.16.95	N.E.	NO	YES	L OF L
14	2.16.95	NORTH	—	YES	L OF L NO DIGGING STAKE ONLY
15	2.17.95	WEST	NO	NO	LOCATE ONLY
16	2.17.95	WEST	NO	NO	LOCATE ONLY → START Rail 3
17	2.17.95	S.E.	NO	NO	"
18	2.17.95	S.E.	NO	NO	"
19	2.17.95	S.E.	NO	NO	"
20	2.17.95	S.E.	NO	NO	"
21	2.17.95	WEST	NO	NO	"

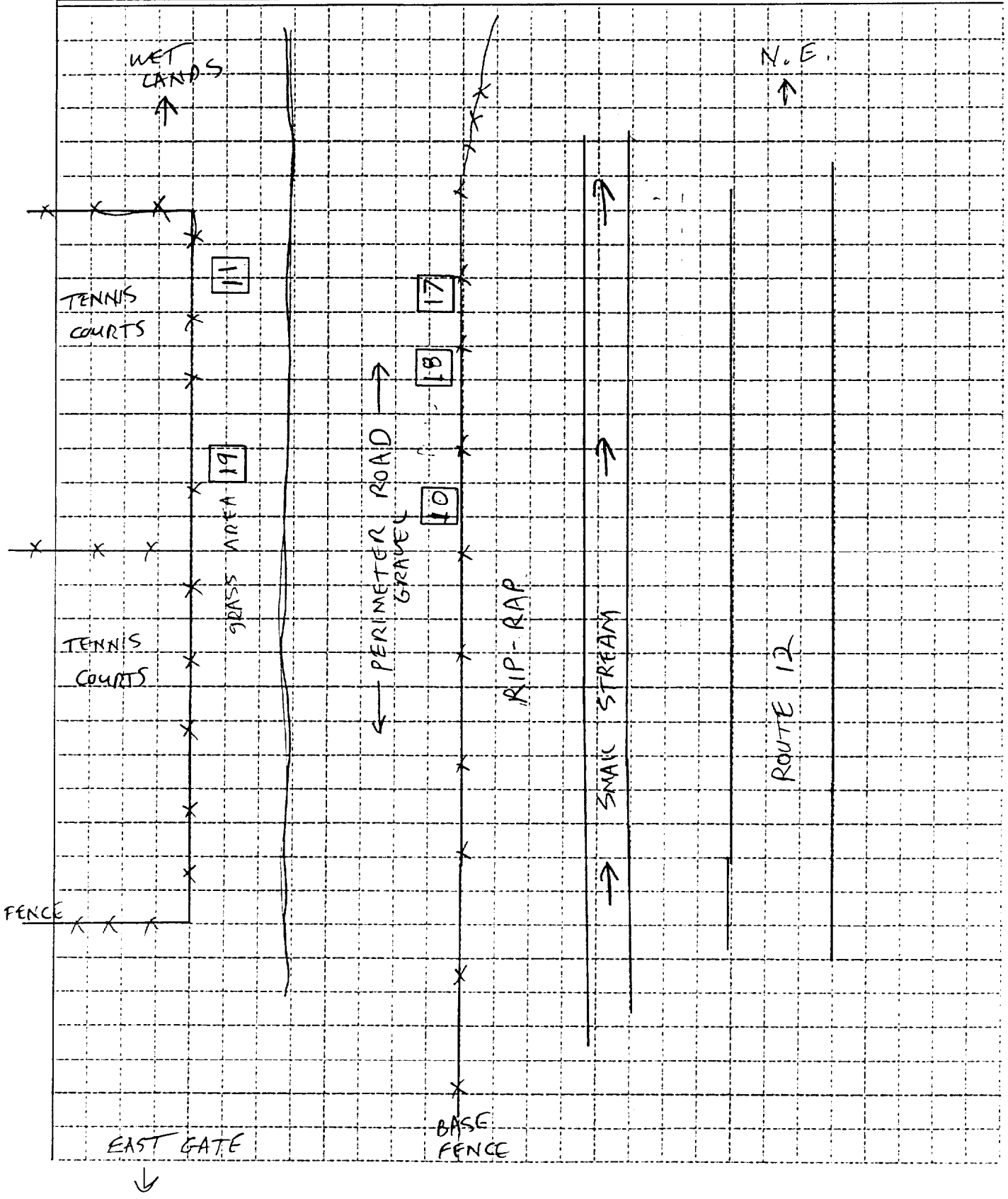
CALCULATION WORKSHEET

Order No. 19116 (01-91)

PAGE ____ OF ____

CLIENT: NSB - NIOIX	JOB NUMBER: 5082
SUBJECT: TEST PITS 10, 11, 17, 18 & 19 LOCATIONS	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
			2.17.95



TEST PIT LOG **HALLIBURTON NUS**

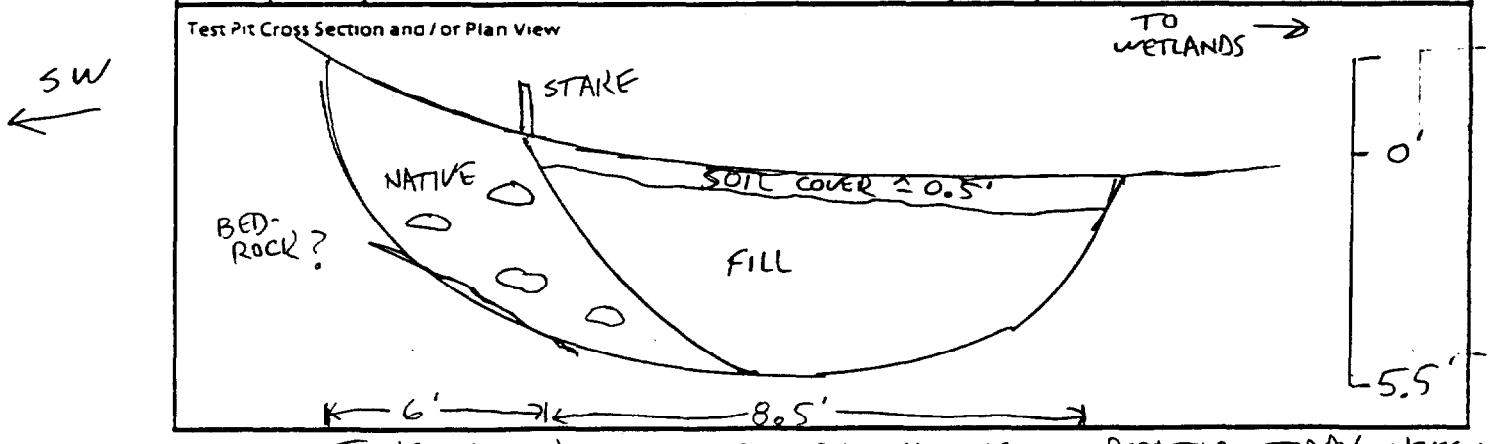
PROJECT: NSB-NLON TEST PIT NO.: LF-TP-01
PROJECT NO.: 5082 DATE: 2.13.95
LOCATION: AREA A
FIELD GEOLOGIST: K. SIMPSON

TIME ART 1030

FND 25.

DEPTH (FT.)	AT STAKE LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		SOIL COVER		0.5' SOIL COVER
1	FILL			FILL = OILY SOIL, BOTTLES
2				CANS, WOOD "GARBICH".
3	NATIVE	SILT/SAND/LONE		
4		BRN COBBLES/3' ϕ BOULDERS	SW	NO LAYERING MIXED
5				UP TRASH
6	≡ ?	BEDROCK AT 5.5'		PETROLEUM ODOR
		— FOR TP 01, 02, 03 & 07 —		
		DID WHAT WE COULD USING		TOTAL TEST PIT 14.5'
		BACKHOE TO CONFIRM COMPETENT		
		BEDROCK. WILL NEED FURTHER TESTING		
		(BORINGS) TO CONFIRM.		
				HNU IN BREATHING ZONE
				< 0.1 PPM

Test Pit Cross Section and / or Plan View



REMARKS T. KEEGAN & SON INC. EXCAVATING OPERATOR TERRY KEEGAN
JOHN DEERE 510C TURBO 4X4 BACKHOE 2' W. BUCKET
PIT BACKFILLED WITH EXCAVATED MATERIAL
SOUTH OF WELLS 2LMW18S/D

PHOTO LOG ROLL #1 4 PHOTOS (NO "STAMP")

TEST PIT LF-TP-01

PAGE 1 OF 2

CALCULATION WORKSHEET

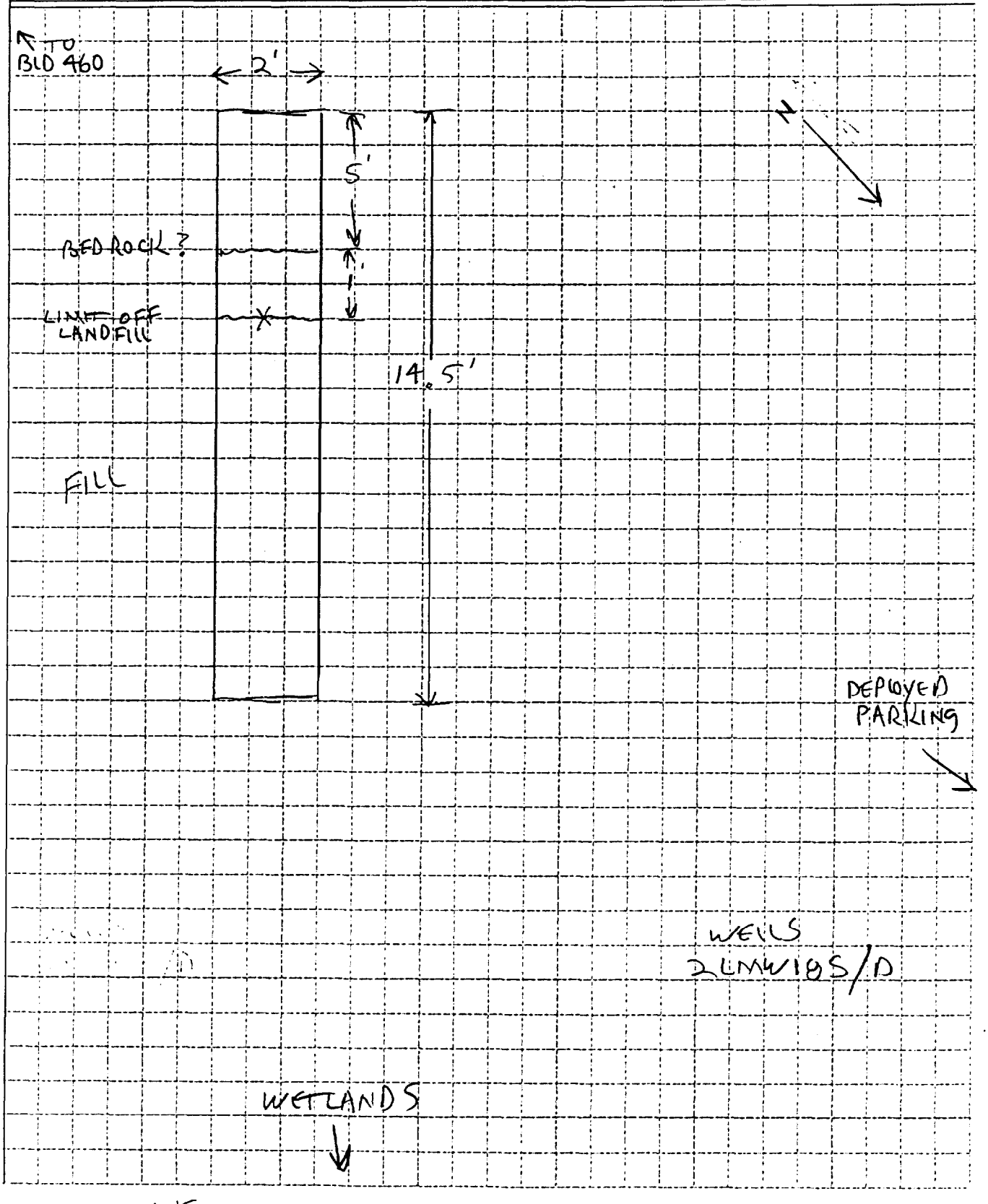
Order No. 19116 (01-91)

CLIENT	JOB NUMBER
NSB-NLON	5082 CTO 203

SUBJECT: LF-TP-01

BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
RES			2.13.95

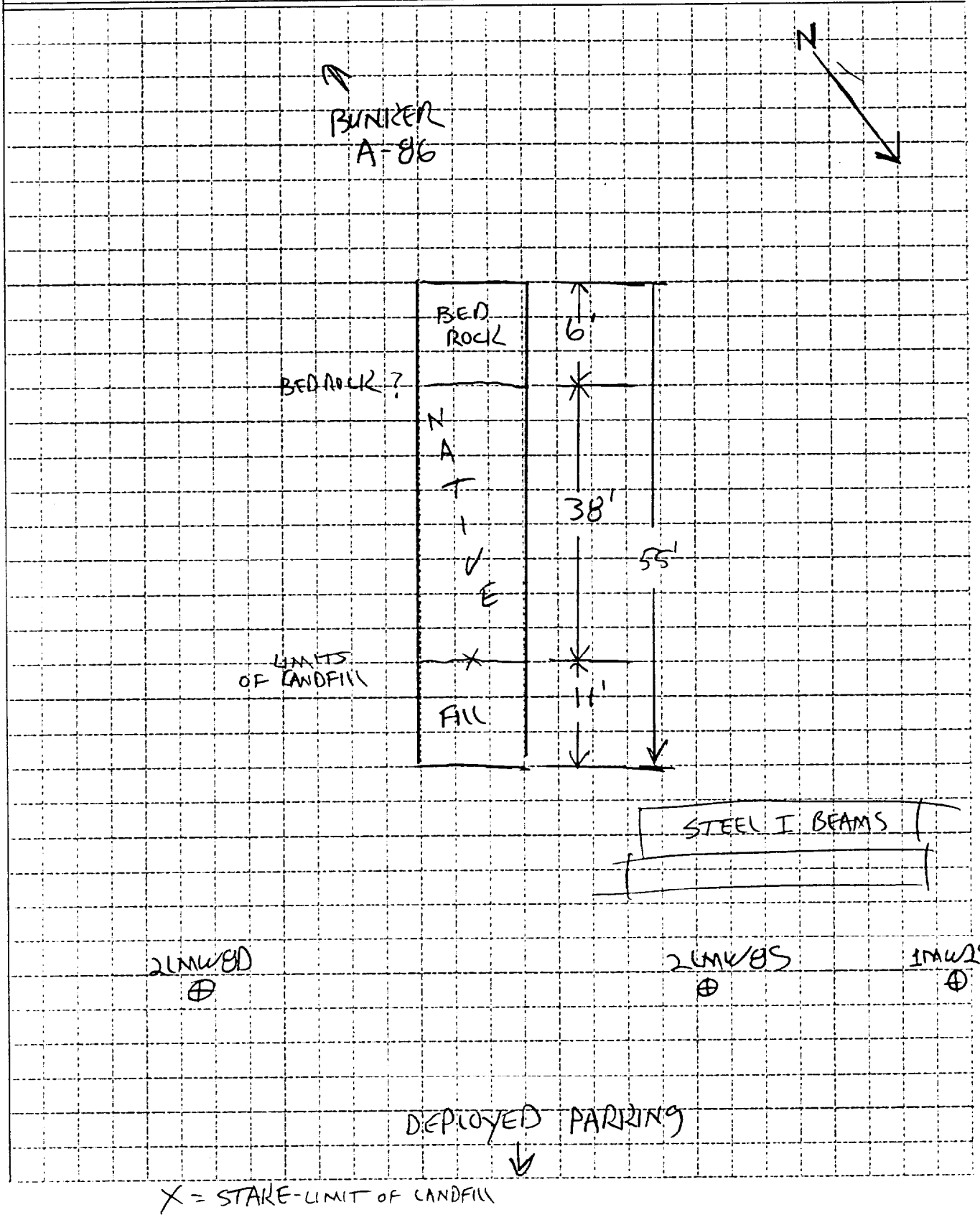


X = STAKE - LIMIT OF LANDFILL

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER
NSB - NLON	5082 CTO 203
SUBJECT: LF TP 02	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
KES			2.13.95

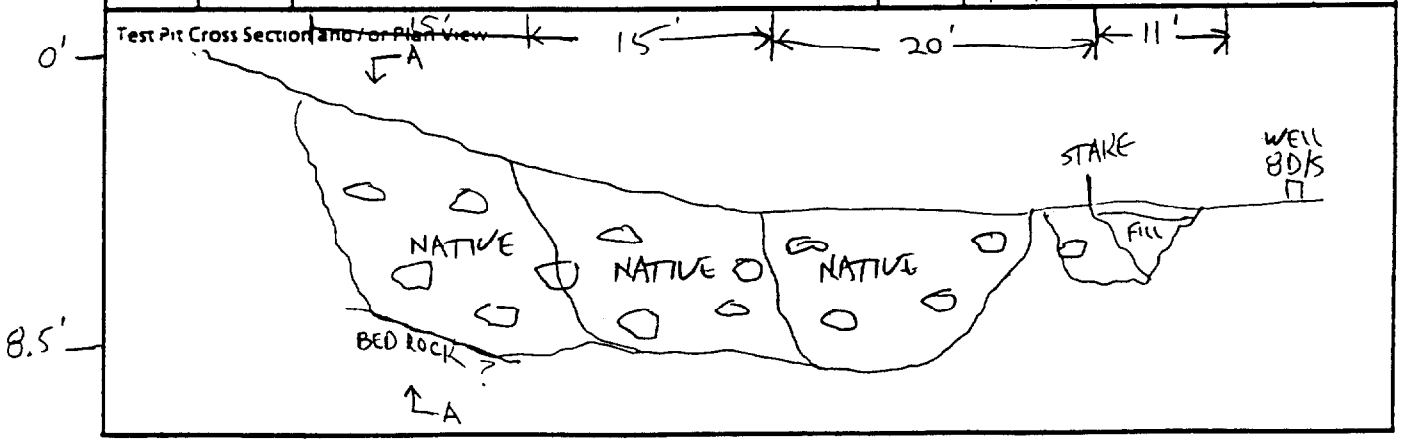


TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB-NLON TEST PIT NO.: LF-TP-02
PROJECT NO.: 5080 DATE: 2.13.95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	A ↓ LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
TIME START 1140 0		BRN, ROOTS SILT/SAND GRAVEL	GM	
2		BRN SILT/SAND/GRAVEL		
		COBBLES 1'-2' ϕ		
4				
6				
		BRN/GRAY	GW	GROUND WATER FILLING
END 1500 8		BOULDERS 3' ϕ		BOTTOM OF PIT
	?	BED ROCK ?		
				FILL = OILY DIRT
				BRICKS, WOOD, PLASTIC
				CANS GLASS
				IRON SCRAPS
				PETROLEUM ODOR
				TOTAL PIT 55' LONG

Test Pit Cross Section and/or Plan View



REMARKS KNOCKED DOWN ≈ 6 SMALL TREES <3" ϕ TO GAIN ACCESS SOUTH OF WELLS 2LMW8D/S
PIT BACKFILLED WITH EXCAVATED MATERIAL
LUNCH 1230 - 1300

PHOTO LOG TP-02 STAMP, 5 PHOTOS

TEST PIT 02

HNU IN BREATHING ZONE <0.1 PPM

PAGE 1 OF 2

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB-NLON TEST PIT NO.: LF-TP-03
PROJECT NO.: 5082 DATE: 2.13/14.95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	AT BED ROCK LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		TOPSOIL ROOTS	SM	ORGANIC MATERIAL
		BRN SOME COBBLES	GM	SAND & GRAVEL
2		BRN COBBLES TO		
		BOULDERS 3'+ Ø		
4				
6				LARGERS BOULDERS
		TURN GRAY/BRN MORE	GW	SLOW DIGGING
8		COBBLES/BOULDERS / GRAVEL		GRAVEL TURNING SUB-ROUNDED
10	?	BEDROCK ?		

Test Pit Cross Section and / or Plan View

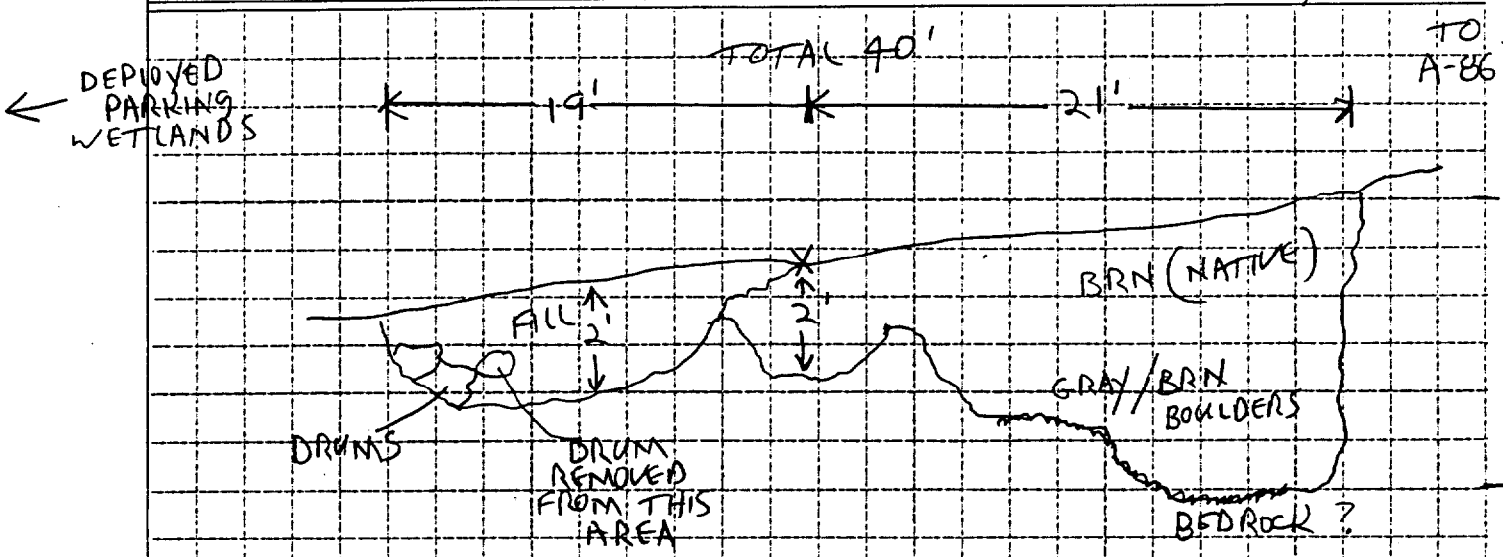
TP-03 SW END DEPLOYED PARKING PULLED ≈ 3 BUCKETS OF SOIL AND REMOVED A 55 GAL. STEEL DRUM, RUSTED, RIPED OPEN WITH A JELL LIKE MATERIAL IN IT ≈ 15 GAL. STOP DIGGING FOR DAY. CONTINUED ON 2.14.95 AT 1300 END PIT AT 1520
MAX HNU READINGS 300 PPM ALLOWED PIT TO VENT ≈ 10 MIN. AND CLOSED IT MOVING SOUTH TO DIG

REMARKS PIT BACKFILLED WITH EXCAVATED MATERIAL

PHOTO LOG 03 STAMP, 5 PHOTOS TEST PIT TP 03

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER		
NSB-NLON	5082	CTO 203	
SUBJECT			
LF-TP-03			
BASED ON	DRAWING NUMBER		
BY	CHECKED BY	APPROVED BY	DATE
KES			2.13/14.95



START TP
AT NORTH END
"1ST DIG" WITH DRUMS
3' L X 2' DEEP
MOVING SOUTH

X = STAKE LIMIT OF LANDFILL

FILL = DIRT, BRICKS, WOOD
DRUMS, GLASS

TEST PIT LOG — **HALLIBURTON NUS**

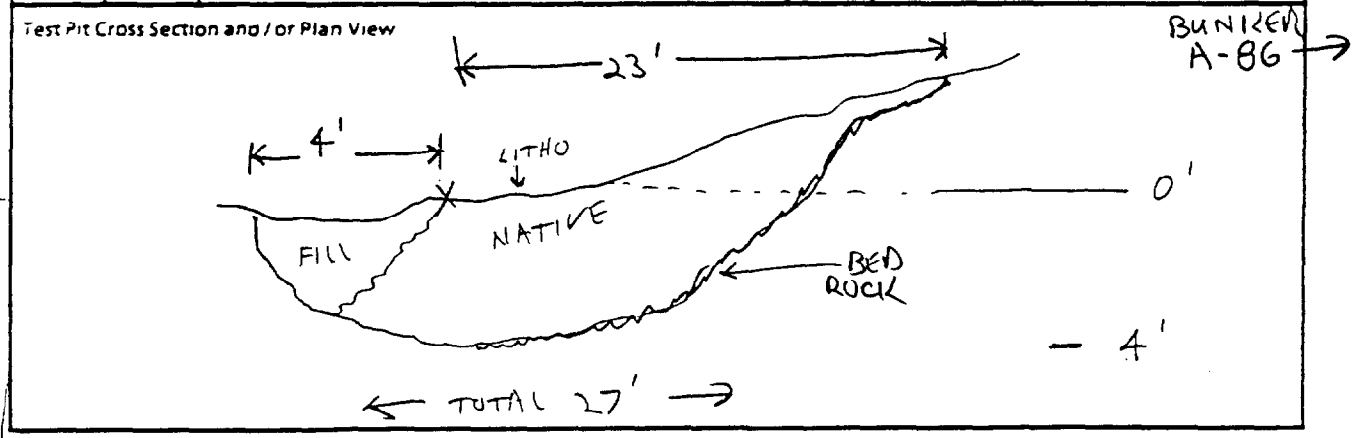
PROJECT: NSB-NION TEST PIT NO.: LF-TP-04
PROJECT NO.: 5082 DATE: 2-14-95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

START 1545

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS (HNU)
0		BRN TOP SOIL	SM	ROOTS MAX
2		COBBLES & BOULDERS BRN GRAVEL 3'+ ϕ	GM ↓	<.1 IN BREATHING ZONE
4				
6				

END 1605

Test Pit Cross Section and / or Plan View



REMARKS ALL = SAND, PLASTIC
X = STAKE LIMIT OF LANDFILL
PIT BACKFILLED WITH EXCAVATED MATERIAL

PHOTO LOG 04STAMP, 2 PHOTOS

TEST PIT TP 04

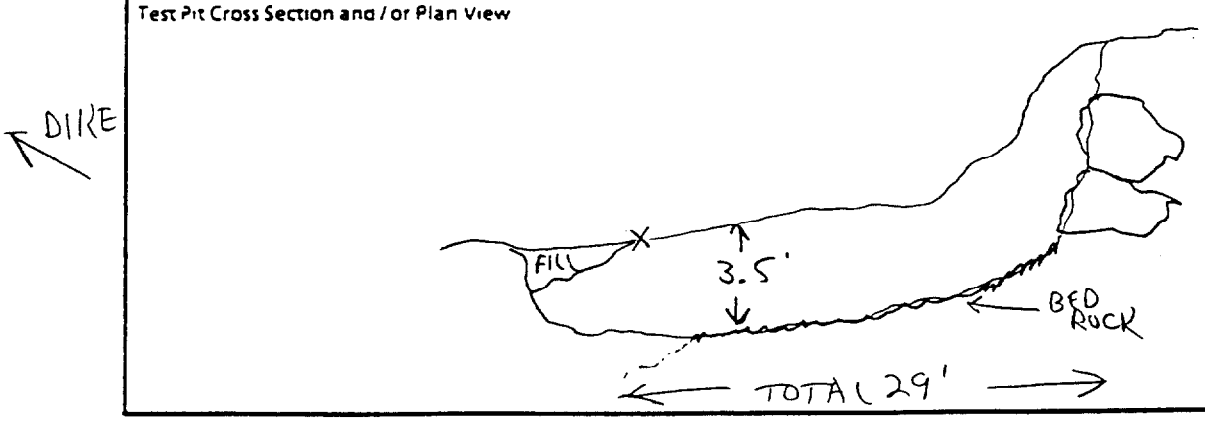
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB-NLON TEST PIT NO.: LF TP 05
PROJECT NO.: 5082 DATE: 2.14.95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

	DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
START 1635	0		FROZEN SOIL COBBLES / GRAVEL	GW	
			BOULDERS 2'+ ø	↓	
	2		BRN	↓	
	4	≡			
END 1745					HNU IN BREATHING ZONE
					<0.1 PPM

Test Pit Cross Section and / or Plan View



REMARKS X STAKE LIMIT OF LANDFILL
FILL = DISTURBED SOIL, SOME FELT PAPER, WOOD
NOT MUCH "GARBICH" MOSTLY SOIL FILL

PHOTO LOG 05 STAMP, 3 PHOTOS TEST PIT TP 05

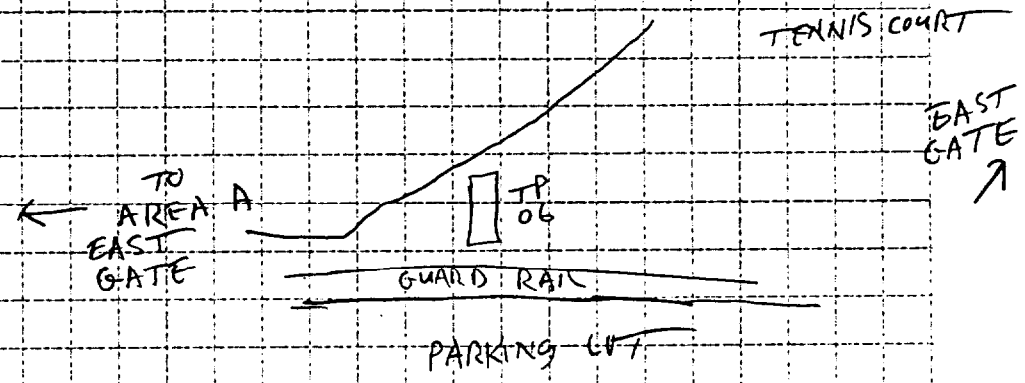
PIT BACK FILLED WITH EXCAVATED MATERIAL PAGE 1 OF 1

CALCULATION WORKSHEET Order No. 19116 (01-91) PAGE ____ OF ____

CLIENT: NSB - NLON	JOB NUMBER: 5082
SUBJECT: LF TP 06	
BASED ON:	DRAWING NUMBER: LF-TP-06
BY: KES	CHECKED BY:	APPROVED BY:	DATE: 2.15.95

START 1040 DIGGING BETWEEN FENCE & GUARD RAIL
BACK HOE IS SITTING ON PARKING LOT

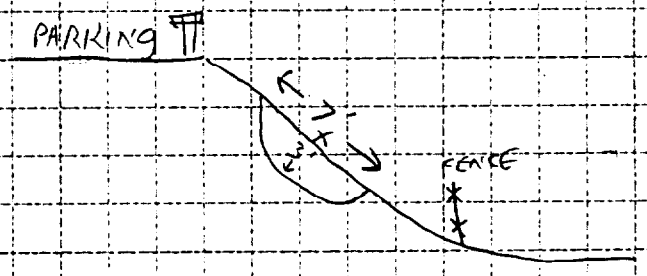
END 1125



LT BRN
GM
MAX GRAVEL 10" Ø

PIT BACKFILLED WITH EXCAVATED MATERIAL

2LMW200/S



ALL CLEAN FILL SAND, DIRT, ROCK
NEED TO MOVE NORTH, ON OTHER SIDE OF FENCE.

3 PHOTOS END OF ROLL

HNU IN BREATHING ZONE <0.1 PPM

X = STAKE FOR SURVEY ONLY, NOT A LIMIT OF LANDFILL

TEST PIT LOG — **HALLIBURTON NUS**

PROJECT: NSB-NGN — TEST PIT NO.: LF-TP-07

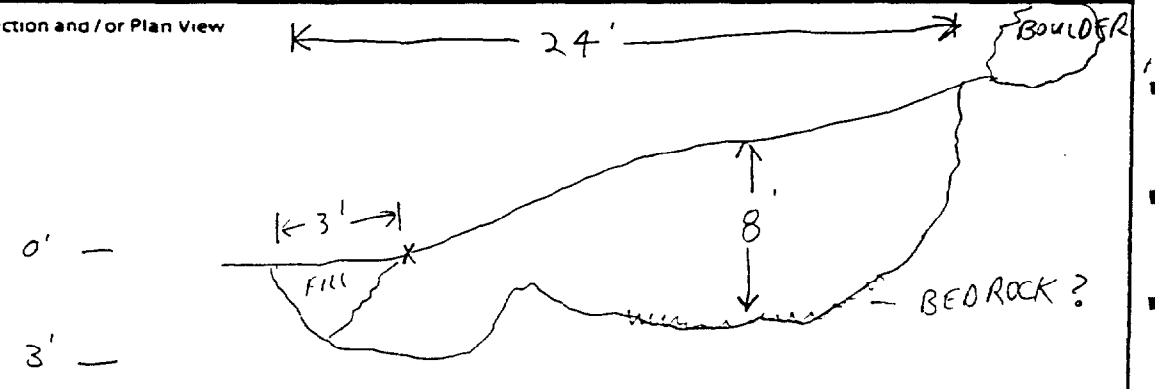
PROJECT NO.: 5082 — DATE: 2.15.95

LOCATION: AREA A

FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	BEDROCK LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS (HNM MAX)
0		BRN SOIL / SAND	SM	ROOTS <0.1 PPM
			↓	IN BREATHING ZONE
2		BRN LG. BOULDERS	GW	
		4+ Ø GRAVEL		
4				
6		BRN/GRAY BOULDERS	GW	GRAVEL TURNING
		3-4' Ø GRAVEL	↓	SUB ANGULAR
8				
	?			
10		BEDROCK ?		

Test Pit Cross Section and / or Plan View



REMARKS 07 IS BETWEEN 02 & 03 SW CENTER OF DEPRESSED PARKING
START 1450 END 1540
PIT BACKFILLED WITH EXCAVATED MATERIAL
FILL = PLASTIC, SOIL, CANS, GLASS

PHOTO LOG 07 STAMP, + 2 PHOTOS — TEST PIT 07

X = STAKE LIMIT OF LANDFILL — PAGE 1 OF 1

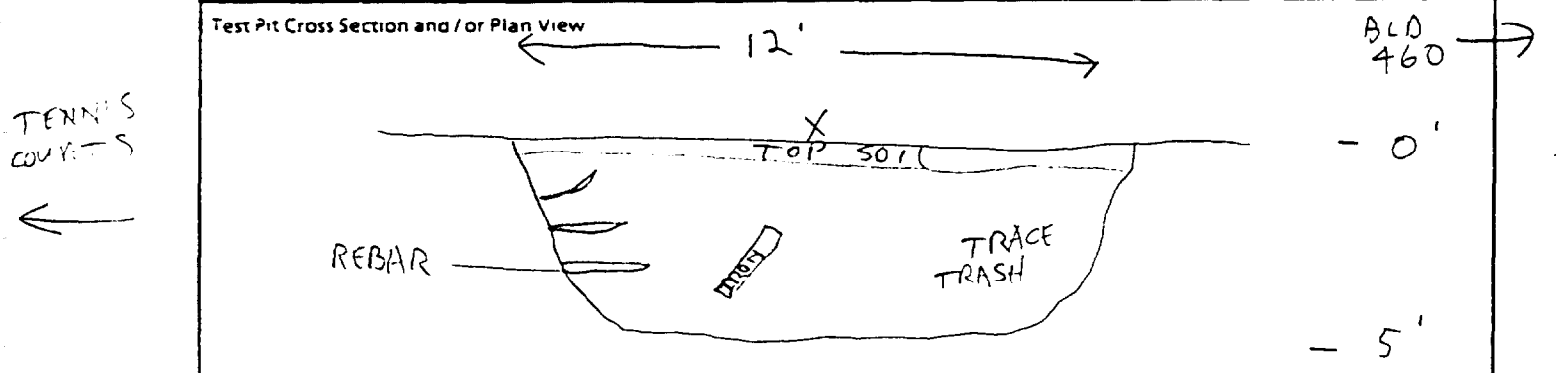
TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB: NLON TEST PIT NO.: LF-TP-08
PROJECT NO.: 5082 DATE: 2-16-95
LOCATION: AREA A LANDFILL
FIELD GEOLOGIST: K. SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS (TOP 8" FROZEN)
0		DARK BRN	SM	GRASS TOPSOIL
.5		BRN SILT & SAND FILL	GM	CLEAN FILL SAND/
1				SOIL - SOME COBBLES
				1' Ø MAX
2		BRN SILT & SAND		LARGER COBBLES & SOME BOULDERS
		GRAVEL / COBBLES		3' Ø
3				
				TRACE TRASH PLASTIC/CANS
4				WITH STEEL REBAR
5				PIPE
6				

½'

Test Pit Cross Section and / or Plan View



PIT BACKFILLED WITH EXCAVATED MATERIAL

REMARKS START 0820 END 0905
NO HNU READINGS MAX < 0.1 IN BREATHING ZONE
WEST OF TENNIS COURTS & ≈100YDS NORTH OF RACQUET CLUB
PHOTO LOG 08 STARTP., PIBTOS 1 LOOKING N.E.
1 LOOKING S.W.
TEST PIT TP-08
X = STAKE FOR SURVEY ONLY NOT A LIMIT OF LANDFILL
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

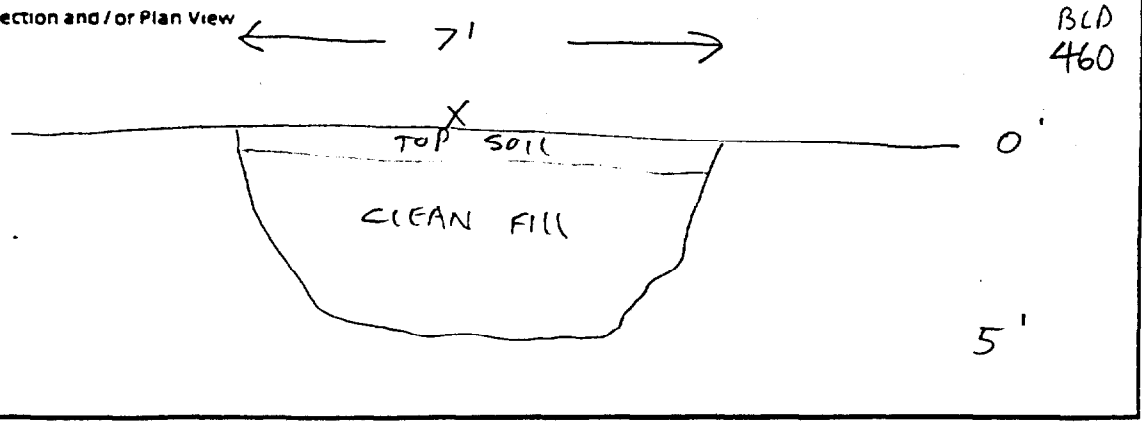
PROJECT: NSB-NLON TEST PIT NO.: LFTP 09
PROJECT NO.: 5082 DATE: 2.16.95
LOCATION: AREA A LANDFILL (TENNIS COURT RACQUET BALL AREA)
FIELD GEOLOGIST: KEITH SIMPSON

(1/2)

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0				8' FROZEN ON TOP
.5		TOP SOIL DARK BRN	SM	TOP SOIL LAWN
1			GW	↑
		SILT/SAND BRN		
2		SOME GRAVEL MAX 8" Ø		CLEAN FILL
				NO TRASH
3				
4				
5				
6				

Test Pit Cross Section and / or Plan View

TENNIS COURTS ←



REMARKS START 0915 END 1010 MAX HNU <0.1
PIT BACKFILLED WITH EXCAVATED MATERIAL
CENTER OF LAWN TENNIS COURT RACQUET BALL AREA

PHOTO LOG 09 STAMP, 2 PHOTOS TEST PIT 09

X = STAKE FOR SURVEY NO LIMIT OF LANDFILL FOUND PAGE 1 OF 1

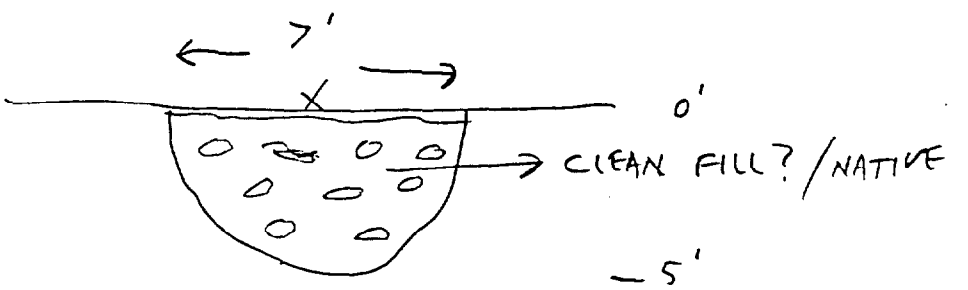
TEST PIT LOG

HALLIBURTON NUS

PROJECT: NSB-NLON TEST PIT NO.: LF TP 10
PROJECT NO.: 5082 DATE: 2.16.95
LOCATION: AREA A, BETWEEN TENNIS COURTS & RT 12
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0'				
.5		GRAVEL ROAD BED	GP	ICE, GRAVEL, EDGE OF ROAD GAV
1		BRN SAND & GRAVEL	GM	
		MAX 7' Ø		FILL? - INCONCLUSIVE
2				COULD BE NATIVE
				UNDISTURBED SOIL
3				OR FILL
4				WILL NEED TO MOVE W.
				INBOARD TO CONFIRM
5				
6				

Test Pit Cross Section and / or Plan View



REMARKS START 1055 END 135 MAX HNU <0.1 PPM
PIT BACKFILLED WITH EXCAVATED MATERIAL

BETWEEN TENNIS COURTS & BASE FENCE (RT 12 SIDE) DIGGING UP CLOSE TO FENCE
CENTERED BETWEEN THE 2 COURTS

PHOTO LOG 10 STAMP, +2 PHOTOS TEST PIT TP 10

X = STAKE FOR SURVEY ONLY NO LIMIT OF LANDFILL FOUND

PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB: NION TEST PIT NO.: LF-TP-11

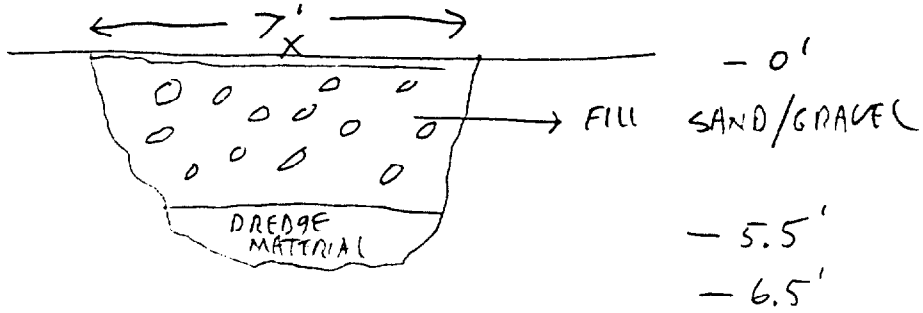
PROJECT NO.: 5082 DATE: 2.16.95

LOCATION: AREA A LANDFILL PERIMETER RD (BETWEEN TENNS CTR. & RT 12)

FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		BRN SAND & GRAVEL MAX 6" ⌀	GW	GRAVEL & WEEDS - 4" ON TOP
.5				
1				
		FILL "CLEAN"		
2				
3				
4				
5				
6		DREDGE MATERIAL	OH	
		DARK BRN TO BLACK		
7				

Test Pit Cross Section and / or Plan View



REMARKS START 1140 MAX HNU <0.1 PPM
HNU READING OF DREDGE MATERIAL <0.1

PHOTO LOG 11 STAMP, + 2 PHOTOS TEST PIT 11

X = STAKE FOR SURVEY ONLY NO LIMIT OF LANDFILL FOUND

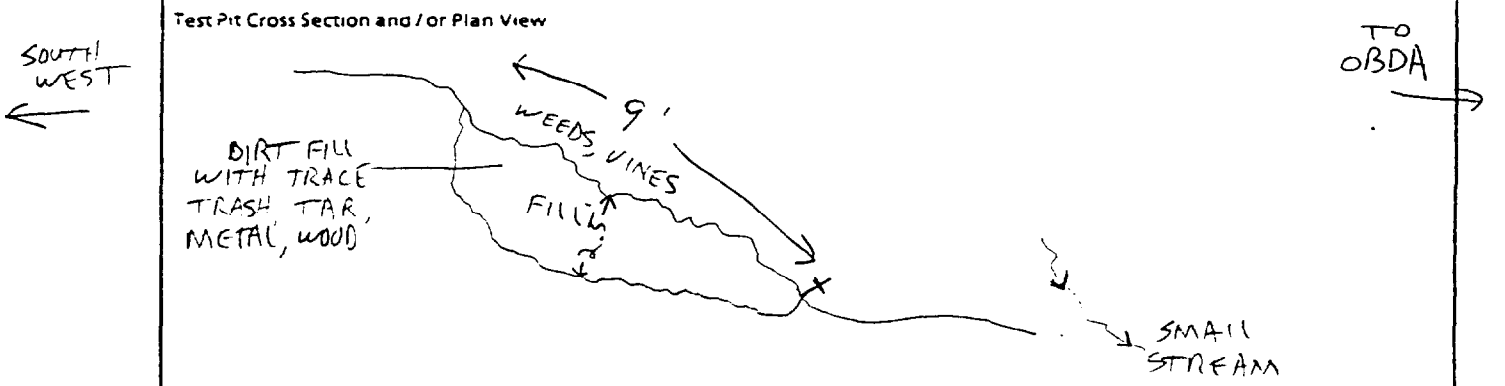
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB-NLON TEST PIT NO.: LF-TP-12
PROJECT NO.: 5082 DATE: 2.16.95
LOCATION: AREA A LANDFILL
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0				
0.5		SAND TR SILT	GM	WEEDS VINES
1		SOME GRAVEL	↓	
2		TRACE TRASH: TAR, WOOD		
		METAL		
3				
4				

Test Pit Cross Section and / or Plan View



REMARKS FAR WEST END OF LANDFILL CLOSE TO WAHOO GATE

START 1320 END 1355 MAX HNU < 0.1

PHOTO LOG 12 STAMP, 2 PHOTOS TEST PIT TP 12

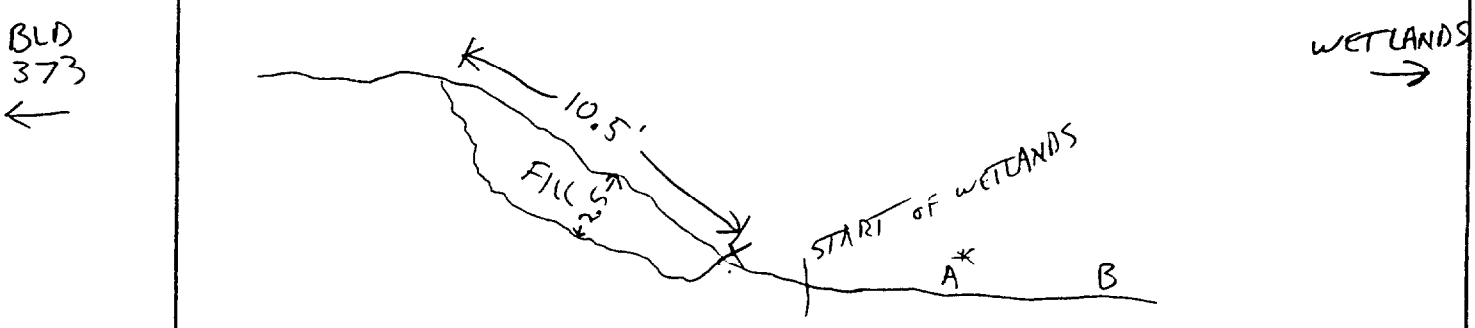
X = STAKE LIMIT OF LANDFILL ≈ 3' FROM STREAM PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB - NLON TEST PIT NO.: LT-TP-13
PROJECT NO.: 5082 DATE: 2-16-95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		FILL	GW	WEEDS, VINES
.5				LT BRN (WITH TRASH)
1				FILL = DIRT ROCK
				SAND BAGS, PLASTIC
2				WOOD, GLASS, METAL
				(DIRT + TRASH)
3				
4				

Test Pit Cross Section and / or Plan View



LIMIT OF LANDFILL IS A FILL WETLANDS INTERFACE

REMARKS START 1400 END 1445 MAX HNU <0.1PPM
CLEARED LT. BRUSH + SM. TREES TO GAIN ACCESS
SOUTH OF DIKE & NORTH OF WELLS 2LMW95/D

PHOTO LOG 13 STAMP, X=STAKE TEST PIT 13

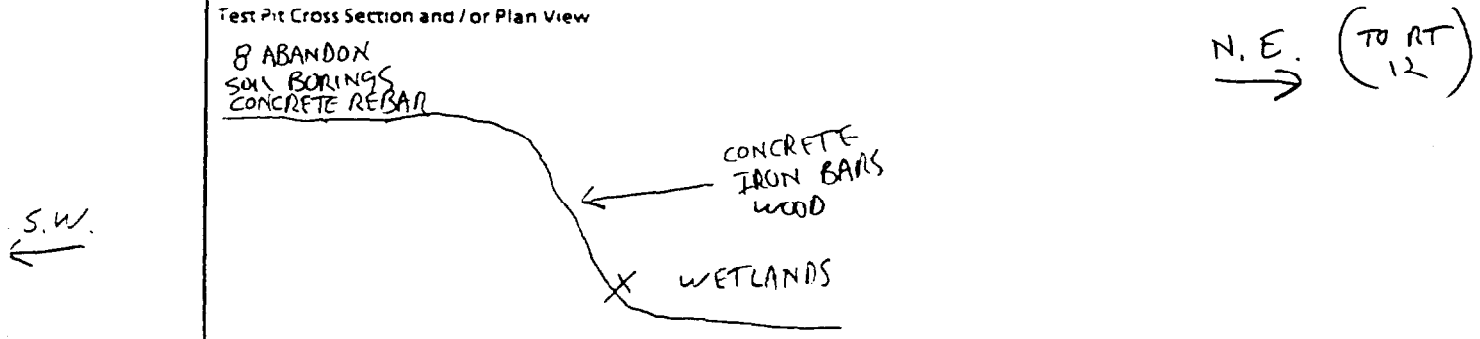
*A = TRANSECT 1 A B = TRANSECT 1 B PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB- NLON TEST PIT NO.: LF-TP-14
PROJECT NO.: 5082 DATE: 2.16.95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		SEE PHOTOS		
		AND BORING LOGS		
				NO HNU NEEDED
				(NO DIGGING)

Test Pit Cross Section and / or Plan View



LIMIT OF LANDFILL IS AT LANDFILL WETLANDS INTERFACE

REMARKS NO BACK HOE WORK STAKE AT LIMIT OF LANDFILL FOR SURVEY.

X = STAKE

PHOTO LOG

TEST PIT 14

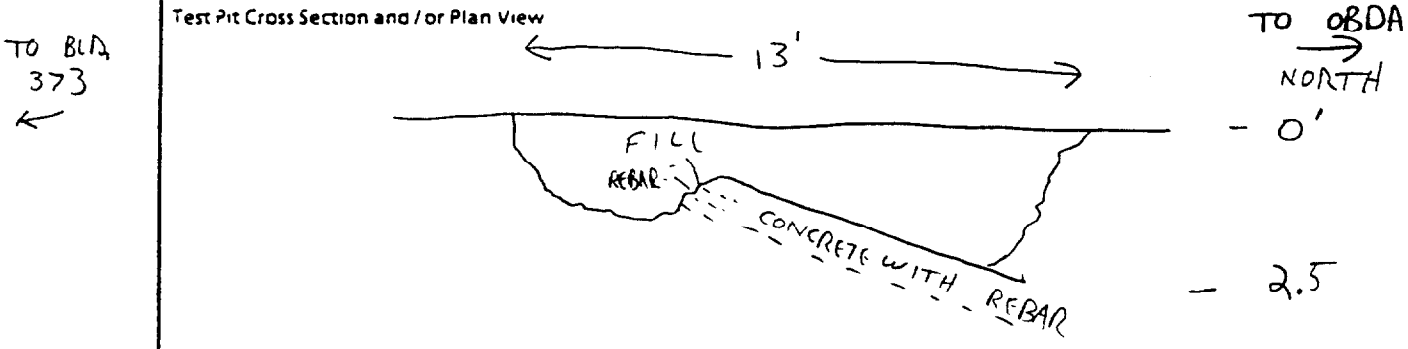
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB - NION TEST PIT NO.: LF-TP-15
PROJECT NO.: 5082 DATE: 2:17:95
LOCATION: AREA A LANDFILL (WEST END)
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		SAND FILL	GM	BRN
.5				
1		FILL SAND GRAVEL, CONCRETE		WATER SEEPING INTO
		TRACE WOOD		PIT ≈ 1' WATER IN BTM
2				
3				
4				

Test Pit Cross Section and / or Plan View



REMARKS START 0820 END 0910
≈ 50' BACK FROM THE OBDA HILL SIDE
MAX HNU IN BREATHING ZONE = <0.1 PPM
PHOTO LOG 15 STAMP, + 2 (DISCARD LAST PICTURE ON ROLL 2) TEST PIT 15

PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB - NLON TEST PIT NO.: LF-TP-16
PROJECT NO.: 5082 DATE: 2.17.95
LOCATION: AREA A LANDFILL (WEST END)
FIELD GEOLOGIST: KEITH SIMPSON

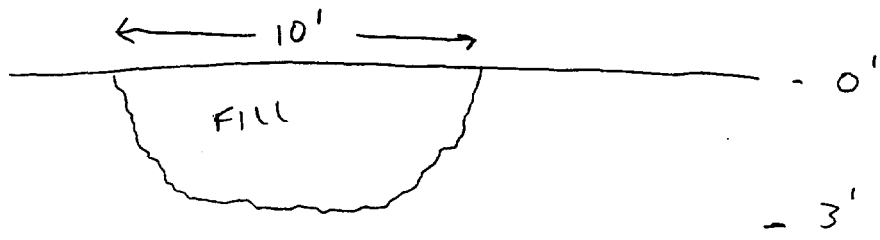
BLD 373

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	DIKE ← ☐ SAND BAGS ON PALLETS ☐ ☐ REMARKS ☐ ☐ ☐ ☐ ☐ TP16 OBDA
0				
.5	FILL		SP	FRZ. SAND
1			GW	LT. BRN.
		FILL = SAND, GRAVEL		SOME BRICK, CONCRETE
2		BOULDERS 2.5' Ø MAX		REBAR
		BRICKS, REBAR		
3				
4				
5				

Test Pit Cross Section and / or Plan View

TO BLD 373

TO DIKE ← N. E



REMARKS START 0913 END 1000

MAX HNU = <0.1 PPM IN BREATHING ZONE

PHOTO LOG 16 STAMP + 2 PHOTOS
1ST PHOTO ROLL 3

TEST PIT 16

PAGE 1 OF 1

TEST PIT LOG — **HALLIBURTON NUS**

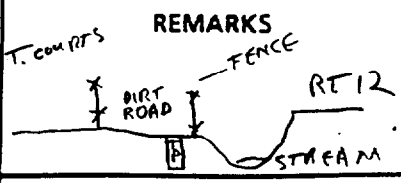
PROJECT: NSB-NLON — TEST PIT NO.: LF-TP-17

PROJECT NO.: 5082 — DATE: 2.17.95

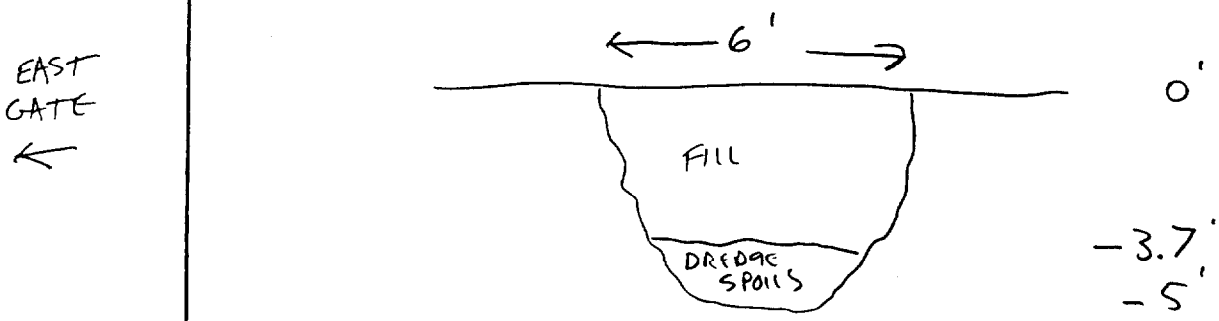
LOCATION: AREA A LANDFILL

FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		GRAVEL & SAND	GW	GRAVEL ROAD
1		MAX 6" Ø		BRN SAND & GRAVEL
		BRN		FILL
2				
		SOME METAL		
3		IN FILL		
4			OH	
		DREDGE SPOILS		
5		DARK BRN		
6				



Test Pit Cross Section and / or Plan View



REMARKS START 1020 END 1100

MAX HNU IN BREATHING ZONE = <0.1 PPM — DREDGE SPOILS 3 PPM

PHOTO LOG 17 STAMP + 2

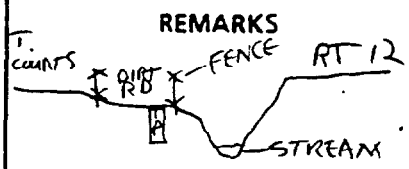
TEST PIT 17

PAGE 1 OF 1

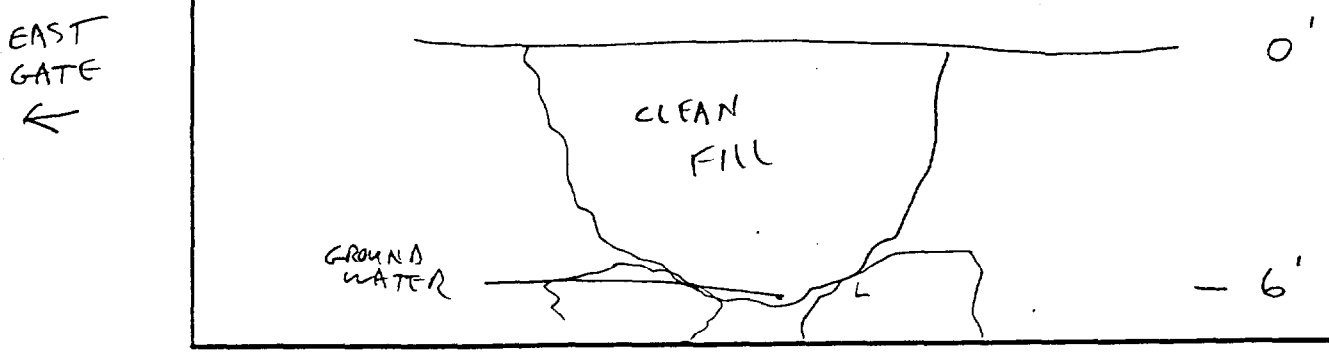
TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB - NION TEST PIT NO.: LF TP-18
PROJECT NO.: 5082 DATE: 2.17.95
LOCATION: AREA A LANDFILL
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		SAND & GRAVEL	GW	GRAVEL ROAD
		A FEW BOULDERS		LT BRN
1		3' Ø MAX		
2				
3				
				CLEAN FILL ALL THE
4				WAY DOWN WANTED
				TO GO DEEPER TO SEE
5				IF THE DREDGE SPOILS
				ARE AT ± 8' BUT
6		GROUND BTM. 2" WATER		LG BOULDERS AND CONCERN
				OF LOSING A FENCE POST.
7				STOPPED PIT AT 6'
				MOVING TO OTHER SIDE OF GRAVEL ROAD



Test Pit Cross Section and / or Plan View



REMARKS START 1105 END 1205

MAX HNU IN BREATHING ZONE < 0.1 PPM

PHOTO LOG 18 STAMP, + 2 PHOTOS

TEST PIT 18

PAGE 1 OF 1

TEST PIT LOG — **HALLIBURTON NUS**

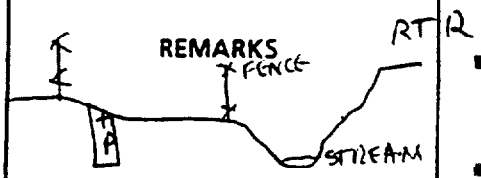
PROJECT: NSB - NLON — TEST PIT NO.: LF-TP-19

PROJECT NO.: 5082 — DATE: 2.17.95

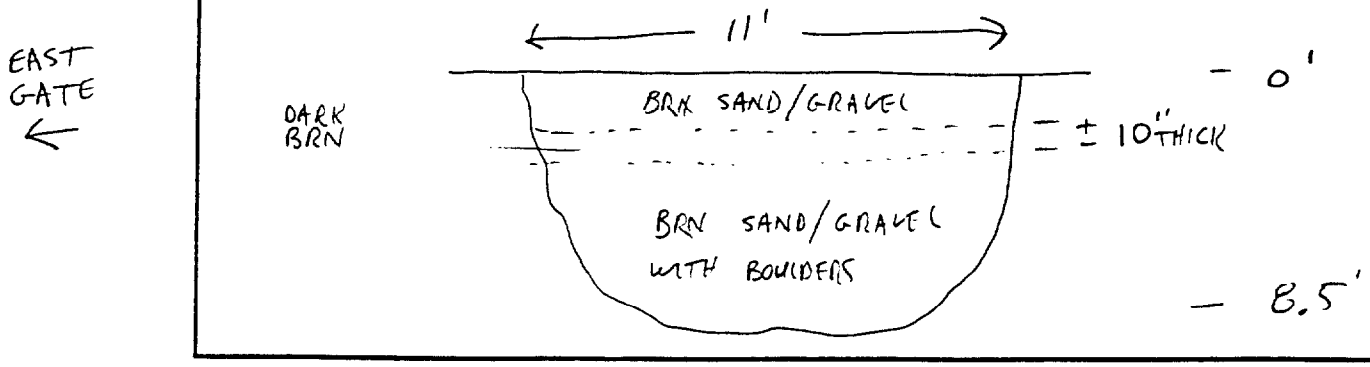
LOCATION: AREA A LANDFILL

FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		BRN SAND & GRAVEL	GW	LAWN TOP SOIL 1ST 4"
1			↓	
2				
3		DARK BRN SAND & SILT	GM	DREDGE SPOILS MIXED
4			GW	WITH FILL
5		BRN SAND & GRAVEL		
6		BOULDERS 3' Ø MAX		
7				
8			↓	GROUND WATER ± 7.8'
9				



Test Pit Cross Section and / or Plan View



REMARKS START 1320 END 1410

MAX HNU IN BREATHING ZONE = < 0.1 PPM

PHOTO LOG 19 STAMP, +2

TEST PIT 19

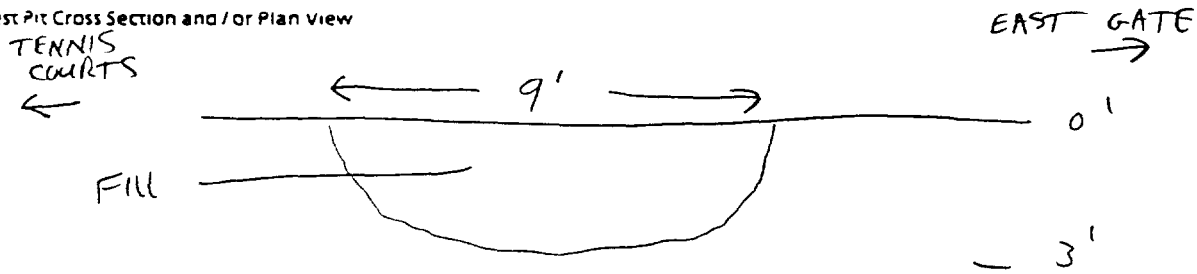
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB - NLON TEST PIT NO.: LF-TP-20
PROJECT NO.: 5082 DATE: 2.17.95
LOCATION: AREA A
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		DARK BRN	SM	LAWN, GRASS
1		SAND SOME GRAVEL	GM	
2		DARK BRN TO GRAY SILT /	↓	
3		SAND		
4				
				FILL = CLEAN SAND
				AND GRAVEL
				ONE PIECE REBAR
				½" X 4' AND
				SOME WOOD

Test Pit Cross Section and / or Plan View



REMARKS START 1500 END 1525

MAX HNU IN BREATHING ZONE

PHOTO LOG 20 STAMP + 1 TEST PIT 20

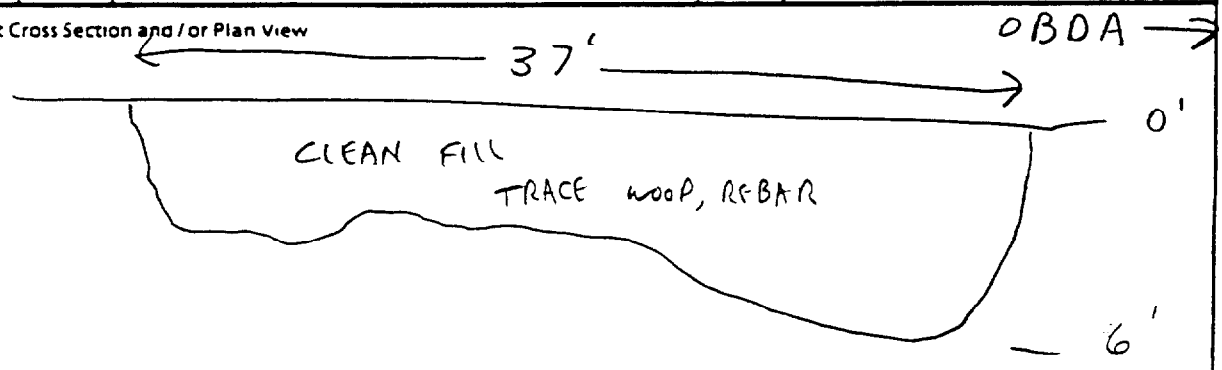
BETWEEN HAND BALL COURT AND RACQUET COURT PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NSB- NLON TEST PIT NO.: LF-TP. 21
PROJECT NO.: 5082 DATE: 2.17.95
LOCATION: AREA A LANDFILL (WEST END)
FIELD GEOLOGIST: KEITH SIMPSON

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0				
1		GRAVEL - SAND - SILT	SW	LT BRN
2		MIXTURE		MORE SAND IN THIS
3		TRACE WOOD REBAR		AREA
4		SAND BAGS, BRICK		
5				
6				

Test Pit Cross Section and / or Plan View



REMARKS START 1530 END 1615
TEST PIT IN BETWEEN WELLS 21MW13D/13S
MAX HNU IN BREATHING ZONE <0.1 PPM
PHOTO LOG 21 STAMP, +2

TEST PIT 21

PAGE 1 OF 1

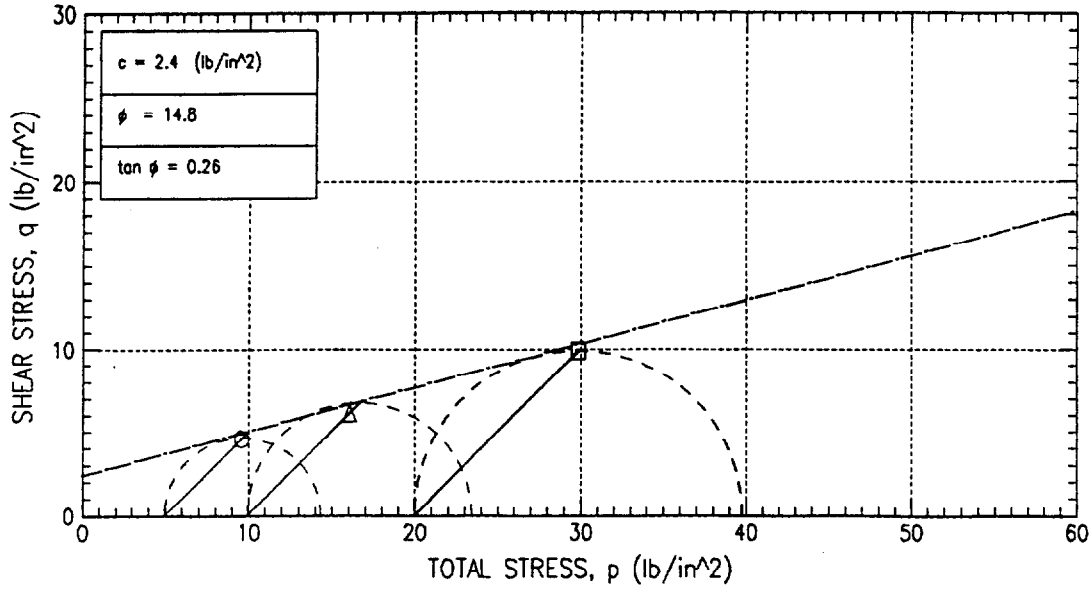
APPENDIX E

GEOTECHNICAL TESTING REPORT

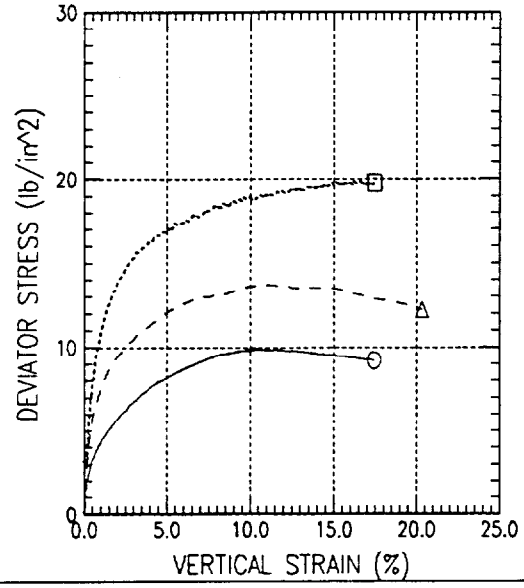
GeoTesting Express

Rapid Testing of Soils
for Geotechnical and
Physical Properties

10 Craig Road
Acton, Massachusetts 01720
508-635-0424
FAX 508-635-[illegible]



FAILURE SKETCHES



SYMBOL		○	△	□	
TEST NO.		CU1	CU3	CU4	
INITIAL	WATER CONTENT (%)	58.41	60.48	59.44	
	DRY DENSITY (lb/ft^3)	63.54	62.32	63.93	
	SATURATION (%)	96.61	96.94	99.27	
	VOID RATIO	1.602	1.653	1.587	
BEFORE SHEAR	WATER CONTENT (%)	57.68	57.54	51.02	
	DRY DENSITY (lb/ft^3)	65.41	65.70	66.04	
	SATURATION (%)	100.04	100.53	89.89	
	VOID RATIO	1.528	1.517	1.504	
	BACK PRESS. (lb/in^2)	69.98	79.01	40.99	
MINOR PRIN. STRESS (lb/in^2)		4.94	9.99	20.00	
MAX. DEV. STRESS (lb/in^2)		9.93	13.75	19.88	
TIME TO FAILURE (min)		76	72	114	
RATE OF STRAIN INCR (%/min)		0.15	0.15	0.15	
INITIAL DIAMETER (in)		2.85	2.85	2.86	
INITIAL HEIGHT (in)		6.33	5.78	5.69	
B-VALUE		0.95	0.95	0.95	

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey SILT 2) Gray clayey SILT 3) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

REMARKS:

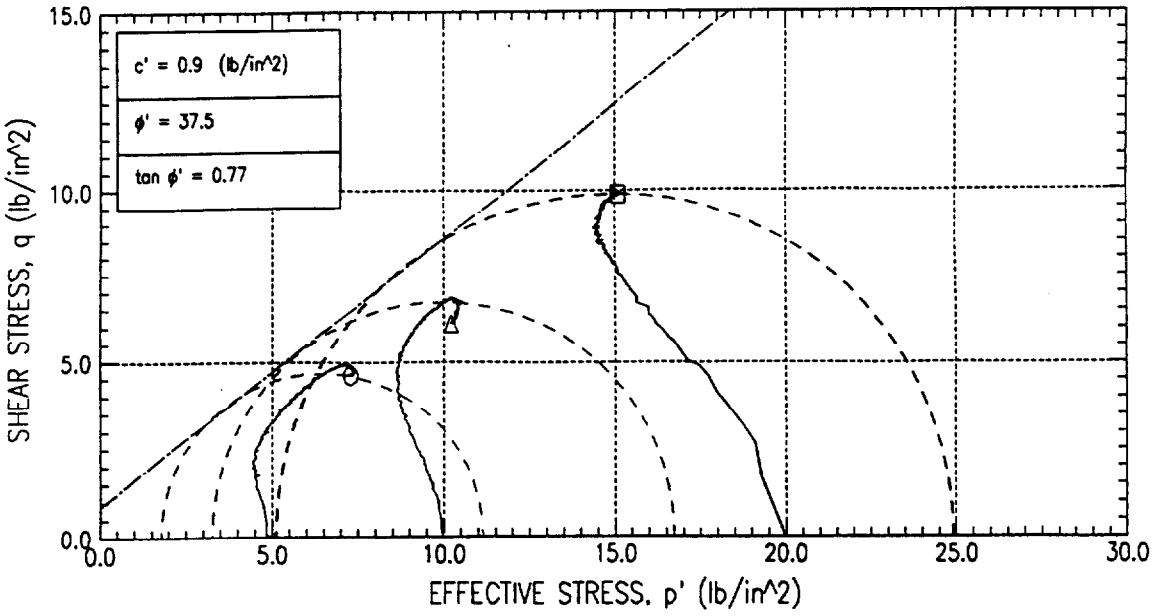
1) Confining Pressure = 5 psi

2) Confining Pressure = 10 psi

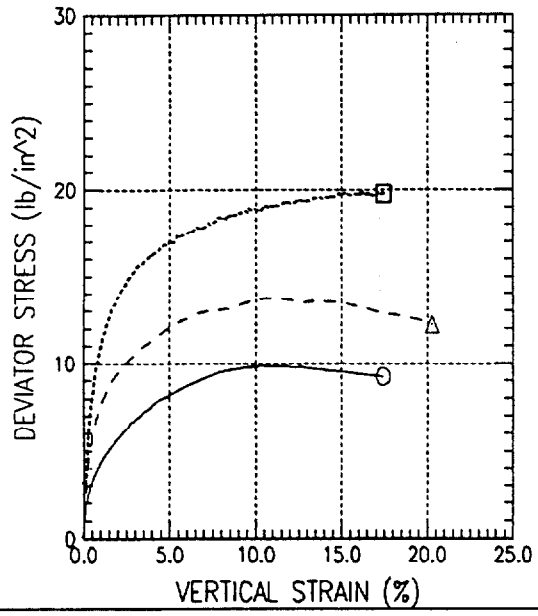
3) Confining Pressure = 20 psi

PROJECT Naval Sub Base					
PROJECT NO.CTX-720					
BORING NO. ---	SAMPLE NO.	LF-SB01-21	LF-SB01-21	LF-SB01-21	
TECH. rh	DEPTH/ELEV	---	---	---	
LABORATORY	DATE	02/24/95	02/28/95	03/01/95	

TRIAXIAL COMPRESSION TEST REPORT



FAILURE SKETCHES



SYMBOL		○	△	□
TEST NO.		CU1	CU3	CU4
INITIAL	WATER CONTENT (%)	58.41	60.48	59.44
	DRY DENSITY (lb/ft^3)	63.54	62.32	63.93
	SATURATION (%)	96.61	96.94	99.27
	VOID RATIO	1.602	1.653	1.587
BEFORE SHEAR	WATER CONTENT (%)	57.68	57.54	51.02
	DRY DENSITY (lb/ft^3)	65.41	65.70	66.04
	SATURATION (%)	100.04	100.53	89.89
	VOID RATIO	1.528	1.517	1.504
	BACK PRESS. (lb/in^2)	69.98	79.01	40.99
MINOR PRIN. STRESS (lb/in^2)		4.94	9.99	20.00
MAX. DEV. STRESS (lb/in^2)		9.93	13.75	19.88
TIME TO FAILURE (min)		76	72	114
RATE OF STRAIN INCR (%/min)		0.15	0.15	0.15
INITIAL DIAMETER (in)		2.85	2.85	2.86
INITIAL HEIGHT (in)		6.33	5.78	5.69
B-VALUE		0.95	0.95	0.95

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey SILT 2) Gray clayey SILT 3) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

REMARKS:

1) Confining Pressure = 5 psi

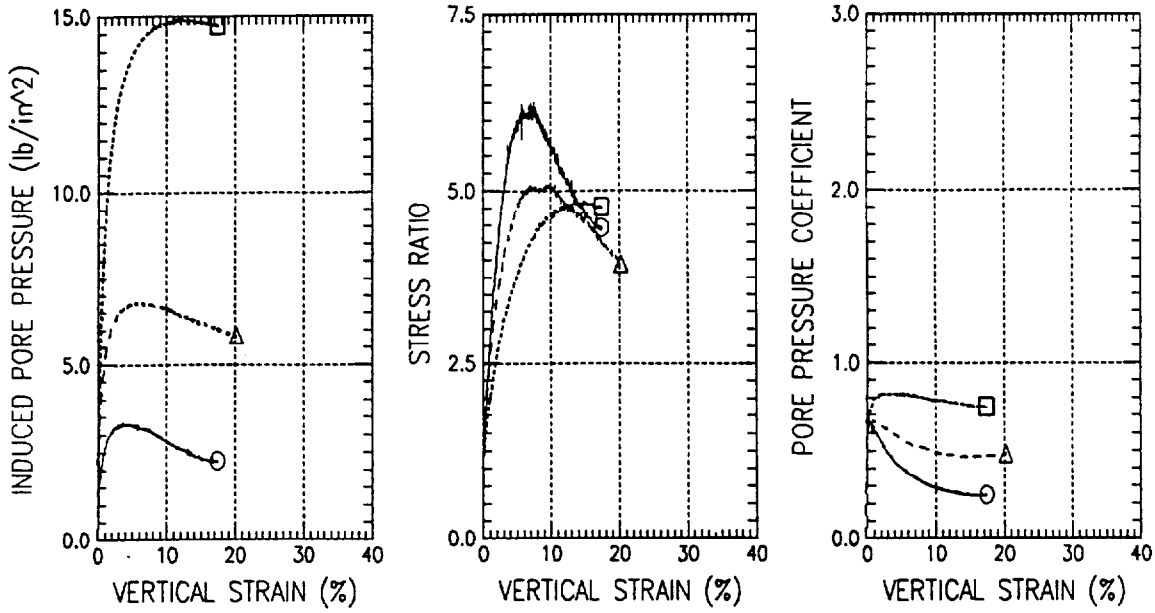
2) Confining Pressure = 10 psi

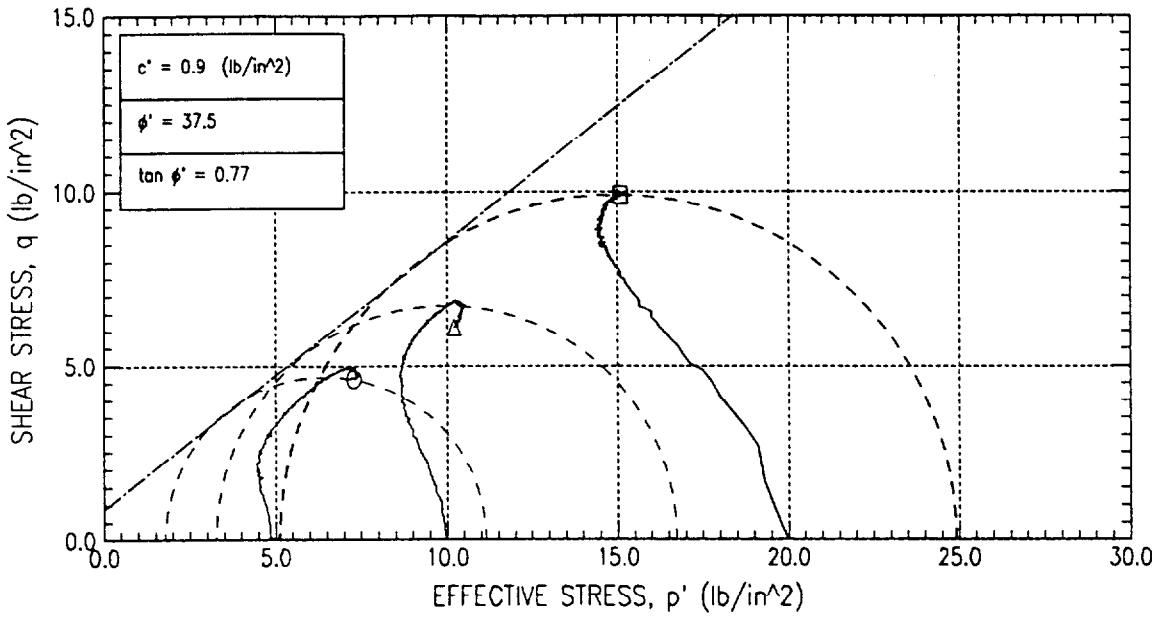
3) Confining Pressure = 20 psi

PROJECT Naval Sub Base					
PROJECT NO.GTX-720					
BORING NO. ---	SAMPLE NO.	LF-SB01-21	LF-SB01-21	LF-SB01-21	
TECH. rh	DEPTH/ELEV	---	---	---	
LABORATORY	DATE	02/24/95	02/28/95	03/01/95	

TRIAXIAL COMPRESSION TEST REPORT

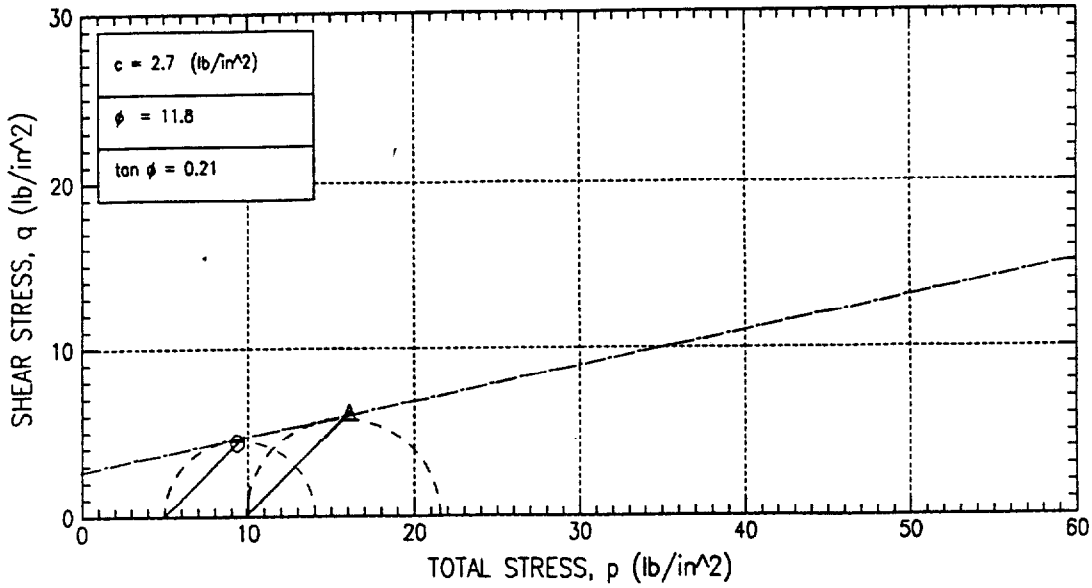
CONSOLIDATED UNDRAINED TRIAXIAL TEST



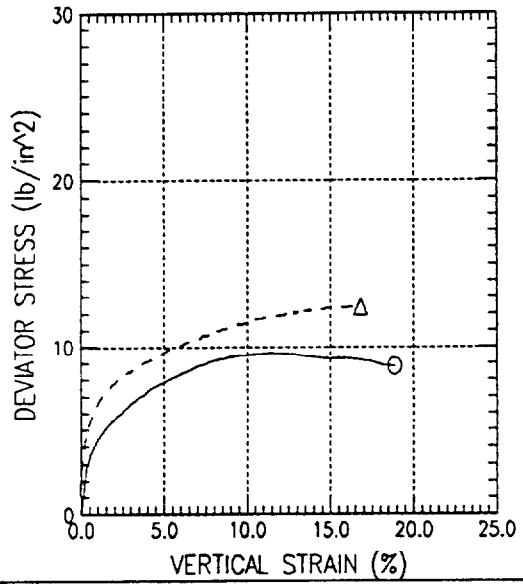


Project Name : Naval Sub Base

Boring No:	Sample No Depth	Test No	Filename	Symbol
---	LF-SB01-21--	CU1	720-cu1.asc	○
---	LF-SB01-21--	CU3	720-cu3.asc	△
---	LF-SB01-21--	CU4	720-cu4.asc	□



FAILURE SKETCHES



SYMBOL		O	Δ		
TEST NO.		CU-2	CU-5		
INITIAL	WATER CONTENT (%)	57.57	60.39		
	DRY DENSITY (lb/ft^3)	63.14	62.86		
	SATURATION (%)	94.24	98.14		
	VOID RATIO	1.619	1.631		
BEFORE SHEAR	WATER CONTENT (%)	56.17	53.44		
	DRY DENSITY (lb/ft^3)	66.43	64.47		
	SATURATION (%)	99.96	90.50		
	VOID RATIO	1.489	1.565		
	BACK PRESS. (lb/in^2)	79.05	60.97		
MINOR PRIN. STRESS (lb/in^2)		4.95	9.96		
MAX. DEV. STRESS (lb/in^2)		9.70	12.46		
TIME TO FAILURE (min)		87	257		
RATE OF STRAIN INCR (%/min)		0.15	0.05		
INITIAL DIAMETER (in)		2.85	2.86		
INITIAL HEIGHT (in)		5.78	5.67		
B-VALUE		0.95	0.95		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey SILT 2) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

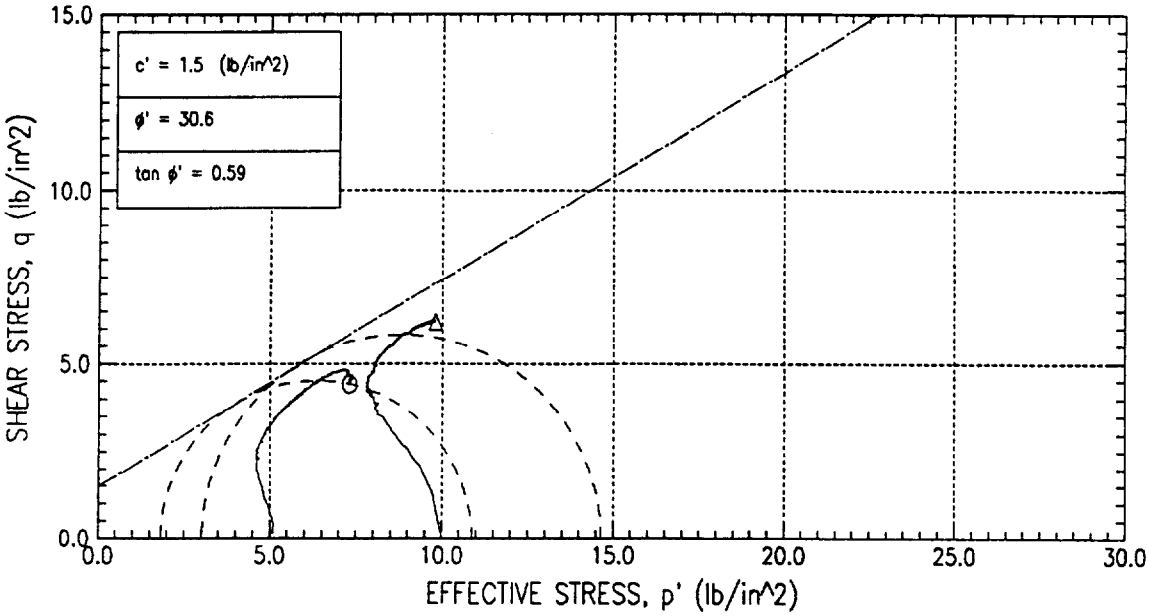
REMARKS:

1) Confining Pressure = 5 psi

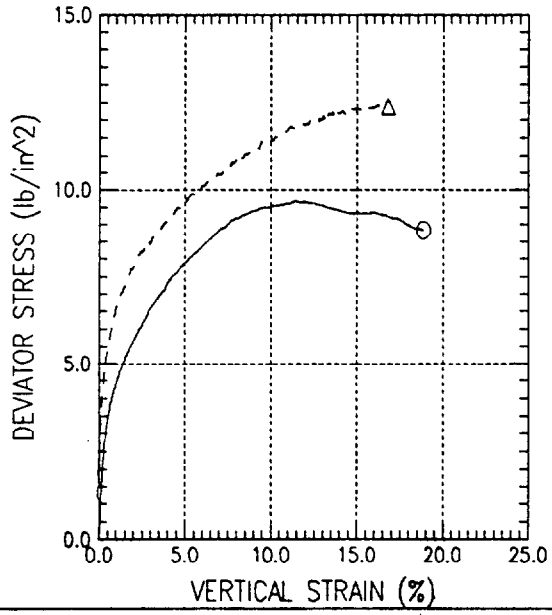
2) Confining Pressure = 10 psi

PROJECT Naval Sub Base				
PROJECT NO.GTX-720				
BORING NO. ---	SAMPLE NO.	LF-SB01-23	LF-SB01-23	
TECH. rh	DEPTH/ELEV	---	---	
LABORATORY	DATE	02/24/95	03/04/95	

TRIAXIAL COMPRESSION TEST REPORT



FAILURE SKETCHES



SYMBOL		O	Δ		
TEST NO.		CU-2	CU-5		
INITIAL	WATER CONTENT (%)	57.57	60.39		
	DRY DENSITY (lb/ft^3)	63.14	62.86		
	SATURATION (%)	94.24	98.14		
	VOID RATIO	1.619	1.631		
BEFORE SHEAR	WATER CONTENT (%)	56.17	53.44		
	DRY DENSITY (lb/ft^3)	66.43	64.47		
	SATURATION (%)	99.96	90.50		
	VOID RATIO	1.489	1.565		
	BACK PRESS. (lb/in^2)	79.05	60.97		
MINOR PRIN. STRESS (lb/in^2)		4.95	9.96		
MAX. DEV. STRESS (lb/in^2)		9.70	12.46		
TIME TO FAILURE (min)		87	257		
RATE OF STRAIN INCR (%/min)		0.15	0.05		
INITIAL DIAMETER (in)		2.85	2.86		
INITIAL HEIGHT (in)		5.78	5.67		
B-VALUE		0.95	0.95		

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray clayey SILT 2) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

REMARKS:

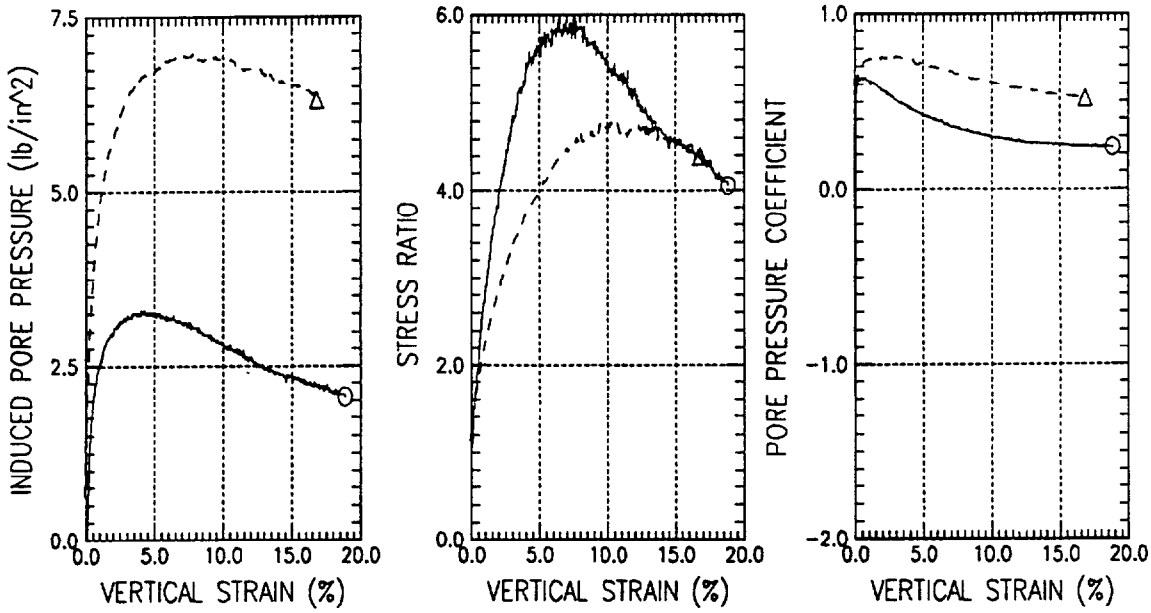
1) Confining Pressure = 5 psi

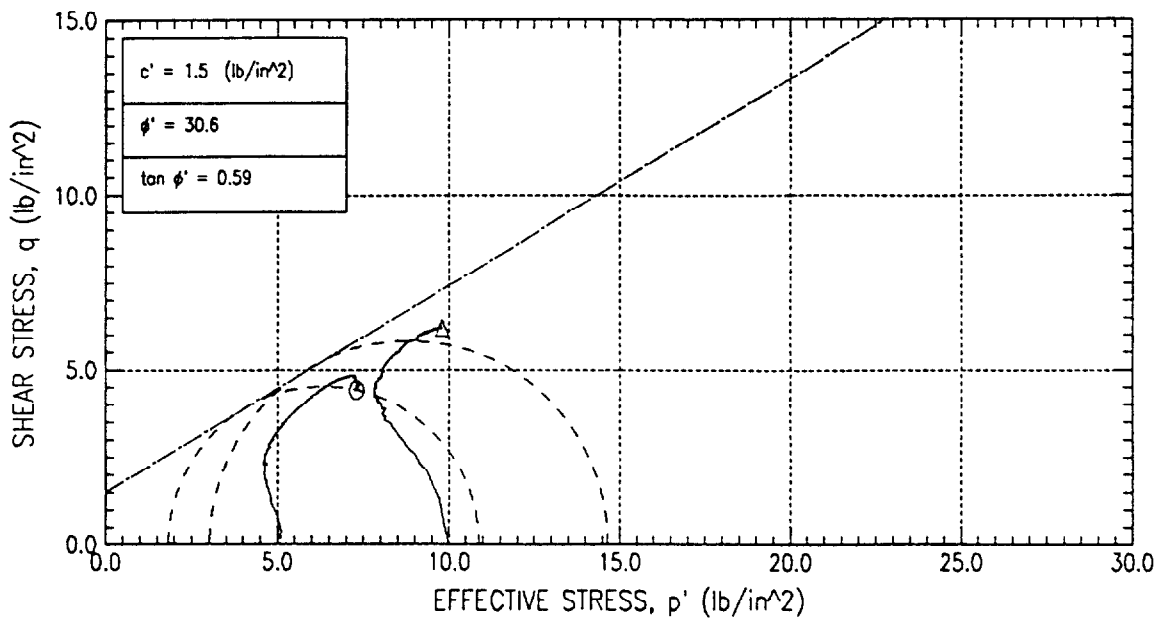
2) Confining Pressure = 10 psi

PROJECT Naval Sub Base			
PROJECT NO.CTX-720			
BORING NO. ---	SAMPLE NO.	LF-SB01-23	LF-SB01-23
TECH. rh	DEPTH/ELEV	---	---
LABORATORY	DATE	02/24/95	03/04/95

TRIAXIAL COMPRESSION TEST REPORT

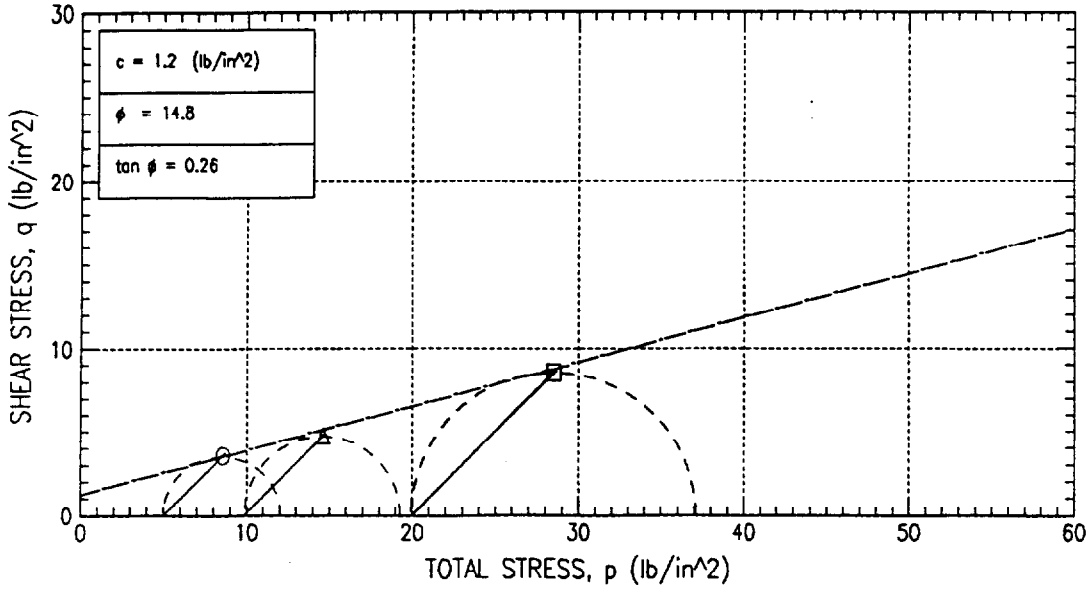
CONSOLIDATED UNDRAINED TRIAXIAL TEST



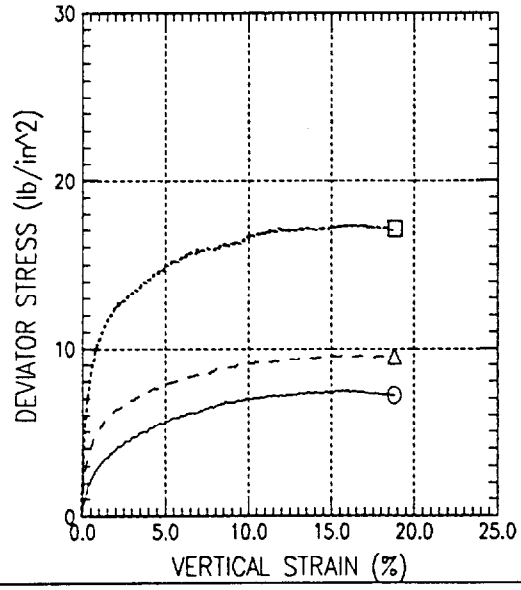


Project Name : Naval Sub Base

Boring No:	Sample No Depth	Test No	Filename	Symbol
---	LF-SB01-23--	CU-2	720-cu2.asc	O
---	LF-SB01-23--	CU-5	720-cu5.asc	Δ



FAILURE SKETCHES



SYMBOL		O	Δ	□
TEST NO.		CU-7	CU-9	CU-8
INITIAL	WATER CONTENT (%)	66.73	66.17	66.62
	DRY DENSITY (lb/ft^3)	58.57	59.44	58.51
	SATURATION (%)	96.99	98.39	96.67
	VOID RATIO	1.823	1.782	1.826
BEFORE SHEAR	WATER CONTENT (%)	62.19	51.20	45.47
	DRY DENSITY (lb/ft^3)	60.15	64.31	72.35
	SATURATION (%)	94.23	86.35	93.74
	VOID RATIO	1.749	1.571	1.285
	BACK PRESS. (lb/in^2)	31.02	31.06	21.01
MINOR PRIN. STRESS (lb/in^2)		4.98	9.94	19.99
MAX. DEV. STRESS (lb/in^2)		7.50	9.60	17.41
TIME TO FAILURE (min)		239	228	329
RATE OF STRAIN INCR (%/min)		0.05	0.05	0.00
INITIAL DIAMETER (in)		2.86	2.86	2.87
INITIAL HEIGHT (in)		6.06	5.92	5.34
B-VALUE		0.95	0.95	0.95

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray Clayey SILT 2) Gray Clayey SILT 3) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

REMARKS:

1) Confining Pressure = 5 psi

2) Confining Pressure = 10 psi

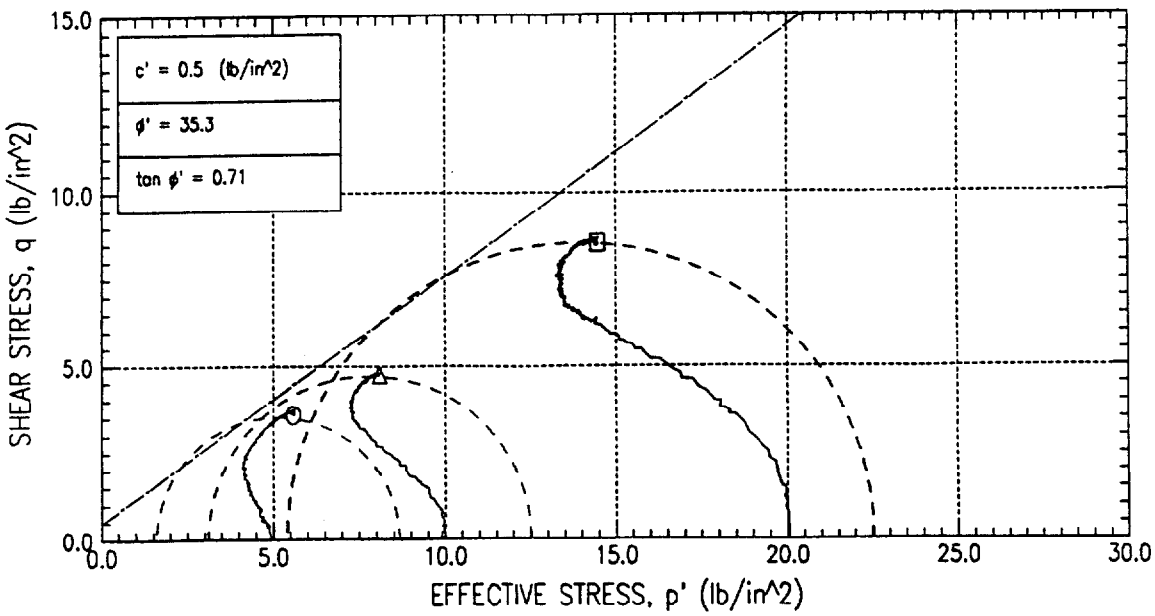
3) Confining Pressure = 20 psi

PROJECT Naval Sub Base

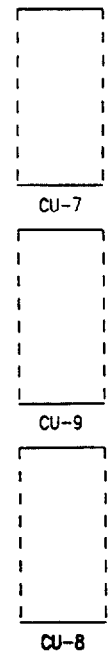
PROJECT NO.GTX-270

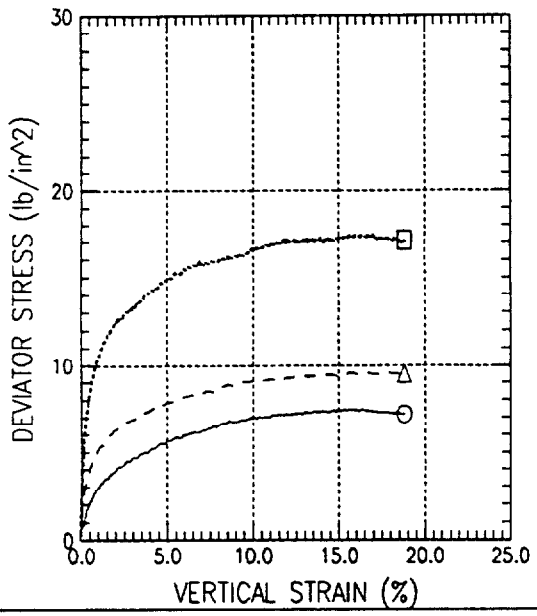
BORING NO. ---	SAMPLE NO.	LF-SB02-19	LF-SB02-19	LF-SB02-19
TECH. wam	DEPTH/ELEV	---	---	---
LABORATORY	DATE	03/05/95	03/09/95	03/06/95

TRIAXIAL COMPRESSION TEST REPORT



FAILURE SKETCHES





SYMBOL		O	Δ	□
TEST NO.		CU-7	CU-9	CU-8
INITIAL	WATER CONTENT (%)	66.73	66.17	66.62
	DRY DENSITY (lb/ft^3)	58.57	59.44	58.51
	SATURATION (%)	96.99	98.39	96.67
	VOID RATIO	1.823	1.782	1.826
BEFORE SHEAR	WATER CONTENT (%)	62.19	51.20	45.47
	DRY DENSITY (lb/ft^3)	60.15	64.31	72.35
	SATURATION (%)	94.23	86.35	93.74
	VOID RATIO	1.749	1.571	1.285
	BACK PRESS. (lb/in^2)	31.02	31.06	21.01
MINOR PRIN. STRESS (lb/in^2)		4.98	9.94	19.99
MAX. DEV. STRESS (lb/in^2)		7.50	9.60	17.41
TIME TO FAILURE (min)		239	228	329
RATE OF STRAIN INCR (%/min)		0.05	0.05	0.00
INITIAL DIAMETER (in)		2.86	2.86	2.87
INITIAL HEIGHT (in)		6.06	5.92	5.34
B-VALUE		0.95	0.95	0.95

STRAIN CONTROLLED

DESCRIPTION OF SPECIMENS:

1) Gray Clayey SILT 2) Gray Clayey SILT 3) Gray Clayey SILT

LL	PL	PI	GS 2.65	TYPE OF SPECIMEN Tube	TYPE OF TEST CU (R)

REMARKS:

1) Confining Pressure = 5 psi

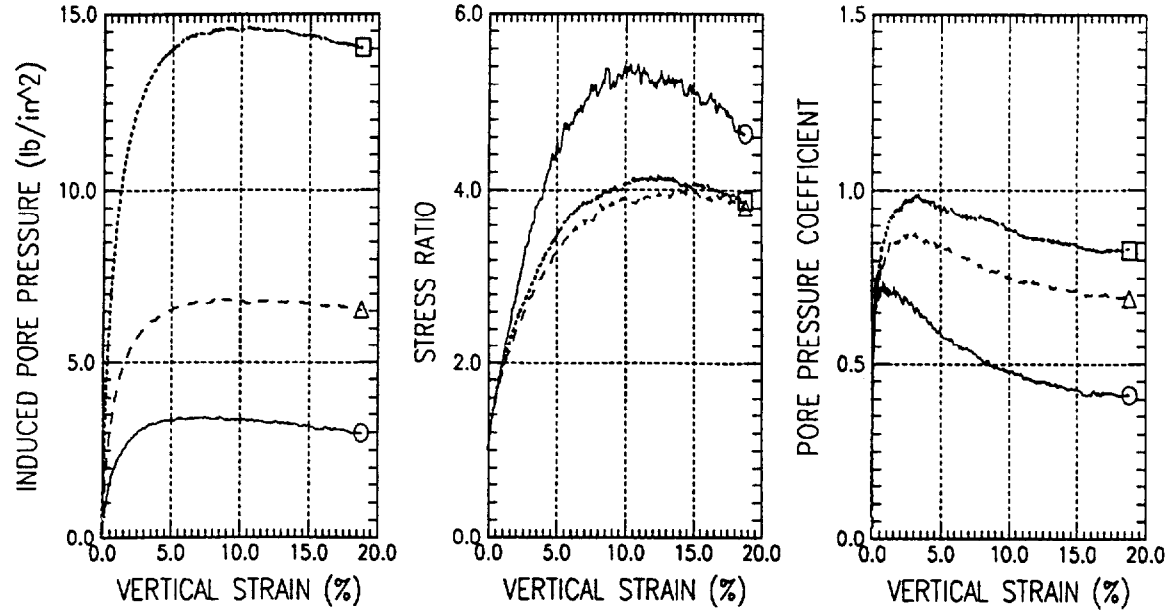
2) Confining Pressure = 10 psi

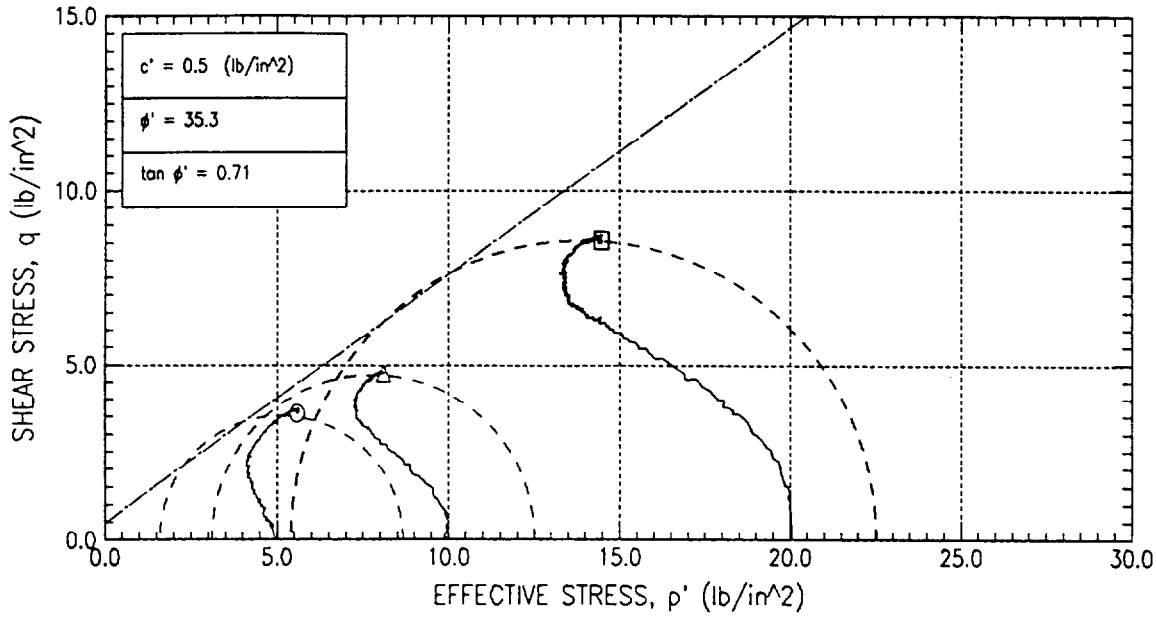
3) Confining Pressure = 20 psi

PROJECT Naval Sub Base					
PROJECT NO.GTX-270					
BORING NO. ---	SAMPLE NO.	LF-SB02-19	LF-SB02-19	LF-SB02-19	
TECH. wam	DEPTH/ELEV	---	---	---	
LABORATORY	DATE	03/05/95	03/09/95	03/06/95	

TRIAXIAL COMPRESSION TEST REPORT

CONSOLIDATED UNDRAINED TRIAXIAL TEST

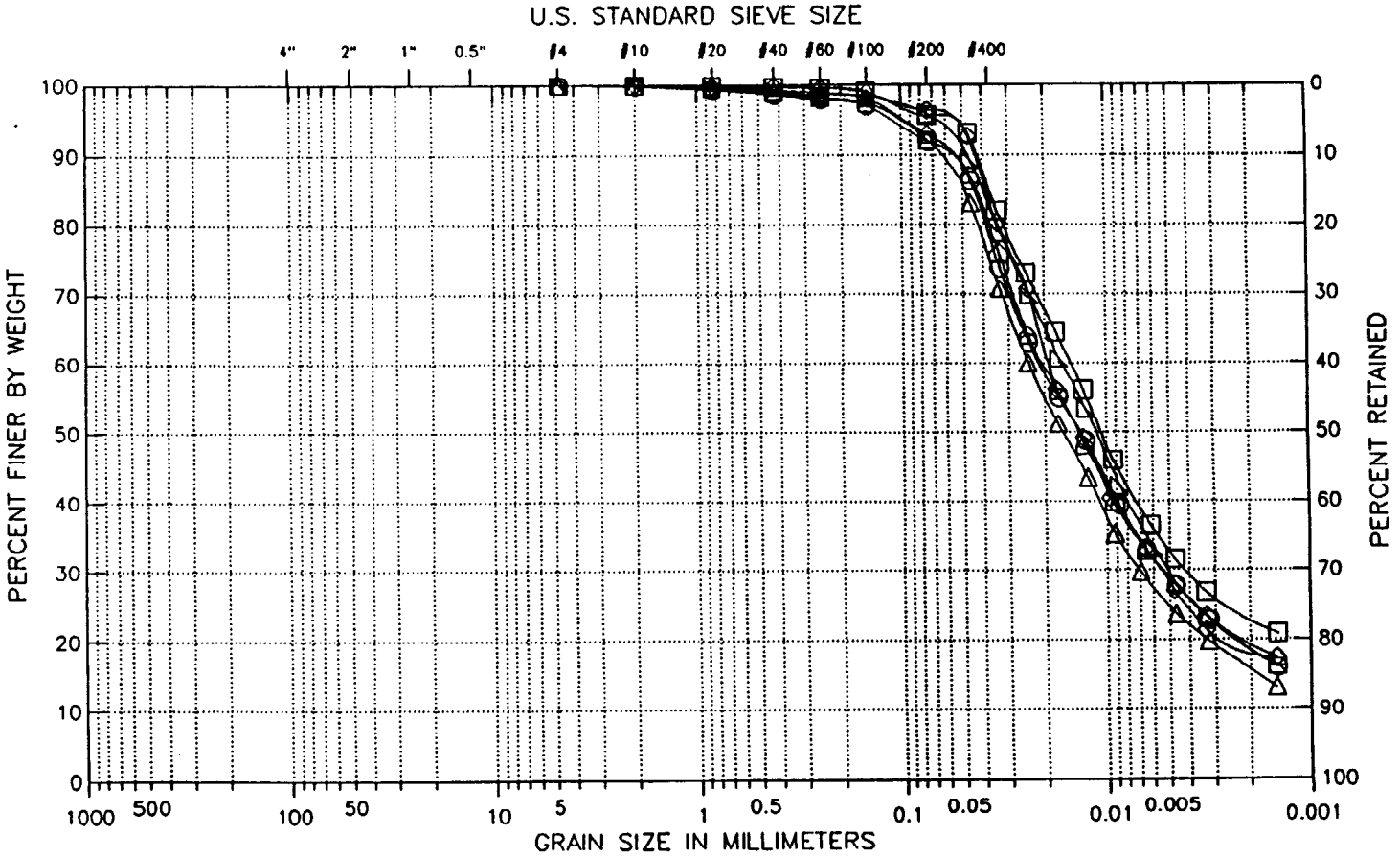




Project Name : Naval Sub Base

Boring No:	Sample No Depth	Test No	Filename	Symbol
---	LF-SB02-~~19~~--	CU-7	720-cu7.asc	○
---	LF-SB02-~~19~~--	CU-9	720-cu9.asc	△
---	LF-SB02-~~19~~--	CU-8	720-cu8a.asc	□

Project : Naval Submarine Base
Project No.: GTX-720
Location: Groton, CT
Date : Wed Mar 01 1995

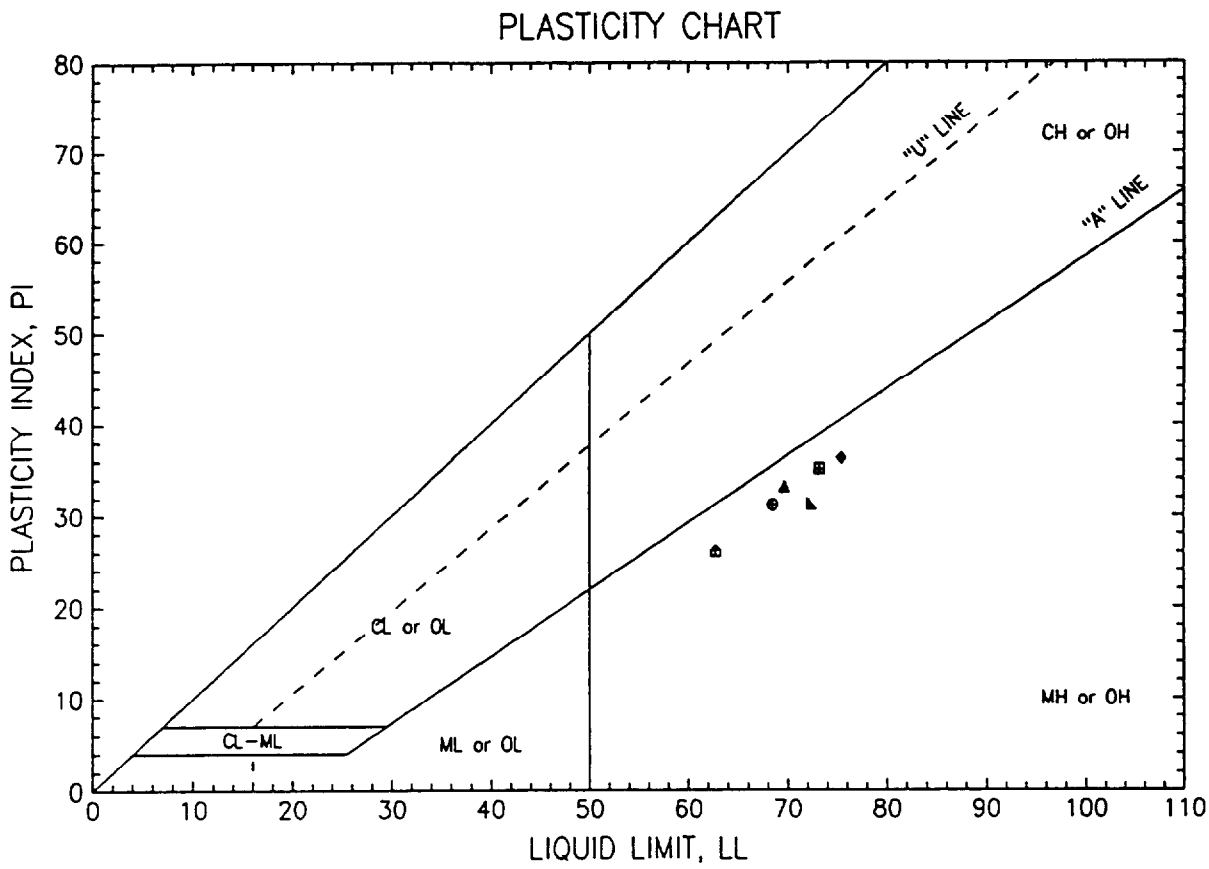


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring No.	Sample No.	Depth	Filename	Classification / Description	
⊖	---	LF-SB01-2123.5	21.0-23.5 ft	SB012123	MH	elastic silt
⊲	---	LF-SB01-23.526	23.5-26.0 ft	SB012352	MH	elastic silt
⊞	---	LF-SB02-1518	15.0-18.0 ft	SB021518	MH	elastic silt
⊕	---	LF-SB02-19.522	19.5-22.0 ft	SB021952	MH	elastic silt

Figure 1

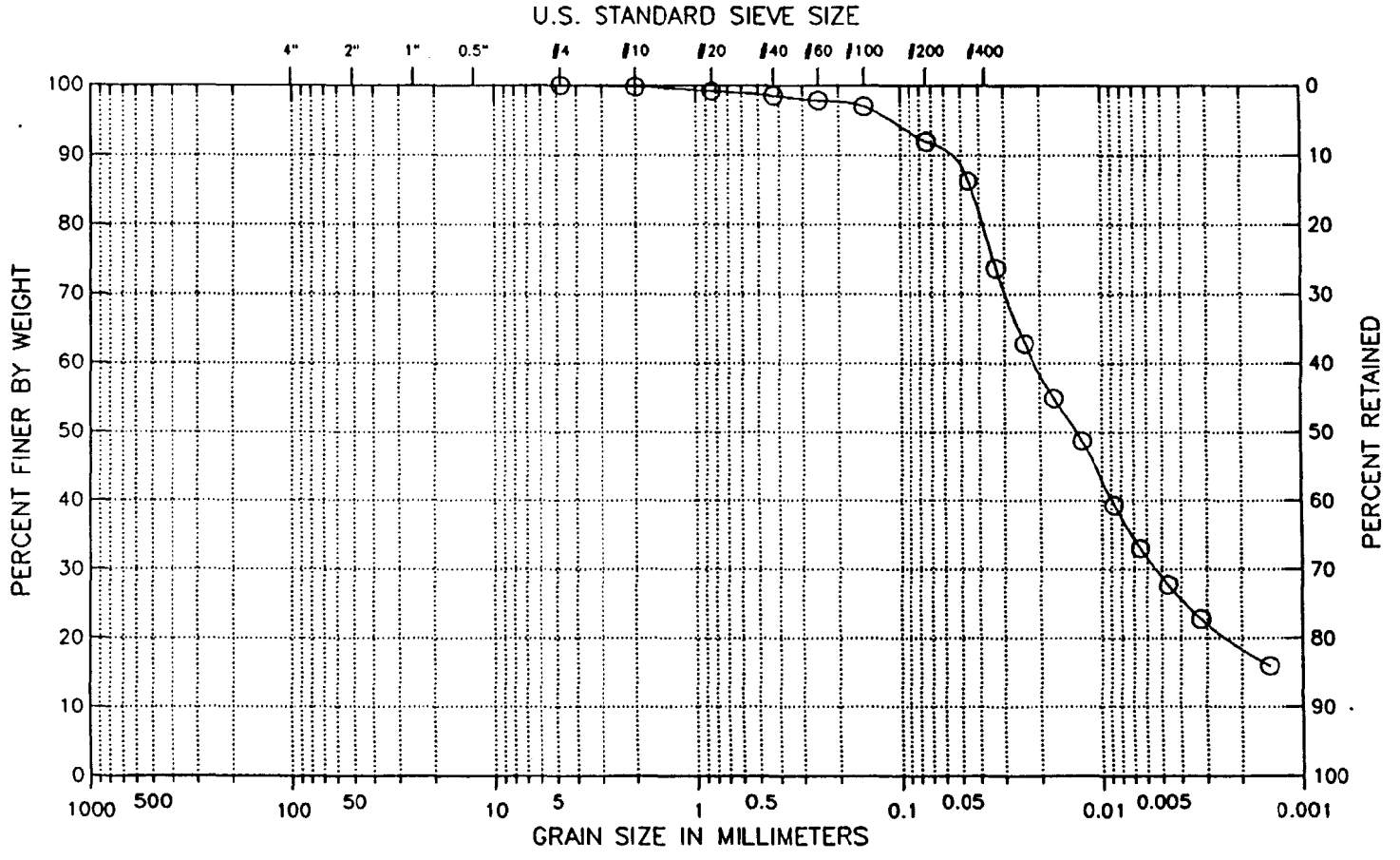
Project : Naval Submarine Base
Project No. : GTX-720
Location : Groton, CT
Date : Wed Mar 01 1995



Symbol	Sample Number	Water Content	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification
○	LF-SB01-25	83.5	68	37	31	(MH) elastic silt
△	LF-SB01-25	26	70	36	33	(MH) elastic silt
□	LF-SB02-15	18	73	38	35	(MH) elastic silt
◇	LF-SB02-19	22	75	39	36	(MH) elastic silt
◭	LF-SB03-16	47	63	37	26	(MH) elastic silt
◺	LF-SB06-12	44	72	41	31	(MH) elastic silt

Figure 1

Boring No. : --- Sample No: LF-SB01-2123.5 Test Method ASTM D422 Filename : SB012123	Project : Naval Submarine Base Project No.: GTX-720 Location: Groton, CT Date : Wed Mar 01 1995



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with shells and sulfer odor

Remarks :

Figure 1

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GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB01-2123.5
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 21.0-23.5 ft
Test Date : 02/24/95
Test Method : ASTM D422

Filename : SB012123
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hy125
Weight of air-dried soil = 31.78 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	33.00	19.50	27.44	0.045	86	0.045
2.00	29.00	19.50	23.44	0.033	74	0.033
4.00	25.50	19.60	19.97	0.024	63	0.024
8.00	23.00	19.60	17.47	0.017	55	0.017
15.00	21.00	19.70	15.50	0.013	49	0.013
33.00	18.00	19.80	12.52	0.009	39	0.009
61.00	16.00	19.80	10.52	0.006	33	0.006
120.00	14.20	20.20	8.84	0.005	28	0.005
256.00	12.50	20.60	7.25	0.003	23	0.003
1341.00	11.00	17.70	5.09	0.001	16	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#4	0.187	4.75	0.00	0.00	100
#10	0.079	2.00	0.07	0.07	100
#20	0.033	0.84	0.19	0.26	99
#40	0.017	0.42	0.21	0.47	99
#60	0.010	0.25	0.22	0.69	98
#100	0.006	0.15	0.27	0.96	97
#200	0.003	0.07	1.60	2.56	92
Pan			29.22	31.78	0

Total Dry Weight of Sample = 41.36

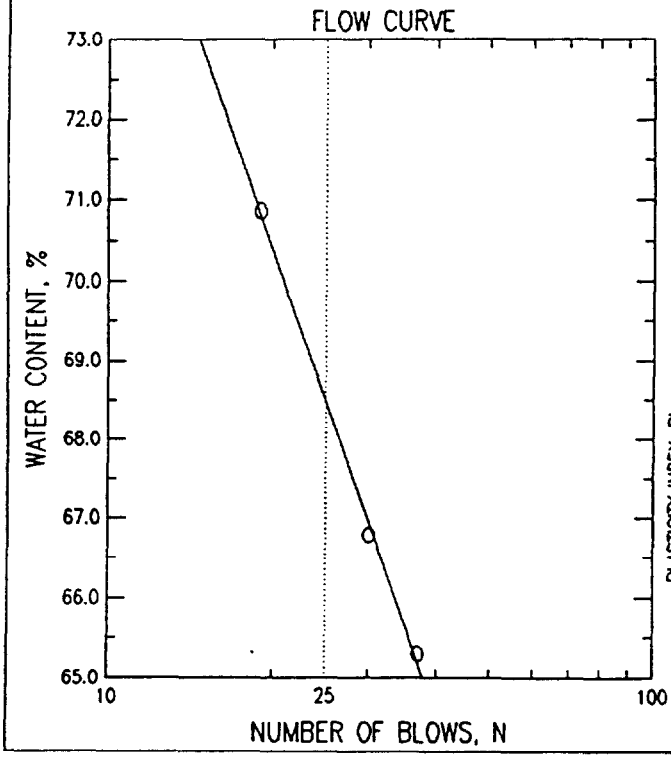
D85 : 0.0439 mm
D60 : 0.0212 mm
D50 : 0.0135 mm
D30 : 0.0053 mm
D15 : N/A
D10 : N/A

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(39)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdt	---
LOCATION Groton, CT		CHECKED BY gtt	SAMPLE NUMBER LF-SB01-2123.5
SAMPLE DESCRIPTION Dark gray, moist silt with shells and sulfer odor		DATE Wed Mar 01 1995	FILENAME SB012123

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	71	33	20		
WT. WET SOIL + TARE	26.49	25.16	25.64		
WT. DRY SOIL + TARE	24.42	23.27	23.33		
WT. WATER	2.07	1.89	2.31		
TARE WT.	21.25	20.44	20.07		
WT. DRY SOIL	3.17	2.83	3.26		
WATER CONTENT, W_N (%)	65.30	66.78	70.86		
NUMBER OF BLOWS, N	37	30	19		
ONE-POINT LIQUID LIMIT, LL	68.47	68.27	68.54		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	11	18			
WT. WET SOIL + TARE	21.68	22.19			
WT. DRY SOIL + TARE	21.28	21.68			
WT. WATER	0.4	0.51			
TARE WT.	20.21	20.31			
WT. DRY SOIL	1.07	1.37			
WATER CONTENT (%)	37.38	37.23			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	58.4
LIQUID LIMIT, LL	68.5
PLASTIC LIMIT, PL	37.3
PLASTICITY INDEX, PI	31.2
LIQUIDITY INDEX, LI*	0.68

*LI = (W − PL)/PI

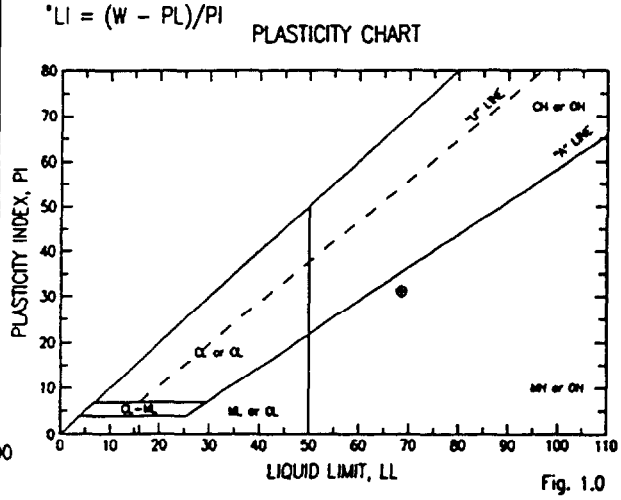


Fig. 1.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB01-2123.5
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 21.0-23.5 ft
Test Date : 02/24/95
Test Method : ASTM D2216

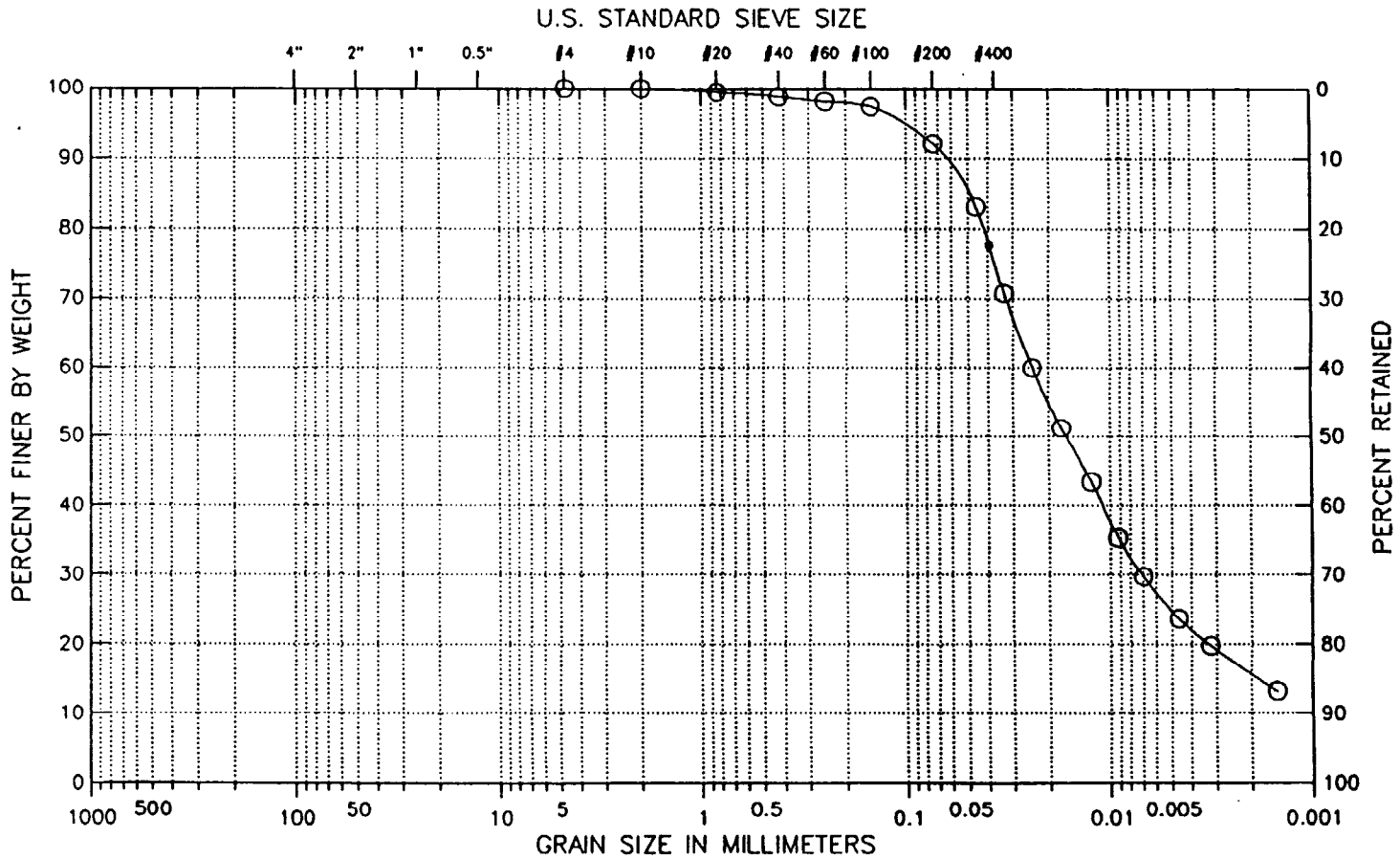
Filename : SB012123
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1) op11	2.27	98.49	63.01	58.41

Average Moisture Content = 58.41

Boring No. : ---	Project : Naval Submarine Base
Sample No.: LF-SB01-23.526	Project No.: GTX-720
Test Method ASTM D422	Location: Groton, CT
Filename : SB012352	Date : Wed Mar 01 1995



Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with shells and sulfer odor

Remarks :

Figure 2

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB01-23.526
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 23.5-26.0 ft
Test Date : 02/24/95
Test Method : ASTM D422

Filename : SB012352
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hy125
Weight of air-dried soil = 32.39 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	32.50	19.30	26.88	0.046	83	0.046
2.00	28.50	19.30	22.88	0.033	71	0.033
4.00	25.00	19.30	19.38	0.024	60	0.024
8.00	22.20	19.20	16.56	0.017	51	0.017
16.00	19.60	19.50	14.04	0.012	43	0.012
30.00	17.00	19.50	11.44	0.009	35	0.009
54.00	15.10	19.80	9.62	0.007	30	0.007
122.00	13.00	20.30	7.66	0.005	24	0.005
253.00	11.60	20.80	6.40	0.003	20	0.003
1320.00	10.20	17.60	4.27	0.001	13	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#4	0.187	4.75	0.00	0.00	100
#10	0.079	2.00	0.00	0.00	100
#20	0.033	0.84	0.17	0.17	99
#40	0.017	0.42	0.21	0.38	99
#60	0.010	0.25	0.22	0.60	98
#100	0.006	0.15	0.23	0.83	97
#200	0.003	0.07	1.73	2.56	92
Pan			29.94	32.50	0

Total Dry Weight of Sample = 41.92

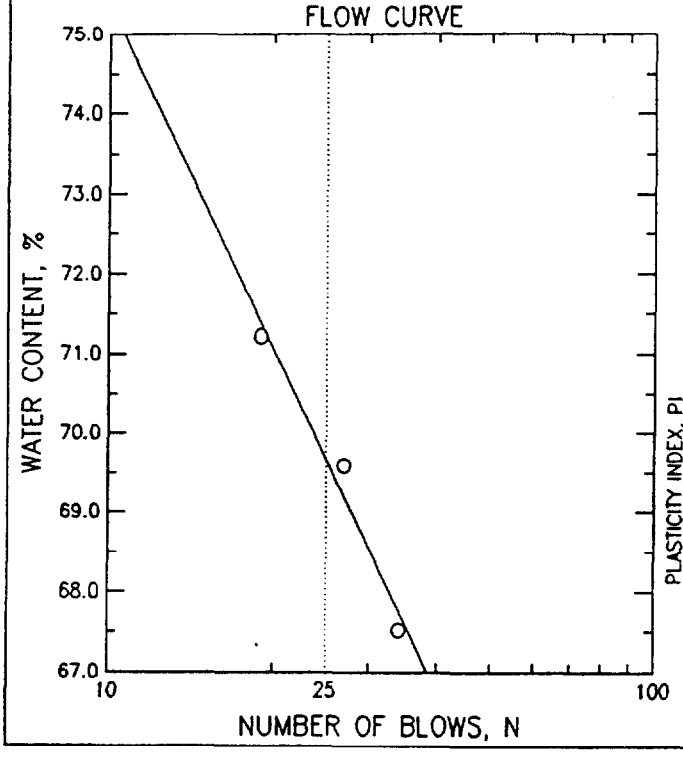
D85 : 0.0505 mm
D60 : 0.0241 mm
D50 : 0.0165 mm
D30 : 0.0070 mm
D15 : 0.0018 mm
D10 : 0.0010 mm

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(41)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdt	---
LOCATION Groton, CT		CHECKED BY gtt	SAMPLE NUMBER LF-SB01-23.526
SAMPLE DESCRIPTION Dark gray, moist silt with shells and sulfer odor		DATE Wed Mar 01 1995	FILENAME SB012352

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	15	02	25		
WT. WET SOIL + TARE	26.49	26	25.58		
WT. DRY SOIL + TARE	24.1	23.78	23.65		
WT. WATER	2.39	2.22	1.93		
TARE WT.	20.56	20.59	20.94		
WT. DRY SOIL	3.54	3.19	2.71		
WATER CONTENT, W_N (%)	67.51	69.59	71.22		
NUMBER OF BLOWS, N	34	27	19		
ONE-POINT LIQUID LIMIT, LL	70.07	70.24	68.89		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	49	43			
WT. WET SOIL + TARE	23.17	22.92			
WT. DRY SOIL + TARE	22.93	22.54			
WT. WATER	0.24	0.38			
TARE WT.	22.27	21.5			
WT. DRY SOIL	0.66	1.04			
WATER CONTENT (%)	36.36	36.54			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	57.6
LIQUID LIMIT, LL	69.7
PLASTIC LIMIT, PL	36.5
PLASTICITY INDEX, PI	33.2
LIQUIDITY INDEX, LI*	0.64

*LI = (W − PL)/PI

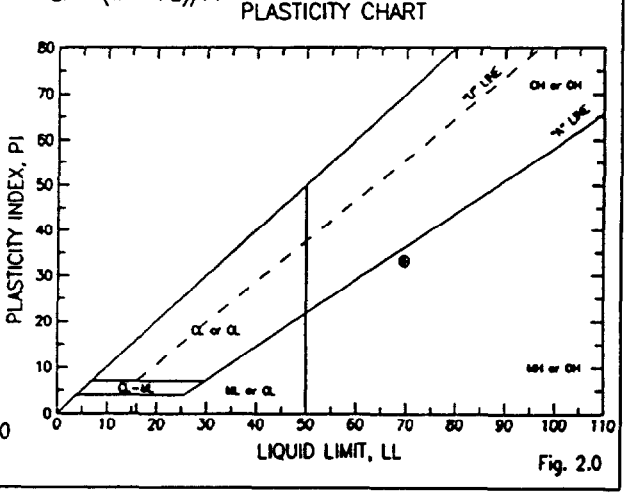


Fig. 2.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB01-23.526
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 23.5-26.0 ft
Test Date : 02/24/95
Test Method : ASTM D2216

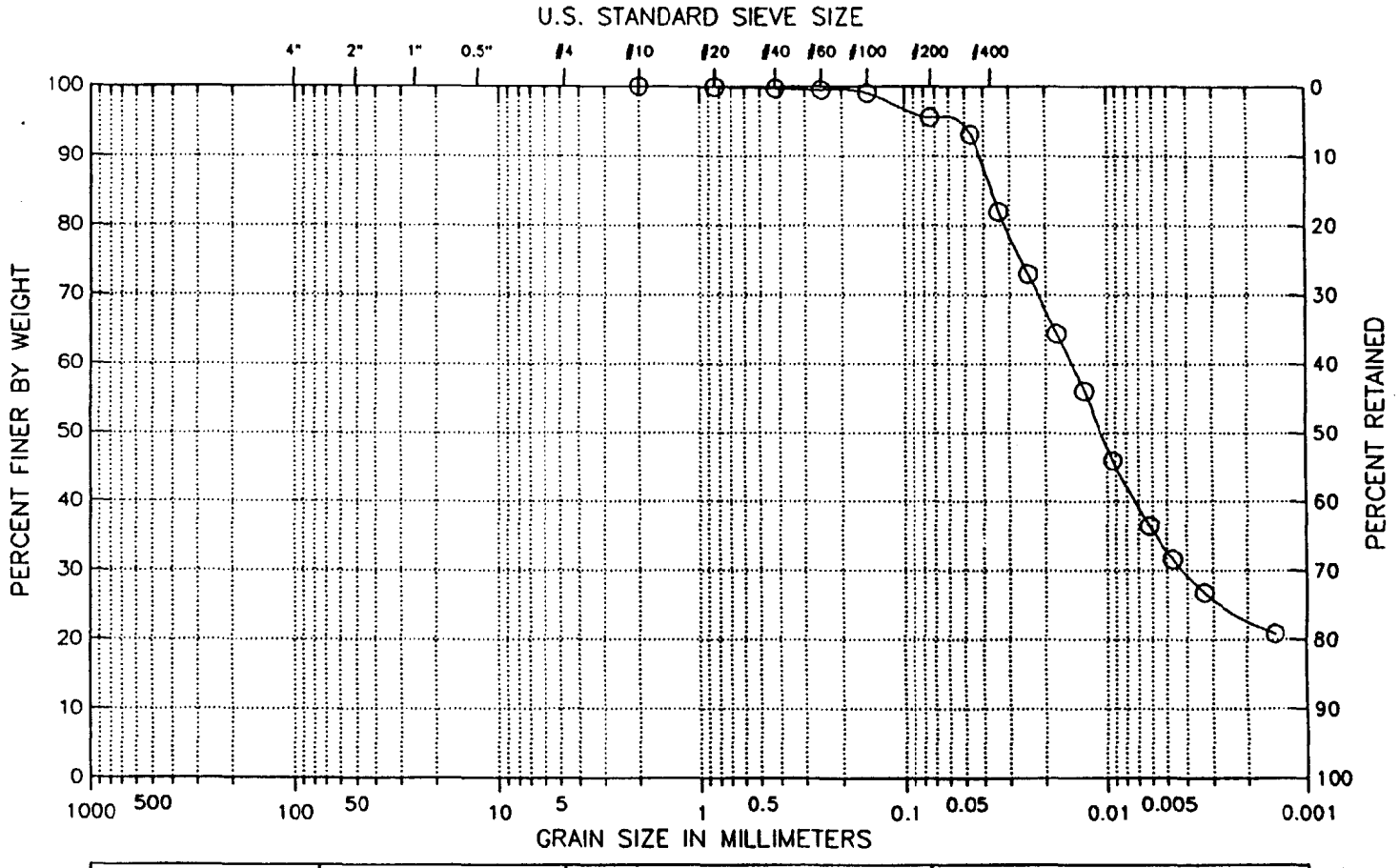
Filename : SB012352
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

	Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1)	op64	2.25	113.81	73.05	57.57

Average Moisture Content = 57.57

Boring No. : --- Sample No: LF-SB02-1518 Test Method ASTM D422 Filename : SB021518	Project : Naval Submarine Base Project No.: GTX-720 Location: Groton, CT Date : Wed Mar 01 1995



Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with sulfer odor

Remarks :

Figure 3

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB02-1518
Location : Groton, CT
Soil Description : Dark gray, moist silt with sulfer odor
Remarks : ---

Depth : 15.0-18.0 ft
Test Date : 02/17/95
Test Method : ASTM D422

Filename : SB021518
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hy125
Weight of air-dried soil = 31.49 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	35.50	15.80	29.28	0.047	93	0.047
2.00	32.00	15.80	25.78	0.034	82	0.034
4.00	29.20	15.70	22.95	0.025	73	0.025
8.00	26.50	15.70	20.25	0.018	64	0.018
15.00	23.80	16.10	17.63	0.013	56	0.013
30.00	20.50	16.80	14.45	0.009	46	0.009
70.00	17.40	17.70	11.49	0.006	37	0.006
120.00	15.70	18.70	9.95	0.005	32	0.005
240.00	14.00	19.50	8.44	0.003	27	0.003
1362.00	12.60	16.90	6.56	0.001	21	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#10	0.079	2.00	0.00	0.00	100
#20	0.033	0.84	0.04	0.04	100
#40	0.017	0.42	0.06	0.10	100
#60	0.010	0.25	0.06	0.16	99
#100	0.006	0.15	0.14	0.30	99
#200	0.003	0.07	1.10	1.40	96
Pan			30.11	31.51	0

Total Dry Weight of Sample = 41.12

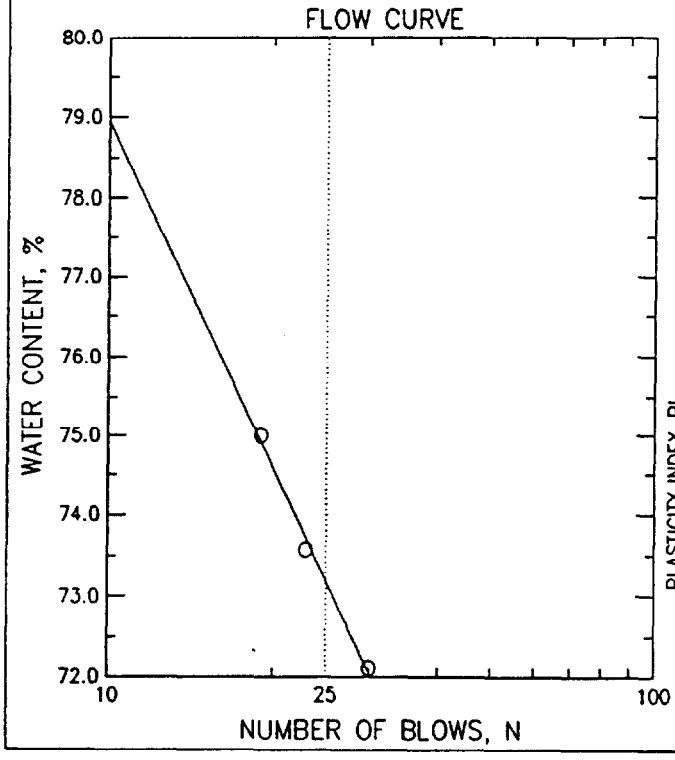
D85 : 0.0370 mm
D60 : 0.0151 mm
D50 : 0.0107 mm
D30 : 0.0042 mm
D15 : N/A
D10 : N/A

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(46)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdl	---
LOCATION: Groton, CT		CHECKED BY: gtt	SAMPLE NUMBER: LF-SB02-1518
SAMPLE DESCRIPTION: Dark gray, moist silt with sulfer odor		DATE: Wed Mar 01 1995	FILENAME: SB021518

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	03	10	33		
WT. WET SOIL + TARE	25.96	26.55	24.98		
WT. DRY SOIL + TARE	23.53	24.1	23.03		
WT. WATER	2.43	2.45	1.95		
TARE WT.	20.16	20.77	20.43		
WT. DRY SOIL	3.37	3.33	2.6		
WATER CONTENT, W_N (%)	72.11	73.57	75.00		
NUMBER OF BLOWS, N	30	23	19		
ONE-POINT LIQUID LIMIT, LL	73.72	72.84	72.55		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	21	25			
WT. WET SOIL + TARE	21.51	22.59			
WT. DRY SOIL + TARE	21.15	22.13			
WT. WATER	0.36	0.46			
TARE WT.	20.2	20.93			
WT. DRY SOIL	0.95	1.2			
WATER CONTENT (%)	37.89	38.33			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	70.9
LIQUID LIMIT, LL	73.2
PLASTIC LIMIT, PL	38.1
PLASTICITY INDEX, PI	35.1
LIQUIDITY INDEX, LI*	0.93

*LI = (W − PL)/PI

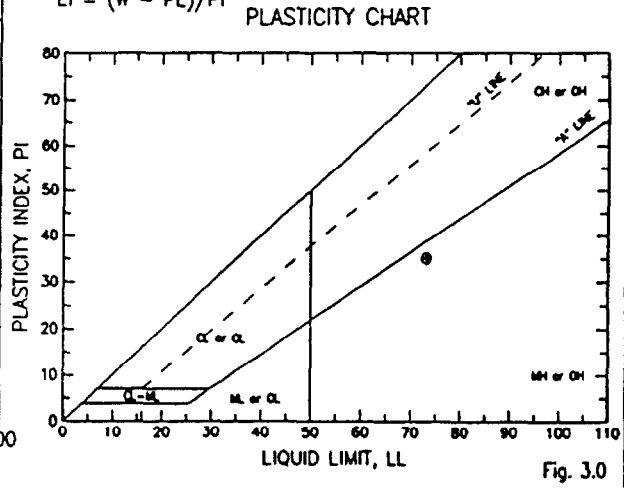


Fig. 3.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB02-1518
Location : Groton, CT
Soil Description : Dark gray, moist silt with sulfer odor
Remarks : ---

Depth : 15.0-18.0 ft
Test Date : 02/17/95
Test Method : ASTM D2216

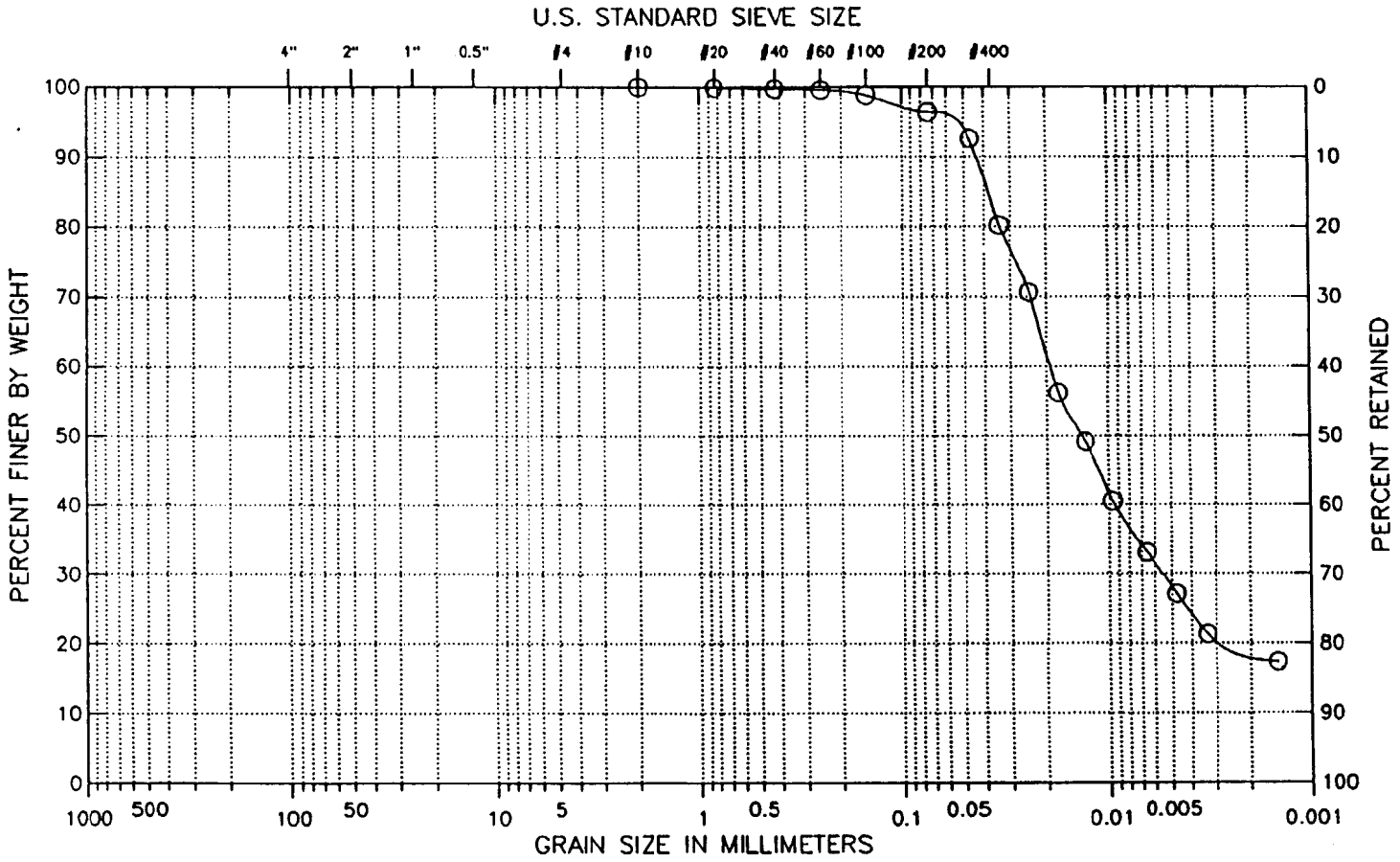
Filename : SB021518
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

	Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1)	ru32	9.80	162.64	99.23	70.90

Average Moisture Content = 70.90

Boring No. : --- Sample No: LF-SB02-19.522 Test Method ASTM D422 Filename : SB021952	Project : Naval Submarine Base Project No.: GTX-720 Location: Groton, CT Date : Wed Mar 01 1995



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with sulfer odor

Remarks :

Figure 4

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB02-19.522
Location : Groton, CT
Soil Description : Dark gray, moist silt with sulfer odor
Remarks : ---

Depth : 19.5-22.0 ft
Test Date : 02/17/95
Test Method : ASTM D422

Filename : SB021952
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hyl25
Weight of air-dried soil = 28.27 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	32.00	18.00	26.14	0.047	93	0.047
2.00	28.50	18.00	22.64	0.034	80	0.034
4.00	25.80	18.00	19.94	0.024	71	0.024
8.00	21.70	18.10	15.85	0.018	56	0.018
15.00	19.70	18.20	13.87	0.013	49	0.013
28.00	17.20	18.60	11.44	0.010	41	0.010
61.00	15.00	19.20	9.36	0.007	33	0.007
120.00	13.30	19.20	7.66	0.005	27	0.005
244.00	11.50	19.80	6.02	0.003	21	0.003
1353.00	11.00	16.50	4.90	0.001	17	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#10	0.079	2.00	0.00	0.00	100
#20	0.033	0.84	0.04	0.04	100
#40	0.017	0.42	0.05	0.09	100
#60	0.010	0.25	0.04	0.13	100
#100	0.006	0.15	0.21	0.34	99
#200	0.003	0.07	0.69	1.03	96
Pan			27.22	28.25	0

Total Dry Weight of Sample = 37.9

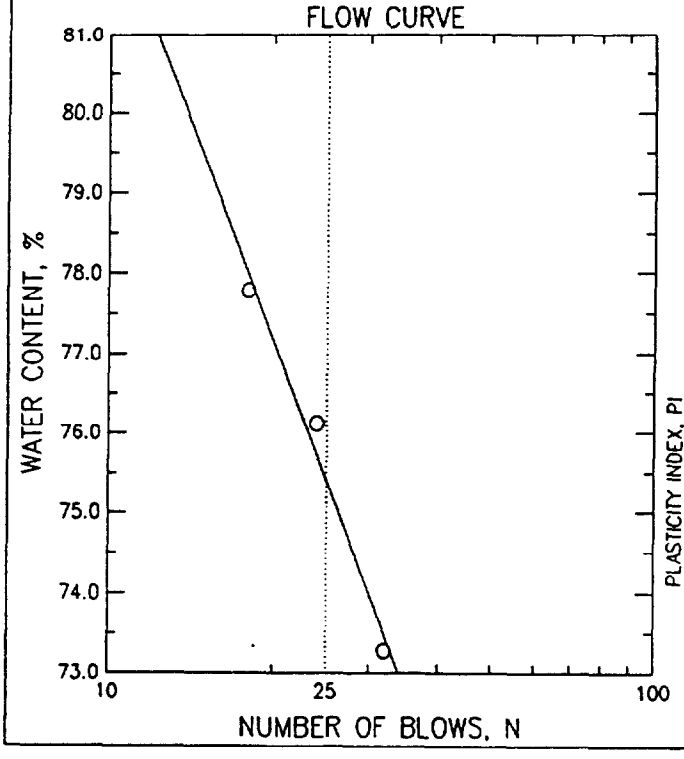
D85 : 0.0382 mm
D60 : 0.0192 mm
D50 : 0.0135 mm
D30 : 0.0055 mm
D15 : N/A
D10 : N/A

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(48)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdt	---
LOCATION: Groton, CT		CHECKED BY: gtt	SAMPLE NUMBER: LF-SB02-19.522
SAMPLE DESCRIPTION: Dark gray, moist silt with sulfer odor		DATE: Wed Mar 01 1995	FILENAME: SB021952

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	11	12	71		
WT. WET SOIL + TARE	24.48	25.55	26.84		
WT. DRY SOIL + TARE	22.67	23.51	24.39		
WT. WATER	1.81	2.04	2.45		
TARE WT.	20.2	20.83	21.24		
WT. DRY SOIL	2.47	2.68	3.15		
WATER CONTENT, W_N (%)	73.28	76.12	77.78		
NUMBER OF BLOWS, N	32	24	18		
ONE-POINT LIQUID LIMIT, LL	75.50	75.74	74.75		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	17	14			
WT. WET SOIL + TARE	21.28	21.57			
WT. DRY SOIL + TARE	20.85	21.15			
WT. WATER	0.43	0.42			
TARE WT.	19.74	20.09			
WT. DRY SOIL	1.11	1.06			
WATER CONTENT (%)	38.74	39.62			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	71.3
LIQUID LIMIT, LL	75.4
PLASTIC LIMIT, PL	39.2
PLASTICITY INDEX, PI	36.2
LIQUIDITY INDEX, LI*	0.89

*LI = (W - PL)/PI

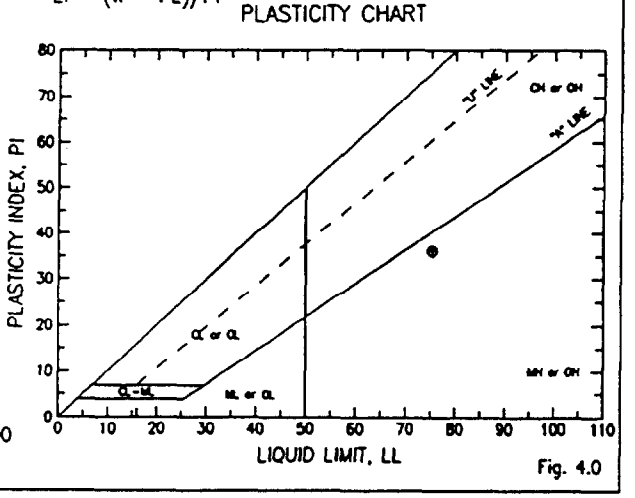


Fig. 4.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB02-19.522
Location : Groton, CT
Soil Description : Dark gray, moist silt with sulfer odor
Remarks : ---

Depth : 19.5-22.0 ft
Test Date : 02/17/95
Test Method : ASTM D2216

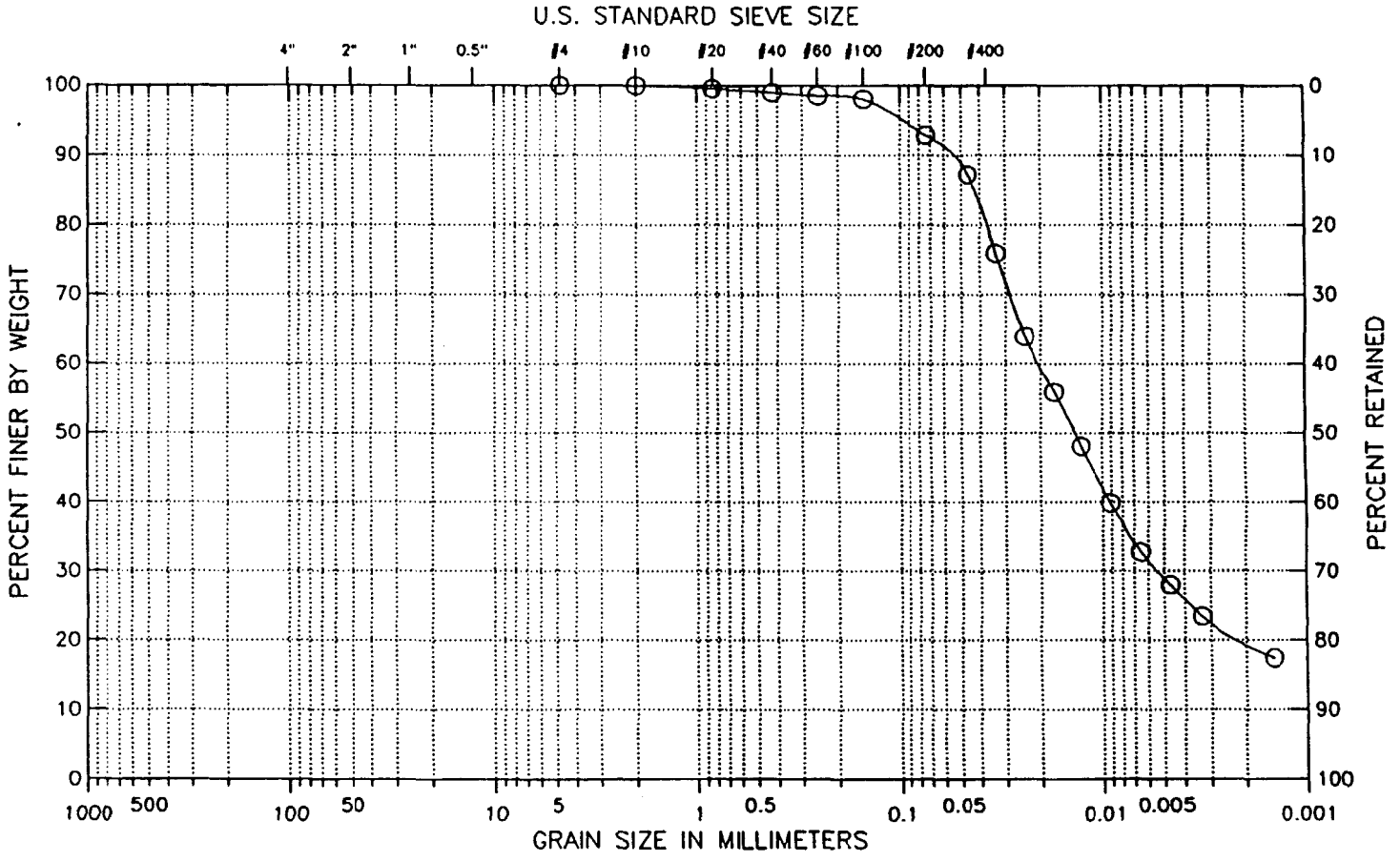
Filename : SB021952
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1) ru64	9.36	170.77	103.60	71.28

Average Moisture Content = 71.28

Boring No. : --- Sample No: LF-SB03-1517 Test Method ASTM D422 Filename : SB031517	Project : Naval Submarine Base Project No.: GTX-720 Location: Groton, CT Date : Wed Mar 01 1995



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with shells and sulfer odor

Remarks :

Figure 5

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB03-1517
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 15.0-17.0 ft
Test Date : 02/24/95
Test Method : ASTM D422

Filename : SB031517
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hy125
Weight of air-dried soil = 29.25 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	31.00	19.60	25.47	0.046	87	0.046
2.00	27.70	19.60	22.17	0.033	76	0.033
4.00	24.20	19.60	18.67	0.024	64	0.024
8.00	21.90	19.50	16.34	0.017	56	0.017
15.00	19.60	19.50	14.04	0.013	48	0.013
30.00	17.10	19.90	11.65	0.009	40	0.009
61.00	15.00	20.00	9.58	0.006	33	0.006
120.00	13.60	20.00	8.18	0.005	28	0.005
240.00	12.10	20.60	6.85	0.003	23	0.003
1326.00	11.00	17.70	5.09	0.001	17	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#4	0.187	4.75	0.00	0.00	100
#10	0.079	2.00	0.00	0.00	100
#20	0.033	0.84	0.14	0.14	100
#40	0.017	0.42	0.15	0.29	99
#60	0.010	0.25	0.14	0.43	99
#100	0.006	0.15	0.14	0.57	98
#200	0.003	0.07	1.52	2.09	93
Pan			27.16	29.25	0

Total Dry Weight of Sample = 38.89

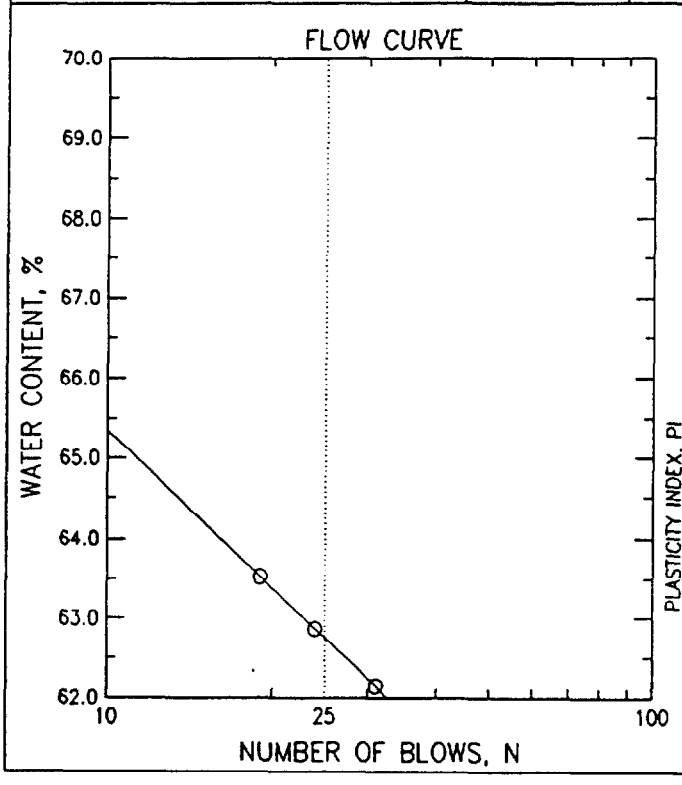
D85 : 0.0432 mm
D60 : 0.0205 mm
D50 : 0.0138 mm
D30 : 0.0054 mm
D15 : N/A
D10 : N/A

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(33)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdt	---
LOCATION		CHECKED BY	SAMPLE NUMBER
Groton, CT		gtt	LF-SB03-1517
SAMPLE DESCRIPTION		DATE	FILENAME
Dark gray, moist silt with shells and sulfer odor		Wed Mar 01 1995	SB031517

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	09	17	40		
WT. WET SOIL + TARE	25.85	25.3	26.17		
WT. DRY SOIL + TARE	23.88	23.15	24.01		
WT. WATER	1.97	2.15	2.16		
TARE WT.	20.71	19.73	20.61		
WT. DRY SOIL	3.17	3.42	3.4		
WATER CONTENT, W_N (%)	62.15	62.87	63.53		
NUMBER OF BLOWS, N	31	24	19		
ONE-POINT LIQUID LIMIT, LL	63.78	62.56	61.45		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	14	10			
WT. WET SOIL + TARE	21.89	22.16			
WT. DRY SOIL + TARE	21.4	21.79			
WT. WATER	0.49	0.37			
TARE WT.	20.07	20.77			
WT. DRY SOIL	1.33	1.02			
WATER CONTENT (%)	36.84	36.27			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	64.3
LIQUID LIMIT, LL	62.8
PLASTIC LIMIT, PL	36.6
PLASTICITY INDEX, PI	26.2
LIQUIDITY INDEX, LI*	1.06

*LI = (W − PL)/PI

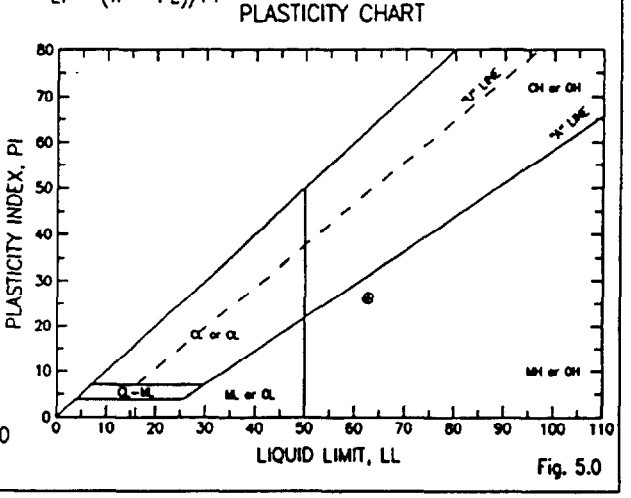


Fig. 5.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB03-1517
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 15.0-17.0 ft
Test Date : 02/24/95
Test Method : ASTM D2216

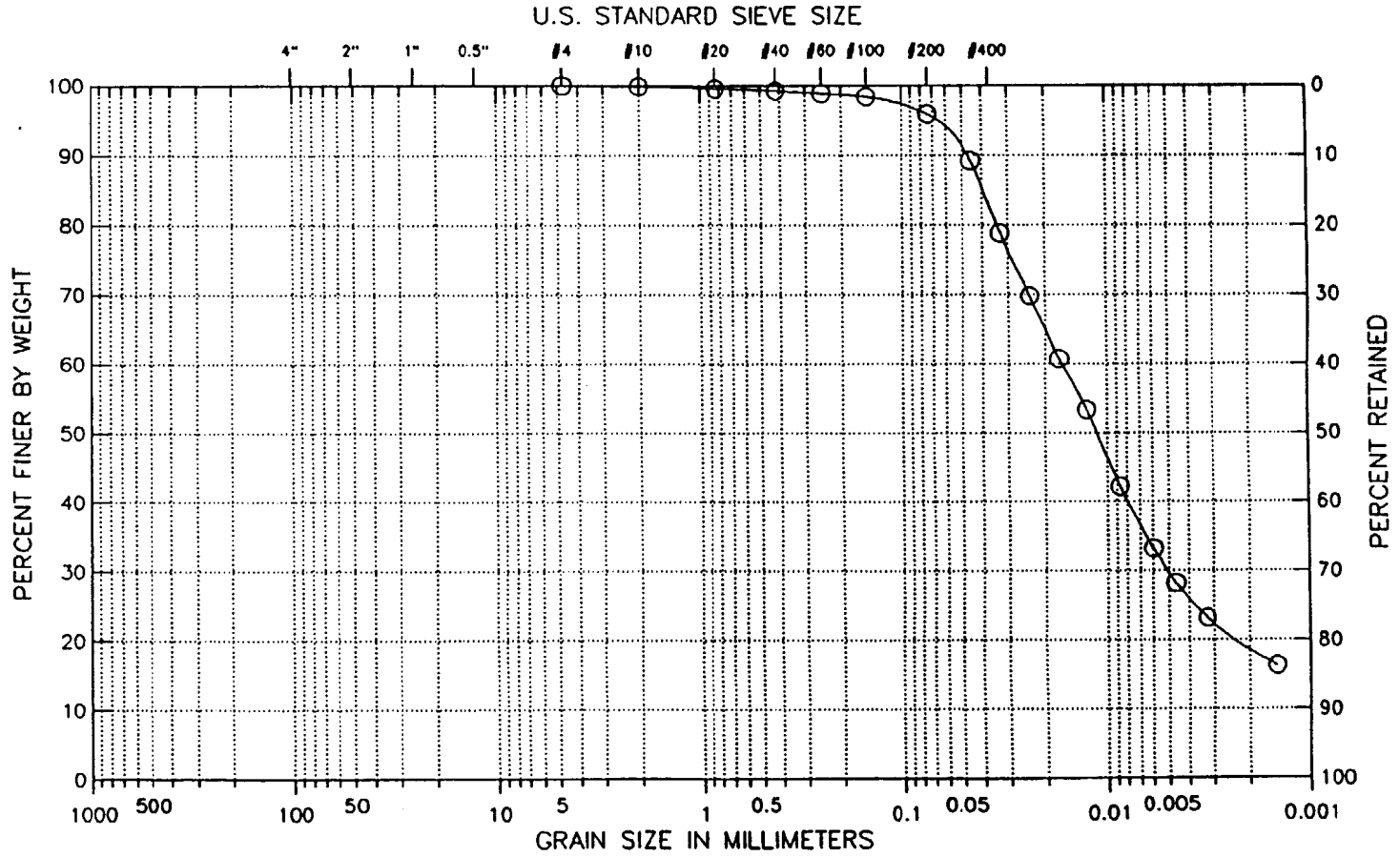
Filename : SB031517
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

	Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1)	op82	2.33	51.62	32.33	64.30

Average Moisture Content = 64.30

Boring No. : ---	Project : Naval Submarine Base
Sample No: LF-SB06-1214	Project No.: GTX-720
Test Method ASTM D422	Location: Groton, CT
Filename : SB061214	Date : Wed Mar 01 1995



Classification :
(MH) elastic silt
Visual Description :
Dark gray, moist silt with shells and sulfer odor

Remarks :

Figure 6

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB06-1214
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 12.0-14.0 ft
Test Date : 02/24/95
Test Method : ASTM D422

Filename : SB061214
Elevation : ---
Tested by : jdt
Checked by : gtt

HYDROMETER

Hydrometer ID : hy125
Weight of air-dried soil = 30.73 gm
Specific Gravity = 2.65

Hydroscopic Moisture Content :
Weight of Wet Soil = 0 gm
Weight of Dry Soil = 0 gm
Moisture Content = 0

Elapsed Time (min)	Reading	Temperature (deg. C)	Corrected Reading	Particle Size (mm)	Percent Finer (%)	Adjusted Particle Size
1.00	33.00	19.40	27.41	0.045	89	0.045
2.00	29.80	19.40	24.21	0.033	79	0.033
4.00	27.00	19.50	21.44	0.024	70	0.024
8.00	24.20	19.50	18.64	0.017	61	0.017
15.00	22.00	19.30	16.38	0.013	53	0.013
33.00	18.50	19.60	12.97	0.009	42	0.009
72.00	15.70	19.80	10.22	0.006	33	0.006
120.00	14.00	20.30	8.66	0.005	28	0.005
247.00	12.40	20.50	7.12	0.003	23	0.003
1334.00	10.90	17.80	5.01	0.001	16	0.001

FINE SIEVE SET

Sieve Mesh	Sieve Openings Inches	Millimeters	Weight Retained (gm)	Cumulative Weight Retained (gm)	Percent Finer (%)
#4	0.187	4.75	0.00	0.00	100
#10	0.079	2.00	0.04	0.04	100
#20	0.033	0.84	0.09	0.13	100
#40	0.017	0.42	0.10	0.23	99
#60	0.010	0.25	0.12	0.35	99
#100	0.006	0.15	0.14	0.49	98
#200	0.003	0.07	0.77	1.26	96
Pan			29.47	30.73	0

Total Dry Weight of Sample = 39.9

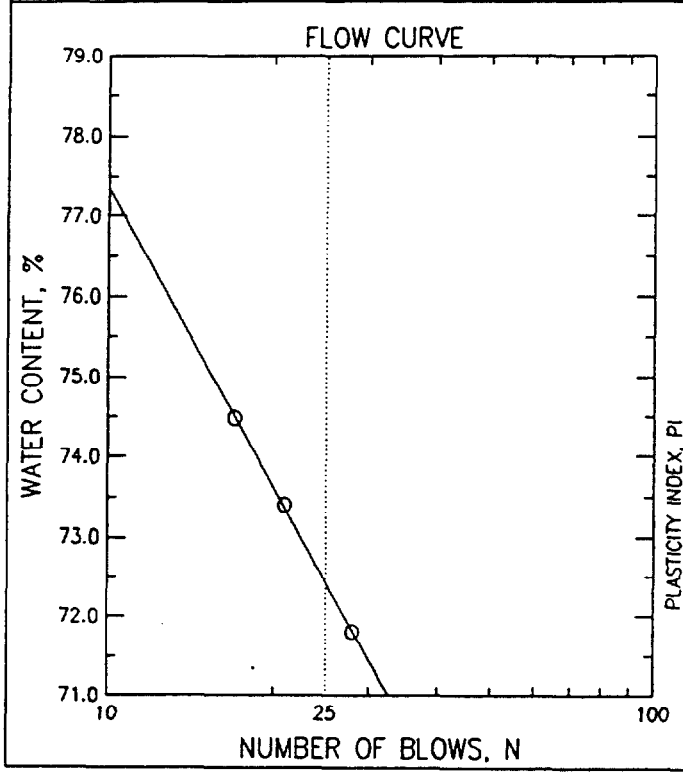
D85 : 0.0398 mm
D60 : 0.0166 mm
D50 : 0.0113 mm
D30 : 0.0051 mm
D15 : N/A
D10 : N/A

Soil Classification
ASTM Group Symbol : MH
ASTM Group Name : elastic silt
AASHTO Group Symbol : A-7-5(42)
AASHTO Group Name : Clayey Soils

ATTERBERG LIMITS

PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
Naval Submarine Base	GTX-720	jdt	---
LOCATION		CHECKED BY	SAMPLE NUMBER
Groton, CT		gtt	LF-SB06-1214
SAMPLE DESCRIPTION		DATE	FILENAME
Dark gray, moist silt with shells and sulfer odor		Wed Mar 01 1995	SB061214

LIQUID LIMIT DETERMINATIONS					
CONTAINER NUMBER	03	01	12		
WT. WET SOIL + TARE	25.4	25.58	25.82		
WT. DRY SOIL + TARE	23.21	23.4	23.69		
WT. WATER	2.19	2.18	2.13		
TARE WT.	20.16	20.43	20.83		
WT. DRY SOIL	3.05	2.97	2.86		
WATER CONTENT, W_N (%)	71.80	73.40	74.48		
NUMBER OF BLOWS, N	28	21	17		
ONE-POINT LIQUID LIMIT, LL	72.79	71.87	71.08		
PLASTIC LIMIT DETERMINATIONS					
CONTAINER NUMBER	42	72			
WT. WET SOIL + TARE	24	23.81			
WT. DRY SOIL + TARE	23.49	23.37			
WT. WATER	0.51	0.44			
TARE WT.	22.24	22.31			
WT. DRY SOIL	1.25	1.06			
WATER CONTENT (%)	40.80	41.51			



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	73.6
LIQUID LIMIT, LL	72.4
PLASTIC LIMIT, PL	41.2
PLASTICITY INDEX, PI	31.3
LIQUIDITY INDEX, LI*	1.04

*LI = (W – PL)/PI

PLASTICITY CHART

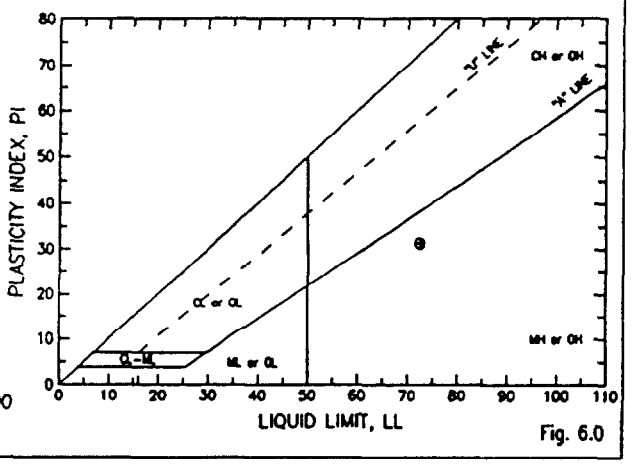


Fig. 6.0

GEOTECHNICAL LABORATORY TEST DATA

Project : Naval Submarine Base
Project No. : GTX-720
Boring No. : ---
Sample No. : LF-SB06-1214
Location : Groton, CT
Soil Description : Dark gray, moist silt with shells and sulfer odor
Remarks : ---

Depth : 12.0-14.0 ft
Test Date : 02/24/95
Test Method : ASTM D2216

Filename : SB061214
Elevation : ---
Tested by : jdt
Checked by : gtt

Natural Moisture Content

	Moisture Content ID	Mass of Container (gm)	Mass of Container and Moist Soil (gm)	Mass of Container and Dried Soil (gm)	Moisture Content (%)
1)	op32	2.37	44.27	26.50	73.64

Average Moisture Content = 73.64

APPENDIX F

DETAILED LABORATORY ANALYTICAL RESULTS AND DATA VALIDATION

F.1 TCL ORGANICS ANALYTICAL RESULTS

F.2 TAL INORGANIC ANALYTICAL RESULTS

F.1 TCL ORGANICS ANALYTICAL RESULTS

Halliburton NUS CORPORATION

INTERNAL CORRESPONDENCE

C-49-03-5-122

TO: J. L. GLORIEUX

DATE: MARCH 22, 1995

FROM: ANNE K. BATTISTA

COPIES: DV FILE

SUBJECT: ORGANIC DATA VALIDATION - ORGANICS VOA/BNA/PEST/PCB
CTO #203, NEW LONDON NAVAL SUBMARINE BASE (NSB),
GROTON, CONNECTICUT
CASE NO. NUS, SDG 21359

SAMPLES: 3/Solid

LF-SB03-18.520.5 LF-SB04-0810 LF-SB05-12.514.5

1/Aqueous

RB-01

The sample set for the CTO 203 New London NSB site, Case NUS, SDG 21359, consists of three (3) soil environmental samples and one (1) aqueous rinsate blank (designated RB-). All samples were analyzed for Target Compound List (TCL) volatile, semivolatile and pesticide/PCB organic compounds. The field crew did not designate a sample for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis, therefore, the laboratory analyzed Laboratory Control Spikes instead. No field duplicate pairs were included in this SDG.

The samples were collected by Halliburton NUS Corporation on February 16th, 17th and 18th, 1995 and analyzed by Southwest Laboratories of Oklahoma under Naval Energy and Environmental Support Activity (NEESA) Level D Quality Assurance/Quality Control (QA/QC) criteria. All analyses were conducted using the Contract Laboratory Program (CLP) Statement of Work (SOW) OLM01.8 3/90 analytical and reporting protocols.

The data were evaluated based on the following parameters:

* • Data Completeness
• Holding Times
* • GC/MS Tuning
• Calibrations
• Blanks
* • Surrogate Spike Recoveries
• Laboratory Control Spike/Laboratory Control Spike Duplicate Results
• Internal Standards Performance
* • Instrument Performance
* • Compound Identification
* • Compound Quantitation
* • Tentatively Identified Compounds (TICs)

The asterisk (*) indicates that all quality control criteria were met for this parameter.

Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets, and Appendix D contains the documentation to support the findings as discussed in this data validation report. The attached Table I summarizes the validation qualifications which were based on the following information:

HOLDING TIMES

The 7 day holding time until extraction was exceeded by several days for the pesticide/PCB analysis of the environmental soil samples. As a result of this noncompliance, positive and nondeteced results were qualified as estimated, (J) and (UJ), respectively, in the affected samples.

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions. The key associated with these tables is presented in following the tables.

Volatiles

Compound	CC 02/23/95	IC 02/27/95
Acetone	X	
2-Butanone	X	X
Chloroethane		X
Associated Samples:	LF-SB03-18.520.5, LF-SB04-0810 LF-SB05-12.514.5	RB-01

The positive result for acetone in sample LF-SB03-18.520.5 was qualified as estimated, (J), as a result of a continuing calibration Percent Differences (%Ds) > 25%. No action was necessary for any of the other aforementioned volatile compounds since only positive results are affected by these noncompliances, and no positive results were reported for those compounds in the affected samples.

Semivolatile

Compound	CC 03/01/95	CC 03/02/95
Hexachlorocyclopentadiene	X	X
2,4-Dinitrophenol	X	X
4-Nitrophenol	X	XX
2,2'-oxybis(1-chloropropane)		XX
3-Nitroaniline		X
Pentachlorophenol		X
Associated Samples:	LF-SB03-18.520.5,	LF-SB03-18.520.5RE,

LF-SB05-12.514.5, RB-01 LF-SB05-12.514.5RE, LF-SB04-0801

Calibration Actions:

X - Percent RSD > 30; percent D > 25; Estimate (J) positive results.
XX - Percent RSD > 50; percent D > 50; Estimate (J) positive results and (UJ) nondetects.

The nondetected results reported for 2,2'-oxybis(1-chloropropane) and 4-nitrophenol in the affected samples were qualified as estimated, (UJ), as a result of %Ds > 50%. No actions were necessary for any of the remaining semivolatile compounds in which %Ds were greater than 25% since no positive results were reported for these compounds in any of the affected samples and nondetects are not considered compromised by these noncompliances.

Pesticides/PCBs

Beta-BHC and Methoxychlor had an initial calibration Percent Relative Standard Deviation (%RSD) that was marginally above the 20% quality control limit. Only positive results are affected by this noncompliance. No action was necessary since no positives were reported in the affected sample.

BLANKS

The maximum concentration of contaminants found in associated low level laboratory method and field quality control blank analyses are summarized below:

Compound	Maximum Concentration	Action Level
Chloroform*	3 µg/L	15 µg/L
Bis(2-ethylhexyl)phthalate	1 µg/L	10 µg/L
Bis(2-ethylhexyl)phthalate	34 µg/Kg	340 µg/Kg

Samples Affected: All

* - Maximum concentrations detected in field quality control blank.

Blank Actions:

- Value < Contract Required Quantitation Limit (CRQL); report CRQL followed by a U.
- Value > CRQL and < action level; report value followed by a U.
- Value > CRQL and > action level; report value unqualified.

Sample aliquot size, percent moisture and dilution factors were taken into consideration prior to the application of all action levels. No actions were

taken for chloroform, since no positive results were reported for this compound in the affected samples. Positive results for bis(2-ethylhexyl)phthalate were qualified in the manner indicated by the blank actions table. It should also be noted that field quality control blanks are not qualified based on field quality control blank contamination.

LABORATORY CONTROL SPIKE/LABORATORY CONTROL SPIKE DUPLICATE RESULTS

Volatiles

The aqueous Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD) sample LCS2 had a low Percent Recovery (%R) reported for ethylbenzene. No action was taken as a result of this marginally low %R.

Semivolatiles

The aqueous LCS/LCSD analysis of LCS2 yielded high Relative Percent Differences (RPDs) for 1,2,4-trichlorobenzene, 4-nitrophenol and pentachlorophenol. Only positive results are affected by this noncompliance. No actions were taken since no positive results were reported for these compounds in the affected samples.

Pesticides/PCBs

The soil LCS/LCSD samples LC0228SB2 and LD0228SB2 had low %Rs reported for Aroclor 1016. No action was taken as a result of these marginally low %Rs.

INTERNAL STANDARD AREAS

Semivolatiles

All six semivolatile internal standard areas were outside quality control limits for samples LF-SB03-18.520.5 and LF-SB05-12.514.5. As a result, the laboratory reanalyzed these samples. The reanalysis of sample LF-SB05-12.514.5 yielded poor areas for 1,4-dichlorobenzene-d4 (DCB) naphthalene-d8 (NPT), acenaphthene-d10 (ANT) and phenanthrene-d10 (PHN). The reanalysis of sample LF-SB03-18.520.5 yielded poor areas for DCB and NPT. Since the reanalysis of these two samples showed some improvement in the areas, the reanalyses were chosen for validation. Positive and nondetected results reported for compounds quantitated by the failed internal standards were qualified as estimated, (J) and (UJ), respectively.

ADDITIONAL COMMENTS

It should be noted that Tentatively Identified Compounds (TICs) reported in both laboratory method blanks and environmental samples are not included in the TIC Summary table. These compounds can be attributed to laboratory blank contamination and sample preparation.

Positive results reported at concentrations below the Contract Required Quantitation Limit (CRQL) were qualified as estimated, (J).

No other problems were encountered in this case. The text of this report has been formulated to address only those problem areas affecting data quality.

OVERALL ASSESSMENT

Laboratory Performance: Holding times until extraction were missed for several pesticide/PCB samples. Several minor initial and continuing calibration noncompliances were noted in all three fractions. Bis(2-ethylhexyl)phthalate was detected in a laboratory method blank. Ethylbenzene had a low LCS/LCSD %R reported. High LCS/LCSD RPDs were noted for 1,2,4-trichlorobenzene, 4-nitrophenol and pentachlorophenol.

Other Factors Affecting Data Quality: Chloroform was detected in the field quality control blank. Two samples were reanalyzed as a result of poor semivolatile internal standard areas.

The data for these analyses were reviewed with reference to the EPA "Functional Guidelines for Organic Data Validation" (3/90). EPA Region I has not yet released Regional amendments updating the existing EPA Region I 2/88 National Functional Guidelines modifications to address 3/90 analytical protocol. Quality requirements outlined in the NEESA guidelines document entitled "Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program (NEESA 20.2-047B; 6/88) were also referenced.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NEESA Guidelines and the Quality Assurance Project Plan (QAPP)."

Anne K. Battista

Halliburton NUS Corporation

Anne K. Battista
Chemist/Data Validator

Halliburton NUS Corporation

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

NEW LONDON NSB

CASE NUS, SDG 21359

TABLE I. Recommendation Summary

Sample ID	VOA	SVOA	PEST/PCB
LF-SB03-18.520.5	$A^{1,6}$	$A^{2,3,5,6}$	J^{1}
LF-SB04-0810	A^{6}	$A^{2,3}$	J^{1}
LF-SB05-12.514.5	A^{6}	$A^{2,3,4}$	J^{1}
RB-01	A^{6}	A^{3}	

If the field is left blank, the qualifier is A - accept all data.

A^{1} - Accept data, but qualify positive result for acetone as estimated, (J), as a result of a continuing calibration %D > 25.

A^{2} - Accept data, but qualify nondetected results for 2,2'-oxybis(1-chloropropane) and 4-nitrophenol as estimated, (UJ), as a result of continuing calibration %Ds > 50%.

A^{3} - Accept data, but change positive results for bis(2-ethylhexyl)phthalate to a revised detection limit and qualify as nondetected, (U), as a result of laboratory method blank contamination.

A^{4} - Accept data, but qualify nondetected results quantitated by the semivolatile internal standards DCB, NPT, ANT and PHN, as estimated, (UJ), as a result of poor internal standard recoveries.

A^{5} - Accept data, but qualify nondetected results quantitated by the semivolatile internal standards DCB and NPT, as estimated, (UJ), as a result of poor internal standard recoveries.

A^{6} - Accept data, but estimate (J), all positive results reported at concentrations below the CRQL.

J^{1} - Accept data, but qualify all nondetected results as estimated, (UJ), as a result of holding time until extraction exceedences.

NEW LONDON NSB

CASE NUS, SDG 21359

TABLE II. Tentatively Identified Compound Summary

TIC	LF-SB03-18.520.5	LF-SB04-0810	LF-SB05-12.514.5	RB-01
Unknown alkane	X		X	
Unknown amide	X	X	X	
Unknown organic acid	X	X		

APPENDIX A

QUALIFIED LABORATORY RESULTS

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID:			LF-SB03-18.5-20.5		LF-SB04-0810		LF-SB05-12.5-14.5	
LABORATORY ID:			21359.01		21361.01		21361.02	
TCL VOLATILE SOILS (UG/KG)								
ANALYTE	CRQL	MDL						
CHLOROMETHANE	10	1.9	16	U	11	U	13	U
BROMOMETHANE	10	2.8	16	U	11	U	13	U
VINYL CHLORIDE	10	1.9	16	U	11	U	13	U
CHLOROETHANE	10	2.9	16	U	11	U	13	U
METHYLENE CHLORIDE	10	2.1	8	J	2	J	2	J
ACETONE	10	3.7	18	J	11	U	13	U
CARBON DISULFIDE	10	1.4	8	J	11	U	13	U
1,1-DICHLOROETHENE	10	1.1	16	U	11	U	13	U
1,1-DICHLOROETHANE	10	1.6	16	U	11	U	13	U
1,2-DICHLOROETHENE(TOTAL)	10	1.2	16	U	11	U	13	U
CHLOROFORM	10	1.3	16	U	11	U	13	U
1,2-DICHLOROETHANE	10	2.8	16	U	11	U	13	U
2-BUTANONE	10	3.9	16	U	11	U	13	U
1,1,1-TRICHLOROETHANE	10	0.6	16	U	11	U	13	U
CARBON TETRACHLORIDE	10	1.2	16	U	11	U	13	U
BROMODICHLOROMETHANE	10	0.7	16	U	11	U	13	U
1,2-DICHLOROPROPANE	10	1.0	16	U	11	U	13	U
CIS-1,3-DICHLOROPROPENE	10	1.0	16	U	11	U	13	U
TRICHLOROETHENE	10	1.1	16	U	11	U	13	U
DIBROMOCHLOROMETHANE	10	1.4	16	U	11	U	13	U
1,1,2-TRICHLOROETHANE	10	1.1	16	U	11	U	13	U
BENZENE	10	1.2	16	U	11	U	13	U
TRANS-1,3-DICHLOROPROPENE	10	0.9	16	U	11	U	13	U
BROMOFORM	10	2.5	16	U	11	U	13	U
4-METHYL-2-PENTANONE	10	4.0	16	U	11	U	13	U
2-HEXANONE	10	4.8	16	U	11	U	13	U
TETRACHLOROETHENE	10	1.3	16	U	11	U	13	U
1,1,2,2-TETRACHLOROETHANE	10	1.7	16	U	11	U	13	U
TOLUENE	10	0.9	16	U	11	U	13	U
CHLOROBENZENE	10	0.8	16	U	11	U	13	U
ETHYLBENZENE	10	2.6	16	U	11	U	13	U
STYRENE	10	0.9	16	U	11	U	13	U
XYLENE (TOTAL)	10	1.7	16	U	11	U	13	U
% SOLIDS:			61.0		89.0		79.0	
DILUTION FACTOR:			1.0		1.0		1.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID: RB-01
LABORATORY ID: 21359.02

TCL VOLATILE WATERS (UG/L)

ANALYTE	CRQL	MDL		
CHLOROMETHANE	10	0.4	10	U
BROMOMETHANE	10	1.0	10	U
VINYL CHLORIDE	10	0.8	10	U
CHLOROETHANE	10	1.2	10	U
METHYLENE CHLORIDE	10	1.0	10	U
ACETONE	10	1.9	10	U
CARBON DISULFIDE	10	0.7	10	U
1,1-DICHLOROETHENE	10	1.1	10	U
1,1-DICHLOROETHANE	10	0.5	10	U
1,2-DICHLOROETHENE(TOTAL)	10	1.0	10	U
CHLOROFORM	10	0.8	3	J
1,2-DICHLOROETHANE	10	1.4	10	U
2-BUTANONE	10	8.8	10	U
1,1,1-TRICHLOROETHANE	10	0.6	10	U
CARBON TETRACHLORIDE	10	0.5	10	U
BROMODICHLOROMETHANE	10	2.5	10	U
1,2-DICHLOROPROPANE	10	1.3	10	U
CIS-1,3-DICHLOROPROPENE	10	0.7	10	U
TRICHLOROETHENE	10	0.4	10	U
DIBROMOCHLOROMETHANE	10	2.5	10	U
1,1,2-TRICHLOROETHANE	10	2.2	10	U
BENZENE	10	0.8	10	U
TRANS-1,3-DICHLOROPROPENE	10	1.0	10	U
BROMOFORM	10	3.7	10	U
4-METHYL-2-PENTANONE	10	2.1	10	U
2-HEXANONE	10	1.5	10	U
TETRACHLOROETHENE	10	0.8	10	U
1,1,2,2-TETRACHLOROETHANE	10	3.7	10	U
TOLUENE	10	0.4	10	U
CHLOROBENZENE	10	0.5	10	U
ETHYLBENZENE	10	0.6	10	U
STYRENE	10	0.8	10	U
XYLENE (TOTAL)	10	0.6	10	U
DILUTION FACTOR:			1.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID:			LF-SB03-18.5-20.5		LF-SB04-0810		LF-SB05-12.5-14.5	
LABORATORY ID:			21359.01 RE		21361.01		21361.02 RE	

TCL SEMIVOLATILE SOILS (UG/KG)

ANALYTE	CRQL	MDL						
PHENOL	330	75	540	UJ	370	U	420	UJ
BIS(2-CHLOROETHYL)ETHER	330	63	540	UJ	370	U	420	UJ
2-CHLOROPHENOL	330	65	540	UJ	370	U	420	UJ
1,3-DICHLOROBENZENE	330	57	540	UJ	370	U	420	UJ
1,4-DICHLOROBENZENE	330	55	540	UJ	370	U	420	UJ
1,2-DICHLOROBENZENE	330	65	540	UJ	370	U	420	UJ
2-METHYLPHENOL	330	23	540	UJ	370	U	420	UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	330	195	540	UJ	370	UJ	420	UJ
4-METHYLPHENOL	330	60	540	UJ	370	U	420	UJ
N-NITROSO-DI-N-PROPYLAMINE	330	100	540	UJ	370	U	420	UJ
HEXACHLOROETHANE	330	52	540	UJ	370	U	420	UJ
NITROBENZENE	330	21	540	UJ	370	U	420	UJ
ISOPHORONE	330	46	540	UJ	370	U	420	UJ
2-NITROPHENOL	330	29	540	UJ	370	U	420	UJ
2,4-DIMETHYLPHENOL	330	78	540	UJ	370	U	420	UJ
2,4-DICHLOROPHENOL	330	42	540	UJ	370	U	420	UJ
1,2,4-TRICHLOROBENZENE	330	52	540	UJ	370	U	420	UJ
NAPHTHALENE	330	45	540	UJ	370	U	420	UJ
4-CHLOROANILINE	330	89	540	UJ	370	U	420	UJ
BIS(2-CHLOROETHOXY)METHANE	330	35	540	UJ	370	U	420	UJ
HEXACHLOROBUTADIENE	330	78	540	UJ	370	U	420	UJ
4-CHLORO-3-METHYLPHENOL	330	41	540	UJ	370	U	420	UJ
2-METHYLNAPHTHALENE	330	29	540	UJ	370	U	420	UJ
HEXACHLOROCYCLOPENTADIENE	330	259	540	U	370	U	420	UJ
2,4,6-TRICHLOROPHENOL	330	54	540	U	370	U	420	UJ
2,4,5-TRICHLOROPHENOL	800	83	1300	U	900	U	1000	UJ
2-CHLORONAPHTHALENE	330	33	540	U	370	U	420	UJ
2-NITROANILINE	800	60	1300	U	900	U	1000	UJ
DIMETHYL PHTHALATE	330	25	540	U	370	U	420	UJ
ACENAPHTHYLENE	330	29	540	U	370	U	420	UJ
2,6-DINITROTOLUENE	330	39	540	U	370	U	420	UJ
3-NITROANILINE	800	164	1300	U	900	U	1000	UJ
ACENAPHTHENE	330	37	540	U	370	U	420	UJ

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID:			LF-SB03-18.5-20.5		LF-SB04-0810		LF-SB05-12.5-14.5	
LABORATORY ID:			21359.01 RE		21361.01		21361.02 RE	
TCL SEMIVOLATILE SOILS (UG/KG)								
ANALYTE	CRQL	MDL						
2,4-DINITROPHENOL	800	87	1300	U	900	U	1000	UJ
4-NITROPHENOL	800	68	1300	UJ	900	UJ	1000	UJ
DIBENZOFURAN	330	28	540	U	370	U	420	UJ
2,4-DINITROTOLUENE	330	46	540	U	370	U	420	UJ
DIETHYL PHTHALATE	330	37	540	U	370	U	420	UJ
4-CHLOROPHENYL PHENYL ETHER	330	61	540	U	370	U	420	UJ
FLUORENE	330	30	540	U	370	U	420	UJ
4-NITROANILINE	800	89	1300	U	900	U	1000	UJ
4,6-DINITRO-2-METHYLPHENOL	800	68	1300	U	900	U	1000	UJ
N-NITROSODIPHENYLAMINE	330	31	540	U	370	U	420	UJ
4-BROMOPHENYL PHENYL ETHER	330	96	540	U	370	U	420	UJ
HEXACHLOROBENZENE	330	95	540	U	370	U	420	UJ
PENTACHLOROPHENOL	800	287	1300	U	900	U	1000	UJ
PHENANTHRENE	330	45	540	U	370	U	420	UJ
ANTHRACENE	330	56	540	U	370	U	420	UJ
CARBAZOLE	330	73	540	U	370	U	420	UJ
DI-N-BUTYL PHTHALATE	330	43	540	U	370	U	420	UJ
FLUORANTHENE	330	41	540	U	370	U	420	UJ
PYRENE	330	92	[illegible]	J	370	U	420	U
BUTYLBENZYL PHTHALATE	330	86	540	U	370	U	420	U
3,3'-DICHLOROBENZIDINE	330	80	540	U	370	U	420	U
BENZO(A)ANTHRACENE	330	29	540	U	370	U	420	U
CHRYSENE	330	27	540	U	370	U	420	U
BIS(2-ETHYLHEXYL)PHTHALATE	330	91	540	U	370	U	420	U
DI-N-OCTYL PHTHALATE	330	43	540	U	370	U	420	U
BENZO(B)FLUORANTHENE	330	142	540	U	370	U	420	U
BENZO(K)FLUORANTHENE	330	166	540	U	370	U	420	U
BENZO(A)PYRENE	330	31	[illegible]	J	370	U	420	U
INDENO(1,2,3-CD)PYRENE	330	67	540	U	370	U	420	U
DIBENZ(A,H)ANTHRACENE	330	81	540	U	370	U	420	U
BENZO(G,H,I)PERYLENE	330	66	540	U	370	U	420	U
% SOLIDS:			61.0		89.0		79.0	
DILUTION FACTOR:			1.0		1.0		1.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID: RB-01
LABORATORY ID: 21359.02

TCL SEMIVOLATILE WATERS (UG/L)

ANALYTE	CRQL	MDL		
PHENOL	10	3.7	10	U
BIS(2-CHLOROETHYL)ETHER	10	4.0	10	U
2-CHLOROPHENOL	10	4.0	10	U
1,3-DICHLOROBENZENE	10	3.0	10	U
1,4-DICHLOROBENZENE	10	3.1	10	U
1,2-DICHLOROBENZENE	10	3.6	10	U
2-METHYLPHENOL	10	4.3	10	U
2,2'-OXYBIS(1-CHLOROPROPANE)	10	4.6	10	U
4-METHYLPHENOL	10	4.0	10	U
N-NITROSO-DI-N-PROPYLAMINE	10	3.0	10	U
HEXACHLOROETHANE	10	2.8	10	U
NITROBENZENE	10	3.6	10	U
ISOPHORONE	10	3.0	10	U
2-NITROPHENOL	10	3.5	10	U
2,4-DIMETHYLPHENOL	10	4.8	10	U
2,4-DICHLOROPHENOL	10	3.7	10	U
1,2,4-TRICHLOROBENZENE	10	2.9	10	U
NAPHTHALENE	10	3.7	10	U
4-CHLOROANILINE	10	9.8	10	U
BIS(2-CHLOROETHOXY)METHANE	10	3.3	10	U
HEXACHLOROBUTADIENE	10	3.0	10	U
4-CHLORO-3-METHYLPHENOL	10	3.2	10	U
2-METHYLNAPHTHALENE	10	3.3	10	U
HEXACHLOROCYCLOPENTADIENE	10	NA	10	U
2,4,6-TRICHLOROPHENOL	10	3.5	10	U
2,4,5-TRICHLOROPHENOL	25	3.4	25	U
2-CHLORONAPHTHALENE	10	3.2	10	U
2-NITROANILINE	25	3.0	25	U
DIMETHYL PHTHALATE	10	2.44	10	U
ACENAPHTHYLENE	10	3.3	10	U
2,6-DINITROTOLUENE	10	2.9	10	U
3-NITROANILINE	25	2.5	25	U
ACENAPHTHENE	10	3.3	10	U

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID: RB-01
LABORATORY ID: 21359.02

TCL SEMIVOLATILE WATERS (UG/L)

ANALYTE	CRQL	MDL		
2,4-DINITROPHENOL	25	2.6	25	U
4-NITROPHENOL	25	2.3	25	U
DIBENZOFURAN	10	3.2	10	U
2,4-DINITROTOLUENE	10	2.1	10	U
DIETHYL PHTHALATE	10	2.9	10	U
4-CHLOROPHENYL PHENYL ETHER	10	3.6	10	U
FLUORENE	10	3.0	10	U
4-NITROANILINE	25	2.1	25	U
4,6-DINITRO-2-METHYLPHENOL	25	2.5	25	U
N-NITROSODIPHENYLAMINE	10	2.0	10	U
4-BROMOPHENYL PHENYL ETHER	10	2.8	10	U
HEXACHLOROBENZENE	10	2.2	10	U
PENTACHLOROPHENOL	25	2.0	25	U
PHENANTHRENE	10	2.3	10	U
ANTHRACENE	10	2.4	10	U
CARBAZOLE	10	2.2	10	U
DI-N-BUTYL PHTHALATE	10	2.8	10	U
FLUORANTHENE	10	1.2	10	U
PYRENE	10	1.6	10	U
BUTYLBENZYL PHTHALATE	10	1.8	10	U
3,3'-DICHLOROBENZIDINE	10	0.7	10	U
BENZO(A)ANTHRACENE	10	1.4	10	U
CHRYSENE	10	1.7	10	U
BIS(2-ETHYLHEXYL)PHTHALATE	10	1.5	10	U
DI-N-OCTYL PHTHALATE	10	2.0	10	U
BENZO(B)FLUORANTHENE	10	1.4	10	U
BENZO(K)FLUORANTHENE	10	2.2	10	U
BENZO(A)PYRENE	10	0.9	10	U
INDENO(1,2,3-CD)PYRENE	10	1.5	10	U
DIBENZ(A,H)ANTHRACENE	10	2.0	10	U
BENZO(G,H,I)PERYLENE	10	1.6	10	U
DILUTION FACTOR:			1.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID:			LF-SB03-18.5-20.5		LF-SB04-0810		LF-SB05-12.5-14.5	
LABORATORY ID:			21359.01		21361.01		21361.02	
TCL PESTICIDE/PCB SOILS (UG/KG)								
ANALYTE	CRQL	MDL						
ALPHA-BHC	1.7	0.07	2.8	UJ	1.9	UJ	2.2	UJ
BETA-BHC	1.7	0.15	2.8	UJ	1.9	UJ	2.2	UJ
DELTA-BHC	1.7	0.07	2.8	UJ	1.9	UJ	2.2	UJ
GAMMA-BHC (LINDANE)	1.7	0.07	2.8	UJ	1.9	UJ	2.2	UJ
HEPTACHLOR	1.7	0.16	2.8	UJ	1.9	UJ	2.2	UJ
ALDRIN	1.7	0.07	2.8	UJ	1.9	UJ	2.2	UJ
HEPTACHLOR EPOXIDE	1.7	0.05	2.8	UJ	1.9	UJ	2.2	UJ
ENDOSULFAN I	1.7	0.08	2.8	UJ	1.9	UJ	2.2	UJ
DIELDRIN	3.3	0.24	5.4	UJ	3.7	UJ	4.2	UJ
4,4'-DDE	3.3	0.10	5.4	UJ	3.7	UJ	4.2	UJ
ENDRIN	3.3	0.15	5.4	UJ	3.7	UJ	4.2	UJ
ENDOSULFAN II	3.3	0.13	5.4	UJ	3.7	UJ	4.2	UJ
4,4'-DDD	3.3	0.09	5.4	UJ	3.7	UJ	4.2	UJ
ENDOSULFAN SULFATE	3.3	2.9	5.4	UJ	3.7	UJ	4.2	UJ
4,4'-DDT	3.3	0.14	5.4	UJ	3.7	UJ	4.2	UJ
METHOXYCHLOR	17	0.66	28	UJ	19	UJ	22	UJ
ENDRIN KETONE	3.3	0.12	5.4	UJ	3.7	UJ	4.2	UJ
ENDRIN ALDEHYDE	3.3	0.10	5.4	UJ	3.7	UJ	4.2	UJ
ALPHA-CHLORDANE	1.7	0.12	2.8	UJ	1.9	UJ	2.2	UJ
GAMMA-CHLORDANE	1.7	0.09	2.8	UJ	1.9	UJ	2.2	UJ
TOXAPHENE	170	1.0	280	UJ	190	UJ	220	UJ
AROCLOR-1016	33	1.0	54	UJ	37	UJ	42	UJ
AROCLOR-1221	67	1.3	110	UJ	75	UJ	85	UJ
AROCLOR-1232	33	0.33	54	UJ	37	UJ	42	UJ
AROCLOR-1242	33	0.33	54	UJ	37	UJ	42	UJ
AROCLOR-1248	33	1.3	54	UJ	37	UJ	42	UJ
AROCLOR-1254	33	1.7	54	UJ	37	UJ	42	UJ
AROCLOR-1260	33	1.3	54	UJ	37	UJ	42	UJ
% SOLIDS:			61.0		89.0		79.0	
DILUTION FACTOR:			1.0		1.0		1.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID: RB-01
LABORATORY ID: 21359.02

TCL PESTICIDE/PCB WATERS (UG/L)

ANALYTE	CRQL	MDL		
ALPHA-BHC	0.05	0.002	0.05	U
BETA-BHC	0.05	0.004	0.05	U
DELTA-BHC	0.05	0.002	0.05	U
GAMMA-BHC (LINDANE)	0.05	0.002	0.05	U
HEPTACHLOR	0.05	0.005	0.05	U
ALDRIN	0.05	0.002	0.05	U
HEPTACHLOR EPOXIDE	0.05	0.002	0.05	U
ENDOSULFAN I	0.05	0.002	0.05	U
DIELDRIN	0.1	0.007	0.1	U
4,4'-DDE	0.1	0.003	0.1	U
ENDRIN	0.1	0.005	0.1	U
ENDOSULFAN II	0.1	0.004	0.1	U
4,4'-DDD	0.1	0.003	0.1	U
ENDOSULFAN SULFATE	0.1	0.089	0.1	U
4,4'-DDT	0.1	0.004	0.1	U
METHOXYCHLOR	0.5	0.020	0.5	U
ENDRIN KETONE	0.1	0.004	0.1	U
ENDRIN ALDEHYDE	0.1	0.003	0.1	U
ALPHA-CHLORDANE	0.05	0.004	0.05	U
GAMMA-CHLORDANE	0.05	0.003	0.05	U
TOXAPHENE	5	0.03	5	U
AROCLOR-1016	1	0.03	1	U
AROCLOR-1221	2	0.04	2	U
AROCLOR-1232	1	0.01	1	U
AROCLOR-1242	1	0.01	1	U
AROCLOR-1248	1	0.04	1	U
AROCLOR-1254	1	0.05	1	U
AROCLOR-1260	1	0.04	1	U
DILUTION FACTOR:			1.0	

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB03185205

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG657.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: not dec. 39 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	16	U
74-83-9	Bromomethane	16	U
75-01-4	Vinyl Chloride	16	U
75-00-3	Chloroethane	16	U
75-09-2	Methylene Chloride	8	J
67-64-1	Acetone	18	
75-15-0	Carbon Disulfide	8	J
75-35-4	1,1-Dichloroethene	16	U
75-34-3	1,1-Dichloroethane	16	U
540-59-0	1,2-Dichloroethene (total)	16	U
67-66-3	Chloroform	16	U
107-06-2	1,2-Dichloroethane	16	U
78-93-3	2-Butanone	16	U
71-55-6	1,1,1-Trichloroethane	16	U
56-23-5	Carbon Tetrachloride	16	U
75-27-4	Bromodichloromethane	16	U
78-87-5	1,2-Dichloropropane	16	U
10061-01-5	cis-1,3-Dichloropropene	16	U
79-01-6	Trichloroethene	16	U
124-48-1	Dibromochloromethane	16	U
79-00-5	1,1,2-Trichloroethane	16	U
71-43-2	Benzene	16	U
10061-02-6	trans-1,3-Dichloropropene	16	U
75-25-2	Bromoform	16	U
108-10-1	4-Methyl-2-Pentanone	16	U
591-78-6	2-Hexanone	16	U
127-18-4	Tetrachloroethene	16	U
108-88-3	Toluene	16	U
79-34-5	1,1,2,2-Tetrachloroethane	16	U
108-90-7	Chlorobenzene	16	U
100-41-4	Ethylbenzene	16	U
100-42-5	Styrene	16	U
1330-20-7	Xylene (Total)	16	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFSB03185205

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG657.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: not dec. 39 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB040810

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG658.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: not dec. 11 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	11	U
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	11	U
67-66-3	Chloroform	11	U
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-Dichloropropene	11	U
79-01-6	Trichloroethene	11	U
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-Dichloropropene	11	U
75-25-2	Bromoform	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	11	U
108-88-3	Toluene	11	U
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
1330-20-7	Xylene (Total)	11	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFSB040810

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.01

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG658.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: not dec. 11 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	12.980	17	JB
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB05125145

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG659.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: not dec. 21 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	13	U
75-15-0	Carbon Disulfide	13	U
75-35-4	1,1-Dichloroethene	13	U
75-34-3	1,1-Dichloroethane	13	U
540-59-0	1,2-Dichloroethene (total)	13	U
67-66-3	Chloroform	13	U
107-06-2	1,2-Dichloroethane	13	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	13	U
56-23-5	Carbon Tetrachloride	13	U
75-27-4	Bromodichloromethane	13	U
78-87-5	1,2-Dichloropropane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
79-01-6	Trichloroethene	13	U
124-48-1	Dibromochloromethane	13	U
79-00-5	1,1,2-Trichloroethane	13	U
71-43-2	Benzene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
75-25-2	Bromoform	13	U
108-10-1	4-Methyl-2-Pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	13	U
108-88-3	Toluene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
100-42-5	Styrene	13	U
1330-20-7	Xylene (Total)	13	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFSB05125145

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG659.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: not dec. 21 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	12.984	13	JB
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RB-01

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359.02

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: KO045.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: not dec. _____ Date Analyzed: 02/27/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (Total)	10	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

RB-01

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359.02

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: KO045.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: not dec. _____ Date Analyzed: 02/27/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB040810

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3310.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 11 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	370	U
111-44-4	bis(2-Chloroethyl)Ether	370	U
95-57-8	2-Chlorophenol	370	U
541-73-1	1,3-Dichlorobenzene	370	U
106-46-7	1,4-Dichlorobenzene	370	U
95-50-1	1,2-Dichlorobenzene	370	U
95-48-7	2-Methylphenol	370	U
108-60-1	2,2'-oxybis(1-Chloropropane)	370	U
106-44-5	4-Methylphenol	370	U
621-64-7	N-Nitroso-di-n-propylamine	370	U
67-72-1	Hexachloroethane	370	U
98-95-3	Nitrobenzene	370	U
78-59-1	Isophorone	370	U
88-75-5	2-Nitrophenol	370	U
105-67-9	2,4-Dimethylphenol	370	U
111-91-1	bis(2-Chloroethoxy)methane	370	U
120-83-2	2,4-Dichlorophenol	370	U
120-82-1	1,2,4-Trichlorobenzene	370	U
91-20-3	Naphthalene	370	U
106-47-8	4-Chloroaniline	370	U
87-68-3	Hexachlorobutadiene	370	U
59-50-7	4-Chloro-3-Methylphenol	370	U
91-57-6	2-Methylnaphthalene	370	U
77-47-4	Hexachlorocyclopentadiene	370	U
88-06-2	2,4,6-Trichlorophenol	370	U
95-95-4	2,4,5-Trichlorophenol	900	U
91-58-7	2-Chloronaphthalene	370	U
88-74-4	2-Nitroaniline	900	U
131-11-3	Dimethylphthalate	370	U
208-96-8	Acenaphthylene	370	U
606-20-2	2,6-Dinitrotoluene	370	U
99-09-2	3-Nitroaniline	900	U
83-32-9	Acenaphthene	370	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB040810

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3310.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 11 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	900	U
100-02-7	4-Nitrophenol	900	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-01-6	4-Nitroaniline	900	U
534-52-1	4,6-Dinitro-2-methylphenol	900	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	900	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
86-74-8	Carbazole	370	U
84-74-2	Di-n-butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	370	U
56-55-3	Benzo(a)anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)phthalate	57	JB
117-84-0	Di-n-octylphthalate	370	U
205-99-2	Benzo(b)fluoranthene	370	U
207-08-9	Benzo(k)fluoranthene	370	U
50-32-8	Benzo(a)pyrene	370	U
193-39-5	Indeno(1,2,3-cd)pyrene	370	U
53-70-3	Dibenz(a,h)anthracene	370	U
191-24-2	Benzo(g,h,i)perylene	370	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFSB040810

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3310.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 11 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 23

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 123-42-2	2-Pentanone, 4-hydroxy-4-met	3.834	7400	NJAB
2.	UNKNOWN ORGANIC ACID	11.409	160	J
3.	UNKNOWN	15.550	160	JB
4.	UNKNOWN AMIDE	15.657	180	J
5.	UNKNOWN AMIDE	16.790	2500	J
6.	UNKNOWN AMIDE	16.910	250	JB
7.	UNKNOWN	17.457	110	J
8. 791-28-6	Phosphine oxide, triphenyl-	18.005	1200	NJ
9.	UNKNOWN AMIDE	19.061	420	J
10.	UNKNOWN	19.423	82	JB
11.	UNKNOWN	19.919	700	JB
12.	UNKNOWN	20.000	320	J
13.	UNKNOWN	20.537	81	J
14.	UNKNOWN	22.137	110	JB
15.	UNKNOWN	22.271	120	JB
16.	UNKNOWN	22.392	100	JB
17.	UNKNOWN	22.500	92	JB
18.	UNKNOWN	22.742	800	JB
19.	UNKNOWN	22.891	160	JB
20.	UNKNOWN	23.066	220	JB
21.	UNKNOWN	23.133	120	JB
22.	UNKNOWN	23.322	150	J
23.	UNKNOWN	23.376	94	J
24.				
25.				
26.				
27.				
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RB-01

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3294.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RB-01

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3294.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	1	JB
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

RB-01

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3294.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9

Number TICs found: 15

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	2.104	4	J
2.	UNKNOWN	2.157	4	J
3.	UNKNOWN	11.514	3	J
4.	UNKNOWN	14.110	2	J
5. 791-28-6	Phosphine oxide, triphenyl-	18.134	5	NJB
6.	UNKNOWN	18.602	2	J
7.	UNKNOWN	18.963	3	J
8.	UNKNOWN	19.177	2	J
9.	UNKNOWN	20.436	3	JB
10.	UNKNOWN	22.316	3	J
11.	UNKNOWN	22.599	3	JB
12.	UNKNOWN	22.706	3	JB
13.	UNKNOWN	23.016	4	JB
14.	UNKNOWN	23.097	3	JB
15.	UNKNOWN	23.232	4	JB
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB03185205

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3290.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	540	U
111-44-4	bis(2-Chloroethyl)Ether	540	U
95-57-8	2-Chlorophenol	540	U
541-73-1	1,3-Dichlorobenzene	540	U
106-46-7	1,4-Dichlorobenzene	540	U
95-50-1	1,2-Dichlorobenzene	540	U
95-48-7	2-Methylphenol	540	U
108-60-1	2,2'-oxybis(1-Chloropropane)	540	U
106-44-5	4-Methylphenol	540	U
621-64-7	N-Nitroso-di-n-propylamine	540	U
67-72-1	Hexachloroethane	540	U
98-95-3	Nitrobenzene	540	U
78-59-1	Isophorone	540	U
88-75-5	2-Nitrophenol	540	U
105-67-9	2,4-Dimethylphenol	540	U
111-91-1	bis(2-Chloroethoxy)methane	540	U
120-83-2	2,4-Dichlorophenol	540	U
120-82-1	1,2,4-Trichlorobenzene	540	U
91-20-3	Naphthalene	540	U
106-47-8	4-Chloroaniline	540	U
87-68-3	Hexachlorobutadiene	540	U
59-50-7	4-Chloro-3-Methylphenol	540	U
91-57-6	2-Methylnaphthalene	540	U
77-47-4	Hexachlorocyclopentadiene	540	U
88-06-2	2,4,6-Trichlorophenol	540	U
95-95-4	2,4,5-Trichlorophenol	1300	U
91-58-7	2-Chloronaphthalene	540	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	540	U
208-96-8	Acenaphthylene	540	U
606-20-2	2,6-Dinitrotoluene	540	U
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	540	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB03185205

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3290.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U
132-64-9	Dibenzofuran	540	U
121-14-2	2,4-Dinitrotoluene	540	U
84-66-2	Diethylphthalate	540	U
7005-72-3	4-Chlorophenyl-phenylether	540	U
86-73-7	Fluorene	540	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	540	U
101-55-3	4-Bromophenyl-phenylether	540	U
118-74-1	Hexachlorobenzene	540	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	540	U
120-12-7	Anthracene	540	U
86-74-8	Carbazole	540	U
84-74-2	Di-n-butylphthalate	540	U
206-44-0	Fluoranthene	540	U
129-00-0	Pyrene	32	J
85-68-7	Butylbenzylphthalate	540	U
91-94-1	3,3'-Dichlorobenzidine	540	U
56-55-3	Benzo(a)anthracene	540	U
218-01-9	Chrysene	540	U
117-81-7	bis(2-Ethylhexyl)phthalate	43	JB
117-84-0	Di-n-octylphthalate	540	U
205-99-2	Benzo(b)fluoranthene	540	U
207-08-9	Benzo(k)fluoranthene	540	U
50-32-8	Benzo(a)pyrene	280	J
193-39-5	Indeno(1,2,3-cd)pyrene	540	U
53-70-3	Dibenz(a,h)anthracene	540	U
191-24-2	Benzo(g,h,i)perylene	540	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB03185205

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3290.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

Number TICs found: 24

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	2.197	830	J
2. 123-42-2	2-Pentanone, 4-hydroxy-4-met	3.928	14000	NJAB
3.	UNKNOWN ORGANIC ACID	11.519	200	JB
4.	UNKNOWN AMIDE	14.384	190	J
5.	UNKNOWN AMIDE	15.665	250	J
6.	UNKNOWN	15.892	160	J
7.	UNKNOWN	16.253	940	J
8.	UNKNOWN	16.321	1700	J
9.	UNKNOWN ALKANE	16.401	530	J
10.	UNKNOWN AMIDE	16.910	3800	JB
11.	UNKNOWN AMIDE	17.030	360	J
12.	UNKNOWN AMIDE	18.089	190	J
13. 791-28-6	Phosphine oxide, triphenyl-	18.143	180	NJB
14.	UNKNOWN ALKANE	18.627	180	J
15.	UNKNOWN ALKANE	19.124	130	J
16.	UNKNOWN AMIDE	19.178	1500	J
17.	UNKNOWN ALKANE	20.675	210	J
18.	UNKNOWN	21.201	130	JB
19.	UNKNOWN ALKANE	21.917	140	J
20.	UNKNOWN	22.173	220	JB
21.	UNKNOWN	22.308	140	JB
22.	UNKNOWN	22.795	1400	JB
23.	UNKNOWN	22.890	140	JB
24.	UNKNOWN	23.323	250	J
25.				
26.				
27.				
28.				
29.				
30.				

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB03185205RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3312.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	540	U
111-44-4	bis(2-Chloroethyl)Ether	540	U
95-57-8	2-Chlorophenol	540	U
541-73-1	1,3-Dichlorobenzene	540	U
106-46-7	1,4-Dichlorobenzene	540	U
95-50-1	1,2-Dichlorobenzene	540	U
95-48-7	2-Methylphenol	540	U
108-60-1	2,2'-oxybis(1-Chloropropane)	540	U
106-44-5	4-Methylphenol	540	U
621-64-7	N-Nitroso-di-n-propylamine	540	U
67-72-1	Hexachloroethane	540	U
98-95-3	Nitrobenzene	540	U
78-59-1	Isophorone	540	U
88-75-5	2-Nitrophenol	540	U
105-67-9	2,4-Dimethylphenol	540	U
111-91-1	bis(2-Chloroethoxy)methane	540	U
120-83-2	2,4-Dichlorophenol	540	U
120-82-1	1,2,4-Trichlorobenzene	540	U
91-20-3	Naphthalene	540	U
106-47-8	4-Chloroaniline	540	U
87-68-3	Hexachlorobutadiene	540	U
59-50-7	4-Chloro-3-Methylphenol	540	U
91-57-6	2-Methylnaphthalene	540	U
77-47-4	Hexachlorocyclopentadiene	540	U
88-06-2	2,4,6-Trichlorophenol	540	U
95-95-4	2,4,5-Trichlorophenol	1300	U
91-58-7	2-Chloronaphthalene	540	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	540	U
208-96-8	Acenaphthylene	540	U
606-20-2	2,6-Dinitrotoluene	540	U
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	540	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB03185205RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3312.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U
132-64-9	Dibenzofuran	540	U
121-14-2	2,4-Dinitrotoluene	540	U
84-66-2	Diethylphthalate	540	U
7005-72-3	4-Chlorophenyl-phenylether	540	U
86-73-7	Fluorene	540	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	540	U
101-55-3	4-Bromophenyl-phenylether	540	U
118-74-1	Hexachlorobenzene	540	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	540	U
120-12-7	Anthracene	540	U
86-74-8	Carbazole	540	U
84-74-2	Di-n-butylphthalate	540	U
206-44-0	Fluoranthene	540	U
129-00-0	Pyrene	30	J
85-68-7	Butylbenzylphthalate	540	U
91-94-1	3,3'-Dichlorobenzidine	540	U
56-55-3	Benzo(a)anthracene	540	U
218-01-9	Chrysene	540	U
117-81-7	bis(2-Ethylhexyl)phthalate	60	JB
117-84-0	Di-n-octylphthalate	540	U
205-99-2	Benzo(b)fluoranthene	540	U
207-08-9	Benzo(k)fluoranthene	540	U
50-32-8	Benzo(a)pyrene	310	J
193-39-5	Indeno(1,2,3-cd)pyrene	540	U
53-70-3	Dibenz(a,h)anthracene	540	U
191-24-2	Benzo(g,h,i)perylene	540	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB03185205RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359.01RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3312.D

Level: (low/med) LOW Date Received: 02/18/95

% Moisture: 39 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0

Number TICs found: 24

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	Unknown	2.130	950	J
2.	UNKNOWN	2.277	350	J
3. 123-42-2	2-Pentanone, 4-hydroxy-4-met	3.834	14000	NJAB
4.	UNKNOWN ORGANIC ACID	11.408	230	J
5.	UNKNOWN	14.724	310	J
6.	UNKNOWN	14.777	210	J
7.	UNKNOWN	14.857	330	J
8.	UNKNOWN	14.924	360	J
9.	UNKNOWN	14.977	400	J
10.	UNKNOWN	15.031	230	J
11.	UNKNOWN AMIDE	15.643	200	J
12.	UNKNOWN ALKANE	16.297	190	J
13.	UNKNOWN AMIDE	16.790	3100	J
14.	UNKNOWN ALKANE	16.870	340	J
15. 791-28-6	Phosphine oxide, triphenyl-	18.005	1700	NJ
16.	UNKNOWN ALKANE	18.513	210	J
17.	UNKNOWN AMIDE	19.061	1200	J
18.	UNKNOWN	19.248	290	JB
19.	UNKNOWN ALKANE	20.535	310	J
20.	UNKNOWN	22.159	200	JB
21.	UNKNOWN	22.495	190	JB
22.	UNKNOWN	22.656	590	JB
23.	UNKNOWN	22.899	290	JB
24.	UNKNOWN	23.006	200	J
25.				
26.				
27.				
28.				
29.				
30.				

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB05125145

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3289.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	420	U
111-44-4	bis(2-Chloroethyl)Ether	420	U
95-57-8	2-Chlorophenol	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
95-50-1	1,2-Dichlorobenzene	420	U
95-48-7	2-Methylphenol	420	U
108-60-1	2,2'-oxybis(1-Chloropropane)	420	U
106-44-5	4-Methylphenol	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
59-50-7	4-Chloro-3-Methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	420	U
208-96-8	Acenaphthylene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	420	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB05125145

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3289.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)phthalate	51	J
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenz(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB05125145

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3289.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

Number TICs found: 25

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 123-42-2	2-Pentanone, 4-hydroxy-4-met	3.928	9200	NJAB
2.	UNKNOWN AMIDE	15.666	160	J
3.	UNKNOWN AMIDE	15.773	240	J
4.	UNKNOWN AMIDE	16.922	3200	J
5.	UNKNOWN AMIDE	17.043	250	J
6.	UNKNOWN AMIDE	19.177	570	J
7.	UNKNOWN ALKANE	19.622	230	J
8.	UNKNOWN	19.770	210	J
9.	UNKNOWN	19.959	180	J
10.	UNKNOWN	20.040	93	J
11.	UNKNOWN ALKANE	20.134	96	J
12.	UNKNOWN	20.418	240	J
13.	UNKNOWN	20.580	250	J
14.	UNKNOWN ALKANE	20.674	340	J
15.	UNKNOWN	20.742	200	J
16.	UNKNOWN	20.863	190	J
17.	UNKNOWN	20.958	120	J
18.	UNKNOWN	21.107	260	J
19.	UNKNOWN	21.215	120	J
20.	UNKNOWN ALKANE	21.269	93	J
21.	UNKNOWN ALKANE	21.930	100	J
22.	UNKNOWN	22.322	97	J
23.	UNKNOWN	22.999	100	J
24.	UNKNOWN	23.148	97	J
25.	UNKNOWN	23.297	200	J
26.				
27.				
28.				
29.				
30.				

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB05125145RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3311.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	420	U
111-44-4	bis(2-Chloroethyl)Ether	420	U
95-57-8	2-Chlorophenol	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
95-50-1	1,2-Dichlorobenzene	420	U
95-48-7	2-Methylphenol	420	U
108-60-1	2,2'-oxybis(1-Chloropropane)	420	U
106-44-5	4-Methylphenol	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
59-50-7	4-Chloro-3-Methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	420	U
208-96-8	Acenaphthylene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	420	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB05125145RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3311.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)phthalate	68	JB
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenz(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB05125145RE

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361.02RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3311.D

Level: (low/med) LOW Date Received: 02/21/95

% Moisture: 21 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

Number TICs found: 24

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.834	9400	NJAB
2.		UNKNOWN ORGANIC ACID	11.409	160	J
3.		UNKNOWN AMIDE	15.643	210	J
4.		UNKNOWN ALKANE	16.297	140	J
5.		UNKNOWN AMIDE	16.790	3000	J
6.		UNKNOWN ALKANE	17.444	170	J
7.	791-28-6	Phosphine oxide, triphenyl-	18.005	1000	NJ
8.		UNKNOWN ALKANE	18.513	150	J
9.		UNKNOWN	18.553	120	JB
10.		UNKNOWN AMIDE	19.061	650	J
11.		UNKNOWN ALKANE	19.503	380	J
12.		UNKNOWN	19.812	170	JB
13.		UNKNOWN	20.282	100	J
14.		UNKNOWN ALKANE	20.537	310	J
15.		UNKNOWN	20.725	100	J
16.		UNKNOWN	20.940	240	J
17.		UNKNOWN ALKANE	21.759	160	J
18.		UNKNOWN	22.001	120	J
19.		UNKNOWN	22.163	140	JB
20.		UNKNOWN	22.526	120	JB
21.		UNKNOWN	22.647	260	JB
22.		UNKNOWN	22.863	270	JB
23.		UNKNOWN	22.984	240	J
24.		UNKNOWN	23.132	330	JB
25.					
26.					
27.					
28.					
29.					
30.					

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB03185205

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21359-01

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 39 decanted: (Y/N) N Date Received: 02/18/95

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/28/95

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 03/06/95

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.8	U
319-85-7	beta-BHC	2.8	U
319-86-8	delta-BHC	2.8	U
58-89-9	gamma-BHC (Lindane)	2.8	U
76-44-8	Heptachlor	2.8	U
309-00-2	Aldrin	2.8	U
1024-57-3	Heptachlor epoxide	2.8	U
959-98-8	Endosulfan I	2.8	U
60-57-1	Dieldrin	5.4	U
72-55-9	4,4'-DDE	5.4	U
72-20-8	Endrin	5.4	U
33213-65-9	Endosulfan II	5.4	U
72-54-8	4,4'-DDD	5.4	U
1031-07-8	Endosulfan sulfate	5.4	U
50-29-3	4,4'-DDT	5.4	U
72-43-5	Methoxychlor	28	U
53494-70-5	Endrin ketone	5.4	U
7421-93-4	Endrin aldehyde	5.4	U
5103-71-9	alpha-Chlordane	2.8	U
5103-74-2	gamma-Chlordane	2.8	U
8001-35-2	Toxaphene	280	U
12674-11-2	Aroclor-1016	54	U
11104-28-2	Aroclor-1221	110	U
11141-16-5	Aroclor-1232	54	U
53469-21-9	Aroclor-1242	54	U
12672-29-6	Aroclor-1248	54	U
11097-69-1	Aroclor-1254	54	U
11096-82-5	Aroclor-1260	54	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RB-01

Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: 21359-02

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 02/18/95

Extraction: (SepF/Cont/Sonc) CONT Date Extracted: 02/21/95

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 02/25/95

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST 3/90

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LF-SB04-0810

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361-01

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 11 decanted: (Y/N) N Date Received: 02/21/95

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/28/95

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 03/07/95

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	1.9	U
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U
1024-57-3	Heptachlor epoxide	1.9	U
959-98-8	Endosulfan I	1.9	U
60-57-1	Dieldrin	3.7	U
72-55-9	4,4'-DDE	3.7	U
72-20-8	Endrin	3.7	U
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	3.7	U
1031-07-8	Endosulfan sulfate	3.7	U
50-29-3	4,4'-DDT	3.7	U
72-43-5	Methoxychlor	19	U
53494-70-5	Endrin ketone	3.7	U
7421-93-4	Endrin aldehyde	3.7	U
5103-71-9	alpha-Chlordane	1.9	U
5103-74-2	gamma-Chlordane	1.9	U
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	75	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFSB05125145

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: 21361-02

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 21 decanted: (Y/N) N Date Received: 02/21/95

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/28/95

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 03/07/95

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 5.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.2	U
72-55-9	4,4'-DDE	4.2	U
72-20-8	Endrin	4.2	U
33213-65-9	Endosulfan II	4.2	U
72-54-8	4,4'-DDD	4.2	U
1031-07-8	Endosulfan sulfate	4.2	U
50-29-3	4,4'-DDT	4.2	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.2	U
7421-93-4	Endrin aldehyde	4.2	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	42	U
11104-28-2	Aroclor-1221	85	U
11141-16-5	Aroclor-1232	42	U
53469-21-9	Aroclor-1242	42	U
12672-29-6	Aroclor-1248	42	U
11097-69-1	Aroclor-1254	42	U
11096-82-5	Aroclor-1260	42	U

APPENDIX C

REGIONAL WORKSHEETS

REGION I
Data Review Worksheets

Site Name New London
Reference Number C-49-03-S-12

REGION I REVIEW OF ORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Southwest data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. NUS
SDG No. 21359
No. of Samples 4
8/1

SAS No. . .
Matrix Soil
Water

Sampling Date(s) 2/16, 2/17, 2/18/95
Shipping Date(s) 2/17, 2/20
Date Rec'd by Lab 2/18, 2/21

Traffic Report Nos: LF-SB03-18.5 20.5, LF-SB04-0810, LF-SB05-12.5 14.5
Trip Blank No.: None
Rinsate ~~Equipment~~ Blank No.: RB-01
Field Dup Nos: None

SOW No. OLM01.8 (3/90) requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Holding Times
- GC/MS Tuning
- Calibrations
- Blanks
- Surrogate Recoveries
- Matrix Spike/Matrix Spike Dup
- Field Duplicates
- Internal Standard Performance
- Pesticide Inst. Performance
- Compound Identification
- Compound Quantitation

Overall comments

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Compound not detected.

Reviewer: Anne K Battista Date: March 15, 1995

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE REC'D
NONE		

REGION I
Data Review Worksheets

II. HOLDING TIMES — Complete table for all samples and circle the fractions which are not within criteria.

SAMPLE ID	DATE SAMPLED	VOA DATE ANAL	SVA DATE EXTR	SVA DATE ANAL	PEST DATE EXTR*	PEST DATE ANAL
LF-SB03-18.5 20.5	2/16/95	2/23	2/21	3/02	2/28	3/06
LF-SB04-0810	2/17/95	2/23	2/21	3/02	2/28	3/7
LF-SB05-12.5 14.5	2/18/95	2/23	2/21	3/02	2/28	3/7
RB-01	2/16/95	2/27	2/22	3/02	2/21	2/25
LF-SB03-18 5205RE	2/16	X	2/21	3/02	X	X
LF-SB05-12 5145RE	2/18	X	2/21	3/02	X	X

VOA - Unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Preserved : Both within 14 days of sample collection.
Soils : Both within 14 days of sample collection.

SVA & PEST - Extracted within 7 days, analyzed within 40 days, soils water.

ACTION:
1. If holding times are exceeded all positive results are estim (J) and non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable(*).

* Dismissed holding times.

REGION I
Data Review Worksheets

III. GC/MS TUNING

✓ The DFTPP performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected: _____

✓ The BFB performance results were reviewed and found to be within the specified criteria.

If no,
Samples affected: _____

If mass calibration is in error refer to the Region guidelines for expanded criteria. If necessary, all associated data as unusable [illegible]

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 1/3/95
Dates of Continuing Calibrations: 2/23/95
Instrument ID : U
Matrix/Level : Soil/Low

	DATE	CRITERIA CHK	COMPOUND (VALUE)
IC	1/3	RF, %RSD, RF, %D	all criteria met.
		Samples Affected:	
CC	2/23	%D > 25%	Acetone; 44.3% 2-Butanone; 33.8%
		Samples Affected:	LF-SB03-185205, LF-SB04-0810, LF-SB05-125145
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheets

IV A. VOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 2/27/95
Dates of Continuing Calibrations: 2/27/95
Instrument ID : K
Matrix/Level : water/low

	DATE	CRITERIA OUT	COMPOUND (VALUE)
IC	2/27	RF, %RSD, RF, %D %RSD>30%	Chloroethane; 31.1%, 2-Butanone; 32.3%
		Samples Affected:	RB-01.
CC	2/27		all outing met.
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	

1. All $\overline{RF}$'s, and RF's must be >0.05
2. All %RSD's must be<30%
3. All %D's must be <25%

ACTION:
1. If any compound has an initial $\overline{RF}$ or a continuing RF of <0.05:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as unusable (R).

2. If any compound has a %RSD >30% or a %D >25%:
   a. Flag positive results for that compound as estimated (J).
   b. Flag non-detects for that compound as estimated (UJ) if the %RSD or %D is >50%.

A separate worksheet should be filled out for each initial curve.

REGION I
Data Review Worksheets

IV B. SEMIVOLATILE CALIBRATION VERIFICATION

Date of Initial Calibration : 3/01/95
Dates of Continuing Calibrations: 3/01, 3/02
Instrument ID : S

	DATE	CRITERIA OUT RF, %RSD, RF, %D	COMPOUND
IC	3/01		all criteria met.
		Samples Affected:	
CC	3/01	% D > 25%	Hexachlorocyclopentadiene; 37.6%,
		Samples Affected:	2,4- Dinitrophenol; 42%,
			4- Nitrophenol; 36.5%
		Samples Affected:	LF-SB05-125145, LF-SB03-185205,
			RB-01
		Samples Affected:	
CC	3/02	% D > 50%	2,2'-oxybis(1-chloropropane); 70.5
		Samples Affected:	4- Nitrophenol; 65.7%
			LF-SB04-0810, LF-SB03-185205 RE,
		Samples Affected:	LF-SB05-125145 RE
CC	3/02	% D > 25%	Hexachlorocyclopentadiene; 27.8%
		Samples Affected:	3-Nitroaniline; 31.0%, 2,4-Dinitrophenol; 37.7%
			Pentachlorophenol; 37.5
		Samples Affected:	" same as above "
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	
		Samples Affected:	

See worksheet IV-A for criteria and actions.

A new worksheet should be filled out for each initial curve.

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

List the contamination in the blanks below.

1. Laboratory Blanks

Level: Low

DATE	LAB ID	FRACTION/ MATRIX	COMPOUND	CONCENTRATION UNITS
3/01	SBLK1	SVOA/soil	bis(2-ethylhexyl)phthalate	34ug/Kg
3/02	SBLK2	SVOA/aq.	" "	1 ug/L
		Pest	No contaminants	

2. Equipment and Trip Blanks

DATE	ID #	FRACTION/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
2/27	RB-01	VOA/aq.	Chloroform	3 ug/L
3/02	RB-01	SVOA/aq.	Bis(2-ethylhexyl)phthalate	1 ug/L
2/25	RB-01	Pest/aq.	No contaminants	

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

V B. BLANK ANALYSIS RESULTS (Section 3)

3. Blank Actions

Action levels should be based upon the highest concentration of contaminant determined in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the compound in the sample exceeds the action level of 10 x's the amount in the blank for the common contaminants, or 5 x's the amount for any other compound. Specific actions are as follows:

1. The concentration is less than the CRQL, report the CRQL.

2. The concentration is greater than the CRQL, but less than the action level, report the concentration found U.

3. The concentration is greater than the action level, report the concentration unqualified.

For examples refer to the Regional Guidelines.

Common contaminants = methylene chloride, acetone, 2-butanone, toluene, and phthalates.

LEVEL: Low

COMPOUND	MAX. CONC./ UNITS	ACTION LEVEL/ UNITS	CRQL
Bis(2-ethylhexyl)phthalate	34 ug/Kg	340 ug/Kg	330
" "	1 ug/L	10 ug/L	10
Chloroform	3 ug/L	15 ug/L	10

A separate worksheet should be used for low and medium level blanks.

REGION I
Data Review Worksheets

VI. SURROGATE SPIKE RECOVERIES

List the percent recoveries which do not meet the criteria for surrogate recovery.

Matrix: Soil/Water

	VOA			B/N			A			
CR #'s	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	[illegible]
	all criteria met.									
QC Limits										
	to	to	to	to	to	to	to	to	to	to

Surrogate Actions: *-Advisory cri

	PERCENT RECOVERY		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
Non-detected results	R	UJ	A

CRR = Contract Required Recovery Range.
Surrogate action should be applied:

1. If at least two surrogates in a B/N or A fraction or one surrogate in the VOA fraction are out of specification, but have recoveries of >10%.
2. If any one surrogate in a fraction shows <10% recovery.

REGION I – DATA VALIDATION WORKSHEETS ADDENDUM

MATRIX: Soil/Water

PESTICIDE/PCB CLP 3/90 SOW – SURROGATE SPIKE RECOVERIES

List the Percent Recoveries which do not meet the criteria for surrogate recovery.

TR #'S	TCX (column 1)	TCX (column 2)	DCB (column 1)	DCB (column 2)
all criteria met.				
*QC Limits	60 to 150	60 to 150	60 to 150	60 to 150

*Advisory

Data Review Worksheets

VII A. ~~MATRIX~~ Laboratory Control SPIKE/~~MATRIX~~ Laboratory Control SPIKE DUPLICATE

1. ~~Matrix~~ Laboratory Control Spike/~~Matrix~~ Laboratory Control Spike Duplicate Recoveries and Precision

TR Nos. LCS2 , LCSD2 Level: Low Matrix: water

List the percent recoveries and RPD's of compounds which do not meet the criteria stated on Form 3.

FRACTION/ ~~MS~~ LCS OR ~~MSD~~ LCSD	COMPOUND	%REC/ RPD	QC LIMITS
LCS	Ethylbenzene	79.3%	82-121
LCSD	1,2,4-Trichlorobenzene	36%	28 RPD
" "	4-Nitrophenol	103%	50 RPD
" "	Pentachlorophenol	57%	50 RPD

QUALIFICATION IS LIMITED TO THE UNSPIKED SAMPLE ONLY.

1. If any compound does not meet the Contract Required Recovery range (CRR) follow the actions stated below:

	PERCENT RECOVERY <10%	10% - CRR	>CRR
Positive Sample Results	J	J	J
Non-detected Results	R	A	A

2. If any compound does not meet the RPD criteria, flag positive results for that compound as estimated (J).

A separate worksheet should be used for each MS/MSD pair.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE

List the internal standard areas of samples which do not meet the criteria of +100% or -50% of the internal standard area in the associ continuing calibration standard.

SAMPLE ID	DATE	IS CMP	IS AREA/ ID	ACCEPTABLE RANGE	ACTION
		(DCB)			
LF-SB05-125145	3/01	1,4-Dichlorobenzene-d4	122799	23408 - 93634	J, UJ
		(NPT) Naphthalene-d8	418981	81852 - 327406	
		(ANT) Acenaphthene-d10	322063	50618 - 202470	
		(PHN) Phenanthrene-d10	639902	98958 - 395830	
		(CRY) Chrysene-d12	621157	115502 - 462008	
		(PRY) Perylene-d12	803212	145666 - 582666	
LF-SB03-185205	3/01	DCB	104746	23408 - 93634	
		NPT	357102	81852 - 327406	
		ANT	277765	50618 - 202470	
		PHN	542840	98958 - 395830	

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagge as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity indicated. Non-detects should then be flagged as unusable (R)

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determ if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection the data for that sample fraction.

REGION I
Data Review Worksheets

IX. INTERNAL STANDARD PERFORMANCE

List the internal standard areas of samples which do not meet the criteria of -100% or -50% of the internal standard area in the associ. continuing calibration standard.

SAMPLE ID	DATE	IS OUT	IS AREA/ RT	ACCEPTABLE RANGE	ACTION
LF-SB03-185205	3/01	CRY	536277	115502-462008	J & UJ
↓	↓	PRY	691080	145666-582666	
LF-SB05-125145 RE	3/2	DCB	114739	21750-86998	
		NPT	401290	77220-308882	
		ANT	210267	46666-186666	
		PHN	339750	83290-333162	
LF-SB03-185205 RE	3/2	DCB	107116	21750-86998	
		NPT	358100	77220-308882	

ACTION:

1. If an IS area count is outside the criteria -50% or +100% of the associated standard:

   a. Positive results for compounds quantitated using that IS are flagged as estimated (J) for that sample fraction.
   b. Non-detects for compounds quantitated using that IS are flagge as estimated (UJ) for that sample fraction.
   c. If extremely low area counts are reported, or if performance exhibits a major drop-off, then a severe loss of sensitivity i indicated. Non-detects should then be flagged as unusable (R)

2. If an IS retention time varies more than 30 seconds, the chromatographic profile for that sample must be examined to determi if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction.

REGION I
Data Review Worksheets

X A. PESTICIDE INSTRUMENT PERFORMANCE (Section 1)

1. DDT Retention Time

List the DDT standards which have a retention time (RT) of less than 12 minutes on the packed column (except CV-1 or CV-101).

STANDARD ID	DATE/ TIME	RT	SAMPLES AFFECTED	NOTE

ACTION:

If the RT is less than 12 minutes, examine the chromatography to evaluate the separation. If adequate separation is not achieved, fl: all affected compound data as unusable (R).

REGION 1-
Data Review Worksheets

X B. PESTICIDE INSTRUMENT PERFORMANCE (Section 2)

1. Retention Time Windows

List the compounds which are not within the established windows.

COMPOUND	DATE (TIME)	RT	RT WINDOW	SAMPLES AFFECTED
All criteria met				

Check the sample chromatograms of the samples analyzed after the last control standard for peaks within an expanded window. If no peaks ar present, there is usuall no effect on the data. Refer to Regional guidelines for information on qualifying data if peaks are present. peaks are present, discuss actions below:

REGION I
Data Review Worksheets

X C. PESTICIDE INSTRUMENT PERFORMANCE (Section 3)

3. DDT and Endrin Degradation

List the standards which have a DDT or Endrin breakdown of greater than 20%.

STANDARD ID	DDT OR ENDRIN	PERCENT BREAKDOWN	SAMPLES AFFECTED	DDD, DDE OR ENDRIN KETONE PRESENT
All criteria met				

If the percent breakdown for DDT is greater than 20%:

1. Flag all positive results for DDT as estimated (J) for all samples following the last in control standard. If no DDT was present, but DDD and/or DDE are positive, then flag the quantitation limit for DDT as unusable (R).

2. Flag all positive results for DDD +/or DDE as estimated (J).

If the percent breakdown for Endrin is greater than 20%:

1. Flag all positive results for endrin as estimated (J) for all samples following the last in-control standard. If no endrin was detected, but endrin aldehyde and/or endrin ketone are positive, flag the quantitation limit for endrin as unusable

2. Flag all positive results for endrin ketone as estimated (J).

REGION I -
Data Review Worksheets

X D. PESTICIDE INSTRUMENT PERFORMANCE (Section 4)

4. DBC Retention Time Check

List the percent difference for the DBC shift greater than 2% for pac columns, greater than 1.5% for wide-bore capillary columns, or greata than 0.3% for narrow-bore capillary columns.

TR #'S	DBC %DIFFERENCE	ACTIONS

If the DBC does not meet the retention time criteria, the analysis ma be flagged as unusable (R) for the affected samples, but qualificatio of the data is left up to the professional judgement of the reviewer. Discuss any qualification of the data below:

_____

_____

_____

_____

_____

_____

REGION I
Data Review worksheets

XI A. PESTICIDE CALIBRATION (Sections 1 and 2)

1. Initial Calibration

List the compounds which did not meet the Relative Standard Deviation (RSD) criteria of less than ~~20%~~ 20% for the initial calibration on the quantitation column.

DATE	COMPOUND	%RSD	COLUMN	SAMPLES AFFECTED
2/23	beta-BHC	20.5	DB-17	RB-01
2/23	Methoxychlor	20.6	DB-17	RB-01

Flag all associated positive results as estimated (J) for samples which did not meet the %RSD criteria.

2. Analytical Sequence

Did the laboratory follow the correct 72 hour sequence described in the SOW? Yes or No

If no,

The data may be affected. The data reviewer must use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below:

REGION I
Data Review Worksheets

XI B. PESTICIDE CALIBRATION (Section 3)

3. Continuing Calibration

List the compounds which did not meet the percent difference (%D) criteria of <15% on the quantitation column or <20% on the confirmatio for the continuing calibration.

DATE	COMPOUND	%D	COLUMN	SAMPLES AFFECTED
	all criteria met.			

If the %D criteria is not met, flag all associated positive results as estimated (J).

CLP 3/90 SOW PESTICIDE/PCB ADDENDUM TO REGION I WORKSHEETS

1. Pesticide Laboratory Control Sample Recovery (Form III - LCP):

Soil:
LC0228SB2 - Aroclor 1016 54% REC 56 - 123 QC limits.
LD0228SB2 " " " " " "

Water:
No noncompliances.

2. Pesticide Analyte Resolution Summary (Form VI - Pest 4):

all criteria met

3. Pesticide Calibration Verification Summary (Form VII - Pest 1 (7D); RPD between nominal amounts and calculated amounts of PEM):

all criteria met.

4. Pesticide Calibration Verification Summary (Form VII - Pest 2 (7E); RPD between nominal amounts and calculated amounts of IND A and IND B Mixtures): all criteria met.

5. Pesticide Florisil Cartridge Check (Form IX - Pest 1 (9A)):

all criteria met.

6. Pesticide Identification Summary of Single Component Analytes (Form X - Pest 1 (10A); %D between positive results on column 1 and column 2):

Not applicable.

REGION I
Data Review Worksheets

XII. SAMPLE QUANTITATION

In the space below, please show a minimum of one sample calculation for each fraction:

VOA:

RB-01 Chloroform 3ug/L

$$\frac{28675}{109796} \times \frac{50}{3.734} = 3.49 = 3ug/L$$

BNA: LF-SB04-0810 Bis(2-ethylhexyl)phthalate 57ug/Kg

$$\frac{12222}{152004} \times \frac{40ng}{1.059} \times \frac{500ml}{30g} \times \frac{2.0}{2.0ml} \times \frac{1}{.89} = 56.8 = 57 ug/Kg$$

PEST/PCB: LC0228SB1 4,4'-DDT 24 ug/Kg

$$\frac{973838}{13700000} \times \frac{5000ml}{30g} \times \frac{2}{1ml} = 23.69 = 24ug/Kg$$

APPENDIX D

SUPPORT DOCUMENTATION

CHAIN OF CUSTODY RECORD

PROJECT NO.: 5082

SITE NAME: NSB-NLON

SAMPLERS (SIGNATURE): Molly S Era

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2 x 2 glass jar TCL VOC	8 x 2 glass jar TCL SVOC	40 ml vial TCL VOC	1L Amber TCL SVOC	1L Amber TAL Pest/PCB	1L HDPE TAL Metals	1L HDPE Cyanide	REMARKS
Area A Landfill	2/16/95	1115		✓	LF-SB03-18.5-20.5	3	2	1						
↓	2/16/95	1350		✓	~~EB~~ TBR RB-01	8			2	2	2	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
K-15	2-17-95 1630	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		K Kellis	2/18/95 0900	A.B. # 3903773271	5°C

Order No. 70440 (0693)

789

PROJECT NO.: 5082

SITE NAME: HSB-NLOU

SAMPLERS (SIGNATURE):

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF						REMARKS
Area A Landfill	2/17/95	1600		✓	LF-SB04-0808	2						
↓	2/18/95	1424		✓	LF-SB05-[illegible]	2						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
	2-20-95 1630				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
			2-21-95 1000	FedEx AB# 2299 779 016	

Order No. 70410 (0693)

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A / Broken Arrow, OK 74012
918-251-2858

SDG NARRATIVE
March 7, 1995

Contract: NUS

SDG No.: 21359

VOLATILE FRACTION

Three soil samples and one water sample were submitted for Volatile Organic Analysis. The samples were analyzed by GC/MS following the 3/90 (OLM01.8) CLP Statement of Work.

No major problems occurred during the analyses of these samples.

Blanks: VBLK1 contained approximately 6 ppb of an unknown, non-target compound.

Surrogates: No problems.

Laboratory Control Spikes: LCS2 contained one compound with a percent recovery outside QC limits.

Internal Standards: No problems.

SEMIVOLATILE FRACTION

Three soil samples and one water sample were submitted for Semivolatile Organic Analysis. The samples were analyzed by GC/MS following the 3/90 (OLM01.8) CLP Organic Statement of Work.

No major problems occurred during the analyses of these samples.

Blanks: SBLK1 and SBLK2 contained low level phthalate contamination below CRQL.

Surrogates: No problems.

Matrix Spikes: No matrix spikes were analyzed with this set of samples. Instead, Laboratory Control Spikes were analyzed and reported.

Internal Standards: The following samples contained internal standard areas outside QC limits: SB05125145, SB05125145RE, SB03185205, and SB03185205RE.

Harry M. Borg

Harry M. Borg
Organic Program Manager

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID: UG298.D BFB Injection Date: 01/03/95

Instrument ID: U BFB Injection Time: 1313

GC Column:DB624 ID: 0.53 (mm) Heated Purge: (Y/N) Y

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	26.4
75	30.0 - 66.0% of mass 95	54.8
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.5
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	63.3
175	4.0 - 9.0% of mass 174	5.1 (8.0)1
176	93.0 - 101.0% of mass 174	61.9 (97.7)1
177	5.0 - 9.0% of mass 176	4.3 (6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	UG299.D	01/03/95	1415
02	VSTD020	VSTD020	UG300.D	01/03/95	1542
03	VSTD010	VSTD010	UG301.D	01/03/95	1602
04	VSTD100	VSTD100	UG302.D	01/03/95	1622
05	VSTD200	VSTD200	UG303.D	01/03/95	1642
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6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: U Calibration Date(s): 01/03/95

Heated Purge: (Y/N) Y Calibration Times: 1415 1642

GC Column: DB-624 ID: 0.53 (mm)

LAB FILE ID: RRF10 =UG301.D RRF20 =UG300.D
RRF50 =UG299.D RRF100=UG302.D RRF200=UG303.D

COMPOUND	RRF10	RRF20	RRF50	RRF100	RRF200	$\overline{RRF}$	% RSD
Chloromethane	1.946	1.702	1.744	1.602	1.566	1.712	8.7
Bromomethane *	2.124	2.001	1.881	1.680	1.459	1.829	14.4*
Vinyl Chloride *	1.859	1.750	1.782	1.645	1.620	1.731	5.7*
Chloroethane	1.109	1.023	0.997	0.907	0.809	0.969	11.8
Methylene Chloride	1.678	1.587	1.519	1.453	1.439	1.535	6.4
Acetone	0.566	0.548	0.388	0.492	0.514	0.501	13.9
Carbon Disulfide	5.137	5.046	4.967	4.509	4.341	4.800	7.3
1,1-Dichloroethene *	1.769	1.739	1.709	1.550	1.461	1.646	8.0*
1,1-Dichloroethane *	3.724	3.604	3.480	3.273	3.175	3.451	6.5*
1,2-Dichloroethene (total)	1.923	1.861	1.836	1.715	1.679	1.803	5.6
Chloroform *	5.053	4.686	4.454	4.153	4.053	4.479	9.0*
1,2-Dichloroethane *	2.528	2.412	2.702	2.342	2.366	2.470	6.0*
2-Butanone	0.771	0.622	0.518	0.666	0.724	0.660	14.7
1,1,1-Trichloroethane *	0.838	0.791	0.755	0.758	0.769	0.782	4.3*
Carbon Tetrachloride *	0.894	0.846	0.848	0.824	0.834	0.849	3.1*
Bromodichloromethane *	0.888	0.828	0.783	0.835	0.869	0.841	4.7*
1,2-Dichloropropane	0.410	0.384	0.363	0.377	0.386	0.384	4.5
cis-1,3-Dichloropropene *	0.593	0.556	0.527	0.568	0.596	0.568	5.0*
Trichloroethene *	0.564	0.535	0.523	0.520	0.534	0.535	3.2*
Dibromochloromethane *	0.661	0.607	0.581	0.670	0.724	0.649	8.6*
1,1,2-Trichloroethane *	0.321	0.284	0.262	0.300	0.327	0.299	8.9*
Benzene *	0.846	0.764	0.862	0.739	0.757	0.794	7.0*
trans-1,3-Dichloropropene *	0.492	0.449	0.430	0.481	0.525	0.476	7.8*
Bromoform *	0.366	0.340	0.329	0.399	0.466	0.380	14.4*
4-Methyl-2-Pentanone	0.340	0.246	0.223	0.278	0.298	0.277	16.4
2-Hexanone	0.299	0.237	0.214	0.281	0.315	0.269	15.7
Tetrachloroethene *	0.653	0.619	0.609	0.586	0.590	0.611	4.4*
Toluene *	1.377	1.279	1.250	1.240	1.262	1.282	4.3*
1,1,2,2-Tetrachloroethane *	0.582	0.474	0.439	0.518	0.588	0.520	12.5*
Chlorobenzene *	1.207	1.121	1.111	1.115	1.136	1.138	3.5*
Ethylbenzene *	0.535	0.508	0.502	0.492	0.508	0.509	3.1*
Styrene *	1.042	0.982	0.984	1.018	1.046	1.014	3.0*
Xylene (Total) *	0.671	0.627	0.628	0.627	0.638	0.638	2.9*
Toluene-d8	1.165	1.220	1.159	1.137	1.153	1.167	2.7
Bromofluorobenzene *	1.037	1.094	1.041	1.045	1.069	1.057	2.2*
1,2-Dichloroethane-d4	2.134	2.041	2.187	1.926	1.947	2.047	5.5

* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID: UG653.D BFB Injection Date: 02/23/95

Instrument ID: U BFB Injection Time: 1003

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) Y

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	25.8
75	30.0 - 66.0% of mass 95	54.2
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	66.5
175	4.0 - 9.0% of mass 174	5.2 (7.9)1
176	93.0 - 101.0% of mass 174	65.8 (98.8)1
177	5.0 - 9.0% of mass 176	4.5 (6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	UG654.D	02/23/95	1019
02	VBLK1	U950223A	UG655.D	02/23/95	1053
03	LCS1	LCS1	UG656.D	02/23/95	1113
04	LFSB03185205	21359.01	UG657.D	02/23/95	1142
05	LFSB040810	21361.01	UG658.D	02/23/95	1202
06	LFSB05125145	21361.02	UG659.D	02/23/95	1222
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7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: U Calibration Date: 02/23/95 Time: 1019

Lab File ID: UG654.D Init. Calibration Date(s): 01/03/95

Heated Purge: (Y/N) Y Init. Calibration Times: 1415 1642

GC Column:DB-624 ID: 0.53 (mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Chloromethane	1.712	1.533		10.5	
Bromomethane	1.829	1.491	0.100	18.5	25.0
Vinyl Chloride	1.731	1.582	0.100	8.6	25.0
Chloroethane	0.969	0.832		14.2	
Methylene Chloride	1.535	1.314		14.4	
Acetone	0.501	0.280		44.3	
Carbon Disulfide	4.800	4.426		7.8	
1,1-Dichloroethene	1.646	1.392	0.100	15.4	25.0
1,1-Dichloroethane	3.451	2.859	0.200	17.2	25.0
1,2-Dichloroethene (total)	1.803	1.508		16.4	
Chloroform	4.479	3.602	0.200	19.6	25.0
1,2-Dichloroethane	2.470	2.138	0.100	13.4	25.0
2-Butanone	0.660	0.440		33.3	
1,1,1-Trichloroethane	0.782	0.706	0.100	9.8	25.0
Carbon Tetrachloride	0.849	0.754	0.100	11.2	25.0
Bromodichloromethane	0.841	0.811	0.200	3.6	25.0
1,2-Dichloropropane	0.384	0.371		3.3	
cis-1,3-Dichloropropene	0.568	0.568	0.200	-0.1	25.0
Trichloroethene	0.535	0.501	0.300	6.4	25.0
Dibromochloromethane	0.649	0.679	0.100	-4.6	25.0
1,1,2-Trichloroethane	0.299	0.313	0.100	-4.6	25.0
Benzene	0.794	0.760	0.500	4.3	25.0
trans-1,3-Dichloropropene	0.476	0.489	0.100	-2.9	25.0
Bromoform	0.380	0.446	0.100	-17.4	25.0
4-Methyl-2-Pentanone	0.277	0.286		-3.2	
2-Hexanone	0.269	0.205		23.7	
Tetrachloroethene	0.611	0.514	0.200	16.0	25.0
Toluene	1.282	1.118	0.400	12.8	25.0
1,1,2,2-Tetrachloroethane	0.520	0.526	0.500	-1.0	25.0
Chlorobenzene	1.138	0.974	0.500	14.4	25.0
Ethylbenzene	0.509	0.447	0.100	12.2	25.0
Styrene	1.014	0.880	0.300	13.2	25.0
Xylene (Total)	0.638	0.563	0.300	11.8	25.0
Toluene-d8	1.167	0.943		19.2	
Bromofluorobenzene	1.057	0.870	0.200	17.7	25.0
1,2-Dichloroethane-d4	2.047	1.636		20.1	

All other compounds must meet a minimum RRF of 0.010.

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID: KO029.D BFB Injection Date: 02/27/95

Instrument ID: K BFB Injection Time: 0908

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	21.7
75	30.0 - 66.0% of mass 95	53.3
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	75.1
175	4.0 - 9.0% of mass 174	6.2 (8.3)1
176	93.0 - 101.0% of mass 174	73.4 (97.7)1
177	5.0 - 9.0% of mass 176	5.1 (7.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD050	VSTD050	KO031.D	02/27/95	1011
02	VSTD020	VSTD020	KO032.D	02/27/95	1037
03	VSTD100	VSTD100	KO034.D	02/27/95	1141
04	VSTD200	VSTD200	KO035.D	02/27/95	1208
05	VSTD010	VSTD010	KO036.D	02/27/95	1443
06	VBLK2	K950227A	KO038.D	02/27/95	1621
07	RB-01	21359.02	KO045.D	02/27/95	1926
08	LCSD1	LCSD1	KO048.D	02/27/95	2041
09	LCS2	LCS2	KO049.D	02/27/95	2106
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6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

L·· Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: K Calibration Date(s): 02/27/95

Heated Purge: (Y/N) N Calibration Times: 1011 1443

GC Column:DB-624 ID: 0.53 (mm)

LAB FILE ID: RRF10 =KO036.D RRF20 =KO032.D
RRF50 =KO031.D RRF100=KO034.D RRF200=KO035.D

COMPOUND		RRF10	RRF20	RRF50	RRF100	RRF200	$\overline{RRF}$	% RSD
Chloromethane		1.472	1.098	1.069	0.882	0.772	1.059	25.2
Bromomethane	*	2.114	1.779	1.731	1.366	1.110	1.620	24.0*
Vinyl Chloride	*	1.607	1.245	1.243	0.932	0.897	1.185	24.3*
Chloroethane		1.521	1.131	1.198	0.852	0.652	1.071	31.1
Methylene Chloride		2.098	1.724	1.723	1.614	1.463	1.724	13.6
Acetone		0.477	0.302	0.305	0.247	0.286	0.323	27.4
Carbon Disulfide		6.430	5.403	5.414	4.899	4.500	5.329	13.5
1,1-Dichloroethene	*	2.010	1.723	1.765	1.574	1.482	1.711	11.8*
1,1-Dichloroethane	*	3.837	3.178	3.136	2.969	2.754	3.175	12.7*
1,2-Dichloroethene (total)		2.195	1.904	1.919	1.791	1.642	1.890	10.7
Chloroform	*	4.589	3.928	3.734	3.573	3.277	3.820	12.8*
1,2-Dichloroethane	*	2.447	2.097	2.025	1.955	1.873	2.080	10.6*
2-Butanone		0.886	0.550	0.492	0.414	0.503	0.569	32.3
1,1,1-Trichloroethane	*	0.860	0.768	0.746	0.821	0.700	0.779	8.0*
Carbon Tetrachloride	*	0.736	0.681	0.612	0.680	0.604	0.663	8.2*
Vinyl Acetate		0.000	0.000	0.000	0.000	0.000	0.000	0.0
Bromodichloromethane	*	0.966	0.814	0.811	0.824	0.717	0.827	10.7*
1,2-Dichloropropane		0.474	0.394	0.391	0.366	0.343	0.394	12.5
cis-1,3-Dichloropropene	*	0.738	0.617	0.614	0.615	0.555	0.628	10.6*
Trichloroethene	*	0.501	0.466	0.422	0.426	0.397	0.442	9.2*
Dibromochloromethane	*	0.581	0.518	0.493	0.492	0.477	0.512	8.0*
1,1,2-Trichloroethane	*	0.384	0.317	0.317	0.298	0.295	0.322	11.2*
Benzene	*	1.169	1.037	1.014	0.957	0.873	1.010	10.7*
trans-1,3-Dichloropropene	*	0.630	0.522	0.539	0.508	0.495	0.539	9.8*
Bromoform	*	0.312	0.277	0.276	0.286	0.296	0.289	5.1*
4-Methyl-2-Pentanone		0.455	0.325	0.361	0.305	0.385	0.366	16.0
2-Hexanone		0.282	0.210	0.238	0.183	0.264	0.235	16.9
Tetrachloroethene	*	0.501	0.469	0.466	0.439	0.435	0.462	5.8*
Toluene	*	1.628	1.461	1.469	1.382	1.273	1.442	9.0*
1,1,2,2-Tetrachloroethane	*	0.775	0.629	0.645	0.565	0.656	0.654	11.6*
Chlorobenzene	*	1.283	1.124	1.097	1.040	1.000	1.109	9.8*
Ethylbenzene	*	0.560	0.521	0.525	0.475	0.451	0.506	8.5*
Styrene	*	1.058	0.950	0.991	0.909	0.886	0.959	7.1*
Xylene (Total)	*	0.716	0.649	0.630	0.601	0.555	0.630	9.4*
cis-1,2-Dichloroethene		2.168	1.900	1.902	1.769	1.618	1.871	10.8
trans-1,2-Dichloroethene		2.223	1.908	1.935	1.812	1.667	1.909	10.7

* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: K Calibration Date(s): 02/27/95

Heated Purge: (Y/N) N Calibration Times: 1011 1443

GC Column:DB-624 ID: 0.53 (mm)

LAB FILE ID: RRF10 =KO036.D RRF20 =KO032.D
RRF50 =KO031.D RRF100=KO034.D RRF200=KO035.D

COMPOUND		RRF10	RRF20	RRF50	RRF100	RRF200	$\overline{RRF}$	% RSD
m,p-Xylene	*	0.727	0.662	0.639	0.598	0.564	0.638	9.7*
o-Xylene	*	0.716	0.649	0.630	0.601	0.555	0.630	9.4*
2-Chloroethyl_Vinyl_Ether	*	0.000	0.000	0.000	0.000	0.000	0.000	0.0*
Acrylonitrile		0.000	0.000	0.000	0.000	0.000	0.000	0.0
1,4-Dioxane	*	0.000	0.000	0.000	0.000	0.000	0.000	0.0*
1,2-Dibromoethane		0.000	0.000	0.000	0.000	0.000	0.000	0.0
1,2-Dichlorobenzene		0.000	0.000	0.000	0.000	0.000	0.000	0.0
1,3-Dichlorobenzene		0.000	0.000	0.000	0.000	0.000	0.000	0.0
1,4-Dichlorobenzene		0.000	0.000	0.000	0.000	0.000	0.000	0.0
Methyl_tert-Butyl_Ether		0.000	0.000	0.000	0.000	0.000	0.000	0.0
Ethyl_Ether		0.000	0.000	0.000	0.000	0.000	0.000	0.0
Toluene-d8		1.364	1.240	1.231	1.142	1.077	1.211	8.9
omofluorobenzene	*	0.799	0.775	0.746	0.712	0.691	0.745	5.9*
,2-Dichloroethane-d4		1.875	1.634	1.556	1.443	1.373	1.576	12.3

* Compounds with required minimum RRF and maximum %RSD values.
All other compounds must meet a minimum RRF of 0.010.

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: K Calibration Date: 02/27/95 Time: 1011

Lab File ID: KO031.D Init. Calibration Date(s): 02/27/95

Heated Purge: (Y/N) N Init. Calibration Times: 1011 1443

GC Column:DB-624 ID: 0.53 (mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Chloromethane	1.059	1.069		-0.9	
Bromomethane	1.620	1.731	0.100	-6.9	25.0
Vinyl Chloride	1.185	1.243	0.100	-4.9	25.0
Chloroethane	1.071	1.198		-11.9	
Methylene Chloride	1.724	1.723		0.1	
Acetone	0.323	0.305		5.7	
Carbon Disulfide	5.329	5.414		-1.6	
1,1-Dichloroethene	1.711	1.765	0.100	-3.1	25.0
1,1-Dichloroethane	3.175	3.136	0.200	1.2	25.0
1,2-Dichloroethene (total)	1.890	1.919		-1.5	
Chloroform	3.820	3.734	0.200	2.3	25.0
1,2-Dichloroethane	2.080	2.025	0.100	2.6	25.0
2-Butanone	0.569	0.492		13.5	
1,1,1-Trichloroethane	0.779	0.746	0.100	4.2	25.0
Carbon Tetrachloride	0.663	0.612	0.100	7.7	25.0
Bromodichloromethane	0.827	0.811	0.200	1.8	25.0
1,2-Dichloropropane	0.394	0.391		0.8	
cis-1,3-Dichloropropene	0.628	0.614	0.200	2.1	25.0
Trichloroethene	0.442	0.422	0.300	4.6	25.0
Dibromochloromethane	0.512	0.493	0.100	3.7	25.0
1,1,2-Trichloroethane	0.322	0.317	0.100	1.6	25.0
Benzene	1.010	1.014	0.500	-0.4	25.0
trans-1,3-Dichloropropene	0.539	0.539	0.100	0.0	25.0
Bromoform	0.289	0.276	0.100	4.7	25.0
4-Methyl-2-Pentanone	0.366	0.361		1.4	
2-Hexanone	0.235	0.238		-1.1	
Tetrachloroethene	0.462	0.466	0.200	-0.9	25.0
Toluene	1.442	1.469	0.400	-1.8	25.0
1,1,2,2-Tetrachloroethane	0.654	0.645	0.500	1.3	25.0
Chlorobenzene	1.109	1.097	0.500	1.0	25.0
Ethylbenzene	0.506	0.525	0.100	-3.6	25.0
Styrene	0.959	0.991	0.300	-3.4	25.0
Xylene (Total)	0.630	0.630	0.300	0.1	25.0
cis-1,2-Dichloroethene	1.871	1.902		-1.7	
trans-1,2-Dichloroethene	1.909	1.935		-1.4	
m,p-Xylene	0.638	0.639	0.300	-0.1	25.0

All other compounds must meet a minimum RRF of 0.010.

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: K Calibration Date: 02/27/95 Time: 1011

Lab File ID: KO031.D Init. Calibration Date(s): 02/27/95

Heated Purge: (Y/N) N Init. Calibration Times: 1011 1443

GC Column:DB-624 ID: 0.53 (mm)

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
o-Xylene	0.630	0.630	0.300	0.1	25.0
Toluene-d8	1.211	1.231		-1.6	
Bromofluorobenzene	0.745	0.746	0.200	-0.2	25.0
1,2-Dichloroethane-d4	1.576	1.556		1.3	

All other compounds must meet a minimum RRF of 0.010.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK1

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: U950223A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG655.D

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 0 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (Total)	10	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK1

Lab Name: SWL-TULSA Contract:

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: U950223A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: UG655.D

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. 0 Date Analyzed: 02/23/95

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	12.991	6	J
2.				
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Data File: /chem/k.i/k950227a.b/ko049.d
Report Date: 27-Feb-1995 21:42

Southwest Laboratory of Oklahoma

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Client ID: LCS 2
Data Type: MS DATA
SpikeList File: WaterLCS.spk
Method File: /chem/k.i/k950227a.b/VOWNEWK.m
Misc Info: MS315**INST:K*SWOK*2-030-8*5ML

Client SDG: k950227a.b
Fraction: VOA
Level: LOW
SampleType: METHSPIKE
Quant Type: ISTD

SPIKE COMPOUND	AMOUNT ADDED ug/l	AMOUNT RECOVERED ug/l	% RECOVERED	LIMITS
1 Chloromethane	50.00	37.02	74.06	21-169
2 Vinyl Chloride	50.00	35.67	71.36	37-155
3 Bromomethane	50.00	35.41	70.83	39-167
4 Chloroethane	50.00	32.48	64.97	63-142
6 1,1-Dichloroethene	50.00	39.83	79.66	54-161
7 Acetone	50.00	33.63	67.27	50-176
8 Carbon Disulfide	50.00	38.65	77.31	55-138
9 Methylene Chloride	50.00	38.46	76.92	76-134
11 trans-1,2-Dichloro	50.00	40.49	80.99	75-128
13 1,1-Dichloroethane	50.00	40.07	80.14	76-130
15 cis-1,2-Dichloroet	50.00	41.12	82.25	77-128
17 2-Butanone	50.00	38.66	77.33	40-179
19 Chloroform	50.00	43.69	87.39	78-124
20 1,1,1-Trichloroeth	50.00	43.93	87.86	71-130
21 Carbon Tetrachlori	50.00	47.85	95.70	69-132
23 Benzene	50.00	39.06	78.13	74-133
24 1,2-Dichloroethane	50.00	41.40	82.81	79-124
26 Trichloroethene	50.00	43.63	87.27	73-131
28 1,2-Dichloropropan	50.00	38.46	76.94	67-141
30 Bromodichlorometha	50.00	40.42	80.86	67-134
32 cis-1,3-Dichloropr	50.00	39.00	78.00	68-134
33 4-Methyl-2-Pentano	50.00	35.36	70.72	33-195
35 Toluene	50.00	39.88	79.78	75-130
36 trans-1,3-Dichloro	50.00	38.06	76.14	45-166
37 1,1,2-Trichloroeth	50.00	39.06	78.12	64-144
38 Tetrachloroethene	50.00	44.29	88.58	75-147
39 2-Hexanone	50.00	34.59	69.19	26-194
40 Dibromochlorometha	50.00	43.97	87.94	62-138
43 Chlorobenzene	50.00	41.58	83.17	72-128
44 Ethylbenzene	50.00	39.68	79.37	82-121
45 m,p-Xylene	100.00	80.68	80.69	55-151
46 o-Xylene	50.00	40.73	81.47	80-127
47 Styrene	50.00	39.99	79.99	78-123
49 Bromoform	50.00	44.66	89.33	46-149
51 1,1,2,2-Tetrachlor	50.00	38.39	76.79	38-158

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID: S3276.D DFTPP Injection Date: 03/01/95

Instrument ID: S DFTPP Injection Time: 1826

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	50.4
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	58.4
70	Less than 2.0% of mass 69	0.7 (1.3)1
127	25.0 - 75.0% of mass 198	44.9
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.5
275	10.0 - 30.0% of mass 198	22.0
365	Greater than 0.75% of mass 198	1.30
441	Present, but less than mass 443	13.1
442	40.0 - 110.0% of mass 198	88.8
443	15.0 - 24.0% of mass 442	16.7 (18.8)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD050	SSTD050	S3277.D	03/01/95	1842
02	SBLK1	BL022108S	S3285.D	03/01/95	2345
03	LCS1	LCS:21361	S3286.D	03/02/95	0019
04	SB05125145	21361.02	S3289.D	03/02/95	0158
05	SB03185205	21359.01	S3290.D	03/02/95	0231
06	SBLK2	BL022201W	S3291.D	03/02/95	0303
07	LCSD2	LCSD:21359	S3293.D	03/02/95	0407
08	RB-01	21359.02	S3294.D	03/02/95	0439
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7B
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: S Calibration Date: 03/01/95 Time: 1842

Lab File ID: S3277.D Init. Calibration Date(s): 03/01/95

Init. Calibration Times: 0857 1117

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Phenol	1.970	1.499	0.800	23.9	25.0
bis(2-Chloroethyl)Ether	1.606	1.831	0.700	-14.0	25.0
2-Chlorophenol	1.424	1.106	0.800	22.3	25.0
1,3-Dichlorobenzene	1.495	1.355	0.600	9.4	25.0
1,4-Dichlorobenzene	1.510	1.387	0.500	8.2	25.0
1,2-Dichlorobenzene	1.394	1.379	0.400	1.1	25.0
2-Methylphenol	1.244	1.030	0.700	17.2	25.0
2,2'-oxybis(1-Chloropropane)	1.925	1.957		-1.6	
4-Methylphenol	1.305	1.093	0.600	16.3	25.0
N-Nitroso-di-n-propylamine	1.249	1.156	0.500	7.4	25.0
Hexachloroethane	0.702	0.639	0.300	9.0	25.0
Nitrobenzene	0.499	0.438	0.200	12.2	25.0
Isophorone	0.906	0.862	0.400	4.8	25.0
2-Nitrophenol	0.205	0.165	0.100	19.2	25.0
2,4-Dimethylphenol	0.400	0.362	0.200	9.6	25.0
bis(2-Chloroethoxy)methane	0.566	0.521	0.300	7.8	25.0
2,4-Dichlorophenol	0.299	0.281	0.200	6.0	25.0
1,2,4-Trichlorobenzene	0.324	0.304	0.200	6.0	25.0
Naphthalene	1.110	1.088	0.700	2.0	25.0
4-Chloroaniline	0.483	0.373		22.7	
Hexachlorobutadiene	0.175	0.176		-0.8	
4-Chloro-3-Methylphenol	0.379	0.352	0.200	7.3	25.0
2-Methylnaphthalene	0.683	0.706	0.400	-3.3	25.0
Hexachlorocyclopentadiene	0.385	0.241		37.6	
2,4,6-Trichlorophenol	0.402	0.376	0.200	6.4	25.0
2,4,5-Trichlorophenol	0.427	0.390	0.200	8.6	25.0
2-Chloronaphthalene	1.224	1.147	0.800	6.3	25.0
2-Nitroaniline	0.528	0.444		15.8	
Dimethylphthalate	1.445	1.470		-1.7	
Acenaphthylene	2.029	1.872	1.300	7.7	25.0
2,6-Dinitrotoluene	0.311	0.282	0.200	9.3	25.0
3-Nitroaniline	0.381	0.309		18.8	
Acenaphthene	1.257	1.213	0.800	3.5	25.0
2,4-Dinitrophenol	0.116	0.068		42.0	
4-Nitrophenol	0.225	0.143		36.5	
Dibenzofuran	1.723	1.753	0.800	-1.7	25.0
2,4-Dinitrotoluene	0.418	0.387	0.200	7.5	25.0

All other compounds must meet a minimum RRF of 0.010.

FORM VII SV-1 3/90

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: S Calibration Date: 03/01/95 Time: 1842

Lab File ID: S3277.D Init. Calibration Date(s): 03/01/95

Init. Calibration Times: 0857 1117

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Diethylphthalate	1.589	1.528		3.8	
4-Chlorophenyl-phenylether	0.710	0.707	0.400	0.3	25.0
Fluorene	1.413	1.377	0.900	2.5	25.0
4-Nitroaniline	0.430	0.366		14.9	
4,6-Dinitro-2-methylphenol	0.103	0.084		18.2	
N-Nitrosodiphenylamine (1)	0.531	0.488		8.1	
4-Bromophenyl-phenylether	0.235	0.217	0.100	7.8	25.0
Hexachlorobenzene	0.298	0.295	0.100	0.9	25.0
Pentachlorophenol	0.187	0.150	0.050	19.5	25.0
Phenanthrene	1.169	1.111	0.700	5.0	25.0
Anthracene	1.155	1.100	0.700	4.8	25.0
Carbazole	1.072	1.046		2.4	
Di-n-butylphthalate	1.626	1.612		0.8	
Fluoranthene	1.290	1.351	0.600	-4.7	25.0
Pyrene	1.413	1.219	0.600	13.7	25.0
Butylbenzylphthalate	0.832	0.734		11.7	
3,3'-Dichlorobenzidine	0.523	0.456		12.7	
Benzo(a)anthracene	1.179	1.076	0.800	8.8	25.0
Chrysene	1.134	1.075	0.700	5.2	25.0
bis(2-Ethylhexyl)phthalate	1.167	1.048		10.2	
Di-n-octylphthalate	1.702	1.432		15.8	
Benzo(b)fluoranthene	1.289	1.048	0.700	18.7	25.0
Benzo(k)fluoranthene	1.156	1.237	0.700	-7.0	25.0
Benzo(a)pyrene	1.037	1.019	0.700	1.7	25.0
Indeno(1,2,3-cd)pyrene	1.251	1.263	0.500	-0.9	25.0
Dibenz(a,h)anthracene	1.074	1.119	0.400	-4.2	25.0
Benzo(g,h,i)perylene	1.099	1.169	0.500	-6.4	25.0
Nitrobenzene-d5	0.455	0.377	0.200	17.3	25.0
2-Fluorobiphenyl	1.261	1.219	0.700	3.3	25.0
Terphenyl-d14	0.933	0.803	0.500	13.9	25.0
Phenol-d5	1.599	1.274	0.800	20.3	25.0
2-Fluorophenol	1.163	0.831	0.600	28.5	25.0
2,4,6-Tribromophenol	0.226	0.240		-6.1	
2-Chlorophenol-d4	1.109	0.916	0.800	17.3	25.0
1,2-Dichlorobenzene-d4	0.857	0.807	0.400	5.8	25.0

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

5B
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID: S3303.D DFTPP Injection Date: 03/02/95

Instrument ID: S DFTPP Injection Time: 1003

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 80.0% of mass 198	54.9
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	59.7
70	Less than 2.0% of mass 69	0.4 (0.7)1
127	25.0 - 75.0% of mass 198	39.8
197	Less than 1.0% of mass 198	0.0
198	Base peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.6
275	10.0 - 30.0% of mass 198	18.7
365	Greater than 0.75% of mass 198	1.39
441	Present, but less than mass 443	11.6
442	40.0 - 110.0% of mass 198	75.6
443	15.0 - 24.0% of mass 442	14.3 (19.0)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SSTD050	SSTD050	S3304.D	03/02/95	1018
02	LCS2	LCS:21359	S3305.D	03/02/95	1056
03	LFSB040810	21361.01	S3310.D	03/02/95	1344
04	SB05125145RE	21361.02RA	S3311.D	03/02/95	1419
05	SB03185205RE	21359.01RA	S3312.D	03/02/95	1453
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7B

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: S Calibration Date: 03/02/95 Time: 1018

Lab File ID: S3304.D Init. Calibration Date(s): 03/01/95

Init. Calibration Times: 0857 1117

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Phenol	1.970	1.951	0.800	0.9	25.0
bis(2-Chloroethyl)Ether	1.606	1.916	0.700	-19.3	25.0
2-Chlorophenol	1.424	1.288	0.800	9.5	25.0
1,3-Dichlorobenzene	1.495	1.356	0.600	9.3	25.0
1,4-Dichlorobenzene	1.510	1.404	0.500	7.1	25.0
1,2-Dichlorobenzene	1.394	1.301	0.400	6.7	25.0
2-Methylphenol	1.244	1.223	0.700	1.6	25.0
2,2'-oxybis(1-Chloropropane)	1.925	3.282		-70.5	
4-Methylphenol	1.305	1.312	0.600	-0.5	25.0
N-Nitroso-di-n-propylamine	1.249	1.244	0.500	0.4	25.0
Hexachloroethane	0.702	0.595	0.300	15.3	25.0
Nitrobenzene	0.499	0.459	0.200	8.0	25.0
Isophorone	0.906	0.818	0.400	9.6	25.0
2-Nitrophenol	0.205	0.163	0.100	20.6	25.0
2,4-Dimethylphenol	0.400	0.334	0.200	16.4	25.0
bis(2-Chloroethoxy)methane	0.566	0.621	0.300	-9.7	25.0
2,4-Dichlorophenol	0.299	0.276	0.200	7.9	25.0
1,2,4-Trichlorobenzene	0.324	0.310	0.200	4.3	25.0
Naphthalene	1.110	1.086	0.700	2.1	25.0
4-Chloroaniline	0.483	0.374		22.6	
Hexachlorobutadiene	0.175	0.181		-3.8	
4-Chloro-3-Methylphenol	0.379	0.317	0.200	16.5	25.0
2-Methylnaphthalene	0.683	0.698	0.400	-2.1	25.0
Hexachlorocyclopentadiene	0.385	0.278		27.8	
2,4,6-Trichlorophenol	0.402	0.300	0.200	25.4	25.0
2,4,5-Trichlorophenol	0.427	0.357	0.200	16.2	25.0
2-Chloronaphthalene	1.224	1.091	0.800	10.9	25.0
2-Nitroaniline	0.528	0.398		24.6	
Dimethylphthalate	1.445	1.205		16.7	
Acenaphthylene	2.029	1.726	1.300	15.0	25.0
2,6-Dinitrotoluene	0.311	0.238	0.200	23.4	25.0
3-Nitroaniline	0.381	0.263		31.0	
Acenaphthene	1.257	1.164	0.800	7.5	25.0
2,4-Dinitrophenol	0.116	0.073		37.7	
4-Nitrophenol	0.225	0.077		65.7	
Dibenzofuran	1.723	1.613	0.800	6.4	25.0
2,4-Dinitrotoluene	0.418	0.324	0.200	22.5	25.0

All other compounds must meet a minimum RRF of 0.010.

7C

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Instrument ID: S Calibration Date: 03/02/95 Time: 1018

Lab File ID: S3304.D Init. Calibration Date(s): 03/01/95

Init. Calibration Times: 0857 1117

COMPOUND	$\overline{RRF}$	RRF50	MIN RRF	%D	MAX %D
Diethylphthalate	1.589	1.514		4.8	
4-Chlorophenyl-phenylether	0.710	0.663	0.400	6.5	25.0
Fluorene	1.413	1.319	0.900	6.7	25.0
4-Nitroaniline	0.430	0.327		24.0	
4,6-Dinitro-2-methylphenol	0.103	0.080		22.4	
N-Nitrosodiphenylamine (1)	0.531	0.510		4.0	
4-Bromophenyl-phenylether	0.235	0.201	0.100	14.8	25.0
Hexachlorobenzene	0.298	0.266	0.100	10.8	25.0
Pentachlorophenol	0.187	0.117	0.050	37.5	25.0
Phenanthrene	1.169	1.106	0.700	5.4	25.0
Anthracene	1.155	1.030	0.700	10.8	25.0
Carbazole	1.072	0.972		9.3	
Di-n-butylphthalate	1.626	1.327		18.4	
Fluoranthene	1.290	1.174	0.600	9.0	25.0
Pyrene	1.413	1.431	0.600	-1.3	25.0
Butylbenzylphthalate	0.832	0.722		13.2	
3,3'-Dichlorobenzidine	0.523	0.442		15.4	
Benzo(a)anthracene	1.179	1.026	0.800	13.0	25.0
Chrysene	1.134	1.085	0.700	4.4	25.0
bis(2-Ethylhexyl)phthalate	1.167	1.059		9.2	
Di-n-octylphthalate	1.702	1.512		11.1	
Benzo(b)fluoranthene	1.289	1.016	0.700	21.2	25.0
Benzo(k)fluoranthene	1.156	1.378	0.700	-19.2	25.0
Benzo(a)pyrene	1.037	0.954	0.700	8.0	25.0
Indeno(1,2,3-cd)pyrene	1.251	1.148	0.500	8.3	25.0
Dibenz(a,h)anthracene	1.074	0.947	0.400	11.8	25.0
Benzo(g,h,i)perylene	1.099	0.959	0.500	12.8	25.0
Nitrobenzene-d5	0.455	0.377	0.200	17.2	25.0
2-Fluorobiphenyl	1.261	1.146	0.700	9.1	25.0
Terphenyl-d14	0.933	0.952	0.500	-2.0	25.0
Phenol-d5	1.599	1.537	0.800	3.8	25.0
2-Fluorophenol	1.163	0.983	0.600	15.5	25.0
2,4,6-Tribromophenol	0.226	0.166		26.8	
2-Chlorophenol-d4	1.109	1.042	0.800	6.0	25.0
1,2-Dichlorobenzene-d4	0.857	0.810	0.400	5.4	25.0

(1) Cannot be separated from Diphenylamine
All other compounds must meet a minimum RRF of 0.010.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: BL022108S

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3285.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/01/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	800	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	800	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	800	U
83-32-9	Acenaphthene	330	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: BL022108S

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3285.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(UL) Date Analyzed: 03/01/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	800	U
100-02-7	4-Nitrophenol	800	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	800	U
534-52-1	4,6-Dinitro-2-methylphenol	800	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	800	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	34	J
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK1

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) SOIL Lab Sample ID: BL022108S

Sample wt/vol: 30.0 (g/mL) G Lab File ID: S3285.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted: 02/21/95

Concentrated Extract Volume: 500(uL) Date Analyzed: 03/01/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

Number TICs found: 24

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.941	9800	NJA
2.		UNKNOWN ORGANIC ACID	11.533	110	J
3.		UNKNOWN	15.557	100	J
4.		UNKNOWN AMIDE	16.929	300	J
5.	791-28-6	Phosphine oxide, triphenyl-	18.157	890	NJ
6.		UNKNOWN	18.576	93	J
7.		UNKNOWN	19.009	89	J
8.		UNKNOWN	19.185	83	J
9.		UNKNOWN ORGANIC ACID	19.375	110	J
10.		UNKNOWN	19.457	76	J
11.		UNKNOWN	19.660	370	J
12.		UNKNOWN	19.728	80	J
13.		UNKNOWN	19.823	120	J
14.		UNKNOWN	20.149	130	J
15.		UNKNOWN	21.275	90	J
16.		UNKNOWN	21.384	120	J
17.		Unknown	22.198	210	J
18.		UNKNOWN	22.348	250	J
19.		Unknown	22.484	76	J
20.		UNKNOWN	22.620	250	J
21.		UNKNOWN	22.701	150	J
22.		Unknown	22.769	70	J
23.		UNKNOWN	22.837	86	J
24.		UNKNOWN	23.109	100	J
25.					
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: BL022201W

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3291.D

Level: (low/med) LOW Date Received: / /

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: BL022201W

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3291.D

Level: (low/med) LOW Date Received: / /

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(UL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	1	J
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK2

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix: (soil/water) WATER Lab Sample ID: BL022201W

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S3291.D

Level: (low/med) LOW Date Received: / /

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 02/22/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 03/02/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 24

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	16.258	12	J
2.	UNKNOWN	16.312	12	J
3. 791-28-6	Phosphine oxide, triphenyl-	18.142	6	NJ
4.	UNKNOWN	19.630	2	J
5.	UNKNOWN	20.047	3	J
6.	UNKNOWN	20.114	5	J
7.	UNKNOWN	20.181	3	J
8.	UNKNOWN	20.424	3	J
9.	UNKNOWN	20.450	3	J
10.	UNKNOWN	20.518	5	J
11.	UNKNOWN	20.585	4	J
12.	UNKNOWN	20.639	4	J
13.	UNKNOWN	20.693	7	J
14.	UNKNOWN	20.854	2	J
15.	UNKNOWN	20.908	3	J
16.	UNKNOWN	21.029	3	J
17.	UNKNOWN	21.097	2	J
18.	UNKNOWN	21.232	3	J
19.	UNKNOWN	21.272	2	J
20.	UNKNOWN	22.417	5	J
21.	UNKNOWN	22.660	10	J
22.	UNKNOWN	22.863	3	J
23.	UNKNOWN	23.065	4	J
24.	UNKNOWN	23.214	2	J
25.				
26.				
27.				
28.				
29.				
30.				

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

	EPA SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	S7 (2CP)#	S8 (DCB)#	TOT OUT
01	SBLK2	66	58	85	90	88	65	86	68	0
02	LCSD2	69	54	78	76	81	55	75	67	0
03	RB-01	54	53	78	80	74	56	74	67	0
04	LCS2	67	68	67	77	82	76	77	54	0
05										
06										
07										
08										
09										
10										
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29										
30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(35-114)	
S2 (FBP)	= 2-Fluorobiphenyl	(43-116)	
S3 (TPH)	= Terphenyl-d14	(33-141)	
S4 (PHL)	= Phenol-d5	(10-110)	
S5 (2FP)	= 2-Fluorophenol	(21-110)	
S6 (TBP)	= 2,4,6-Tribromophenol	(10-123)	
S7 (2CP)	= 2-Chlorophenol-d4	(33-110)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(16-110)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (NBZ)#	S2 (FBP)#	S3 (TPH)#	S4 (PHL)#	S5 (2FP)#	S6 (TBP)#	S7 (2CP)#	S8 (DCB)#	TOT OUT
01	SBLK1	80	73	100	81	92	67	78	86	0
02	LCS1	71	64	73	67	79	47	67	74	0
03	SB05125145	65	58	76	70	73	61	69	59	0
04	SB03185205	72	60	75	72	77	69	71	65	0
05	LFSB040810	48	62	70	47	45	61	44	46	0
06	SB05125145RE	64	72	72	66	67	76	63	58	0
07	SB03185205RE	70	79	74	68	70	69	62	67	0
08										
09										
10										
11										
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30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(23-120)	
S2 (FBP)	= 2-Fluorobiphenyl	(30-115)	
S3 (TPH)	= Terphenyl-d14	(18-137)	
S4 (PHL)	= Phenol-d5	(24-113)	
S5 (2FP)	= 2-Fluorophenol	(25-121)	
S6 (TBP)	= 2,4,6-Tribromophenol	(19-122)	
S7 (2CP)	= 2-Chlorophenol-d4	(20-130)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(20-130)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

Data File: /chem/s.i/s950301e.b/s3286.d
Report Date: 03-Mar-1995 09:01

Southwest Laboratory of Oklahoma

RECOVERY REPORT

Client Name: NUS
Sample Matrix: SOLID
Client ID: LCS
Data Type: MS DATA
SpikeList File: SoilMsd.spk
Client SDG: s950301e.b
Fraction: SV
Level: LOW
SampleType: MS
Quant Type: ISTD
Method File: /chem/s.i/s950301e.b/BNA390EPA.m
Misc Info: MS515**INSTS*NUS*LCS:21361*30G/.5ML/2UL*

SPIKE COMPOUND	AMOUNT ADDED ug/Kg	AMOUNT RECOVERED ug/Kg	% RECOVERED	LIMITS
3 Phenol	2500.00	1665.47	66.62	26-90
6 2-Chlorophenol	2500.00	1519.42	60.78	25-102
9 1,4-Dichlorobenzen	1666.66	1099.51	65.97	28-104
16 N-Nitroso-di-n-pro	1666.66	981.97	58.92	41-126
26 1,2,4-Trichloroben	1666.66	1004.95	60.30	38-107
31 4-Chloro-3-Methylp	2500.00	1403.66	56.15	26-103
44 Acenaphthene	1666.66	1026.92	61.62	31-137
47 4-Nitrophenol	2500.00	1258.46	50.34	11-114
48 2,4-Dinitrotoluene	1666.66	802.62	48.16	28-89
58 Pentachlorophenol	2500.00	859.11	34.36	17-109
65 Pyrene	1666.66	1159.05	69.54	35-142

SURROGATE COMPOUND	AMOUNT ADDED ug/Kg	AMOUNT RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 1 2-Fluorophenol	2500.00	1969.00	78.76	25-121
$ 2 Phenol-d5	2500.00	1668.15	66.73	24-113
$ 5 2-Chlorophenol-d4	2500.00	1687.29	67.49	20-130
$ 10 1,2-Dichlorobenzen	1666.66	1231.49	73.89	20-130
$ 18 Nitrobenzene-d5	1666.66	1181.96	70.92	23-120
$ 36 2-Fluorobiphenyl	1666.66	1074.02	64.44	30-115
$ 55 2,4,6-Tribromophen	2500.00	1172.94	46.92	19-122
$ 66 Terphenyl-d14	1666.66	1212.90	72.77	18-137

* - Values outside of QC limits
Spike Recovery: 0 out of 19 outside limits
0 out of 19 not found

3C
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Matrix Spike - EPA Sample No.: LCS2

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Phenol	75	0	47	63	12-110
2-Chlorophenol	75	0	52	69	27-123
1,4-Dichlorobenzene	50	0	24	48	36- 97
N-Nitroso-di-n-prop.(1)	50	0	26	52	41-116
1,2,4-Trichlorobenzene	50	0	23	46	39- 98
4-Chloro-3-Methylphenol	75	0	45	60	23- 97
Acenaphthene	50	0	28	56	46-118
4-Nitrophenol	75	0	40	53	10- 80
2,4-Dinitrotoluene	50	0	28	56	24- 96
Pentachlorophenol	75	0	39	52	9-103
Pyrene	50	0	33	66	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	75	53	71	12	42	12-110
2-Chlorophenol	75	55	73	6	40	27-123
1,4-Dichlorobenzene	50	31	62	25	28	36- 97
N-Nitroso-di-n-prop.(1)	50	33	66	24	38	41-116
1,2,4-Trichlorobenzene	50	33	66	36*	28	39- 98
4-Chloro-3-Methylphenol	75	50	67	11	42	23- 97
Acenaphthene	50	31	62	10	31	46-118
4-Nitrophenol	75	13	17	103*	50	10- 80
2,4-Dinitrotoluene	50	24	48	15	38	24- 96
Pentachlorophenol	75	22	29	57*	50	9-103
Pyrene	50	40	80	19	31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 3 out of 11 outside limits
Spike Recovery: 0 out of 22 outside limits

COMMENTS:

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID (Standard): S3277.D Date Analyzed: 03/01/95

Instrument ID: S Time Analyzed: 1842

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	46817	5.83	163703	7.73	101235	10.69
	UPPER LIMIT	93634	6.33	327406	8.23	202470	11.19
	LOWER LIMIT	23408	5.33	81852	7.23	50618	10.19
	EPA SAMPLE No.						
01	SBLK1	76975	5.85	282710	7.75	181966	10.71
02	LCS1	72686	5.85	251934	7.75	155629	10.71
03	SB05125145	122799*	5.83	418981*	7.74	322063*	10.71
04	SB03185205	104746*	5.83	357102*	7.74	277765*	10.71
05	SBLK2	59705	5.83	245827	7.74	185230	10.70
06	LCSD2	67126	5.83	234074	7.74	171350	10.71
07	RB-01	51606	5.83	223787	7.73	166722	10.70
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID (Standard): S3277.D Date Analyzed: 03/01/95

Instrument ID: S Time Analyzed: 1842

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	197915	13.23	231004	17.86	291333	20.23
	UPPER LIMIT	395830	13.73	462008	18.36	582666	20.73
	LOWER LIMIT	98958	12.73	115502	17.36	145666	19.73
	EPA SAMPLE No.						
01	SBLK1	330296	13.25	291300	17.89	354025	20.26
02	LCS1	253628	13.25	258882	17.89	306503	20.27
03	SB05125145	639902*	13.25	621157*	17.87	803212*	20.26
04	SB03185205	542840*	13.25	536277*	17.87	691080*	20.24
05	SBLK2	352934	13.25	340103	17.89	369327	20.25
06	LCSD2	285805	13.25	279265	17.88	338778	20.25
07	RB-01	306454	13.24	305045	17.88	360048	20.25
08							
09							
10							
11							
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13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID (Standard): S3304.D Date Analyzed: 03/02/95

Instrument ID: S Time Analyzed: 1018

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	43499	5.74	154441	7.63	93333	10.57
	UPPER LIMIT	86998	6.24	308882	8.13	186666	11.07
	LOWER LIMIT	21750	5.24	77220	7.13	46666	10.07
	EPA SAMPLE No.						
01	LCS2	43984	5.74	166316	7.63	85871	10.58
02	LFSB040810	80040	5.74	272097	7.63	132135	10.58
03	SB05125145RE	114739*	5.74	401290*	7.63	210267*	10.58
04	SB03185205RE	107116*	5.74	358100*	7.63	171706	10.58
05							
06							
07							
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19							
20							
21							
22							

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: SWL-TULSA Contract: NUS

Lab Code: SWOK Case No.: NUS SAS No.: SDG No.: 21359

Lab File ID (Standard): S3304.D Date Analyzed: 03/02/95

Instrument ID: S Time Analyzed: 1018

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	166581	13.12	143374	17.74	162349	20.09
	UPPER LIMIT	333162	13.62	286748	18.24	324698	20.59
	LOWER LIMIT	83290	12.62	71687	17.24	81174	19.59
	EPA SAMPLE No.						
01	LCS2	142701	13.11	114348	17.73	134793	20.08
02	LFSB040810	191776	13.13	152004	17.74	177414	20.09
03	SB05125145RE	339750*	13.13	271947	17.74	320865	20.09
04	SB03185205RE	241494	13.13	192146	17.74	220752	20.09
05							
06							
07							
08							
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19							
20							
21							
22							

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

2E
WATER PESTICIDE SURROGATE RECOVERY

Lab Name: SWL-TULSA Contract: PEST PCB

Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

GC Column(1): DB-1701 ID: 0.32(mm) GC Column(2): DB-17 ID: 0.32(mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	PBLKWX	66	74	84	78			0
02	LCSDW	96	80	112	109			0
03	LCSW	86	79	96	92			0
04	RB-01	60	64	92	85			0

	ADVISORY QC LIMITS
TCX = Tetrachloro-m-xylene	(60-150)
DCB = Decachlorobiphenyl	(60-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

2F
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: SWL-TULSA Contract: PEST PCB

Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

GC Column(1): DB-17 ID: 0.32(mm) GC Column(2): DB-1701 ID: 0.32(mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	PBLKSE	70	75	92	89			0
02	LC0228SB1	62	70	90	85			0
03	LC0228SB2	70	76	100	95			0
04	LD0228SB1	68	75	95	90			0
05	LD0228SB2	69	72	98	92			0
06	LF-SB04-0810	62	68	87	84			0
07	LFSB03185205	60	67	88	82			0
08	LFSB05125145	69	76	92	91			0

	ADVISORY QC LIMITS
TCX = Tetrachloro-m-xylene	(60-150)
DCB = Decachlorobiphenyl	(60-150)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

3LCC

WATER PESTICIDE LABORATORY CONTROL SPIKE RECOVERY FORM

Lab Name: SWL-TULSA Contract: PEST_PCB

Lab Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LCSW
LCS Aliquot: 1000 mL
Conc. Extract Volume: 10000 uL
Injection Vol: 1.00 uL
Sulfur Cleanup:(y/n) N

LCS Lot No: 12-220-5
Date Extracted: 02/21/95
Date Analyzed: 02/25/95
Dilution Factor: 1.00
pH: 7.00

Instrument ID(1) : HP_08A GC Column(1) :DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/L)	AMOUNT RECOVERED (ug/L)	% REC #	QC LIMITS
gamma-BHC (Lindane)	.50	.360	72	56-123
Heptachlor	.50	.380	76	40-131
Aldrin	.50	.370	74	40-120
Dieldrin	1.00	.770	77	52-126
Endrin	1.00	.780	78	56-121
4,4'-DDT	1.00	.830	83	38-127

Instrument ID(2) : HP_08B GC Column(2) : DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/L)	AMOUNT RECOVERED (ug/L)	% REC #	QC LIMITS
gamma-BHC (Lindane)	.50	.350	70	56-123
Heptachlor	.50	.380	76	40-131
Aldrin	.50	.360	72	40-120
Dieldrin	1.00	.710	71	52-126
Endrin	1.00	.730	73	56-121
4,4'-DDT	1.00	.770	77	38-127

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:0 Outside limits out of 12 total.

COMMENTS: _____

3LCC

WATER PESTICIDE LABORATORY CONTROL SPIKE RECOVERY FORM

Lab Name: SWL-TULSA Contract: PEST_PCB

Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LCSDW
LCS Aliquot: 1000 mL
Conc. Extract Volume: 10000 uL
Injection Vol: 1.00 uL
Sulfur Cleanup:(y/n) N

LCS Lot No: 12-220-5
Date Extracted: 02/21/95
Date Analyzed: 02/25/95
Dilution Factor: 1.00
pH: 7.00

Instrument ID(1) : HP_08A GC Column(1) :DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/L)	AMOUNT RECOVERED (ug/L)	% REC #	QC LIMITS
gamma-BHC (Lindane)	.50	.390	78	56-123
Heptachlor	.50	.390	78	40-131
Aldrin	.50	.390	78	40-120
Dieldrin	1.00	.830	83	52-126
Endrin	1.00	.840	84	56-121
4,4'-DDT	1.00	.900	90	38-127

Instrument ID(2) : HP_08B GC Column(2) : DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/L)	AMOUNT RECOVERED (ug/L)	% REC #	QC LIMITS
gamma-BHC (Lindane)	.50	.390	78	56-123
Heptachlor	.50	.390	78	40-131
Aldrin	.50	.370	74	40-120
Dieldrin	1.00	.770	77	52-126
Endrin	1.00	.830	83	56-121
4,4'-DDT	1.00	.850	85	38-127

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:0 Outside limits out of 12 total.

COMMENTS:

FORM III LCP

3LCC

SOIL PESTICIDE LABORATORY CONTROL SPIKE RECOVERY FORM

Lab Name: SWL-TULSA Contract: PEST_PCB

Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LC0228SB1 LCS Lot No: 12-220-5
LCS Aliquot: 30 g Date Extracted: 02/28/95
Conc. Extract Volume: 5000 uL Date Analyzed: 03/06/95
Injection Vol: 1.00 uL Dilution Factor:1.00
Sulfur Cleanup:(y/n) N pH: 7.00

Instrument ID(1) : HP_04A GC Column(1) :DB-17 ID:.353mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
gamma-BHC (Lindane)	16.7	11.5	69	56-123
Heptachlor	16.7	12.7	76	40-131
Aldrin	16.7	12.6	76	40-120
Dieldrin	33.3	24.8	74	52-126
Endrin	33.3	26.7	80	56-121
4,4'-DDT	33.3	30.2	91	38-127

Instrument ID(2) : HP_04B GC Column(2) : DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
gamma-BHC (Lindane)	16.7	10.9	65	56-123
Heptachlor	16.7	11.3	68	40-131
Aldrin	16.7	11.4	68	40-120
Dieldrin	33.3	23.3	70	52-126
Endrin	33.3	24.3	73	56-121
4,4'-DDT	33.3	23.7	71	38-127

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:0 outside limits out of 12 total.

COMMENTS: _____

FORM III LCP

3LCC

SOIL PESTICIDE LABORATORY CONTROL SPIKE RECOVERY FORM

Lab Name: SWL-TULSA Contract: PEST_PCB

ɔ Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LD0228SB1
LCS Aliquot: 30 g
Conc. Extract Volume: 5000 uL
Injection Vol: 1.00 uL
Sulfur Cleanup:(y/n) N

LCS Lot No: 12-220-5
Date Extracted: 02/28/95
Date Analyzed: 03/06/95
Dilution Factor:1.00
pH: 7.00

Instrument ID(1) : HP_04A GC Column(1) :DB-17 ID:.353mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
gamma-BHC (Lindane)	16.7	13.4	80	56-123
Heptachlor	16.7	14.5	87	40-131
Aldrin	16.7	14.3	86	40-120
Dieldrin	33.3	28.3	85	52-126
Endrin	33.3	31.0	93	56-121
4,4'-DDT	33.3	33.9	102	38-127

strument ID(2) : HP_04B GC Column(2) : DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
gamma-BHC (Lindane)	16.7	12.6	76	56-123
Heptachlor	16.7	13.1	79	40-131
Aldrin	16.7	13.0	78	40-120
Dieldrin	33.3	26.5	80	52-126
Endrin	33.3	27.7	83	56-121
4,4'-DDT	33.3	26.2	79	38-127

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:0 outside limits out of 12 total.

COMMENTS: _____:
_____:

FORM III LCP

3LCC

SOIL PCB LABORATORY CONTROL SPIKE RECOVERY

Lab Name: SWL-TULSA Contract: PEST_PCB

Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LC0228SB2
LCS Aliquot:30.0g
Conc. Extract Volume: 5000 uL
Injection Volume: 1.00 uL
Sulfur Cleanup:(y/n) N

LCS Lot No: 12-236-5
Date Extracted: 02/28/95
Date Analyzed: 03/06/95
Dilution Factor:1.00
pH: 7.00

Instrument ID(1) : HP_04A GC Column(1) :DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
Arochlor 1016	400	236	59	56-123
Arochlor 1260	800	499	62	40-131

Instrument ID(2) : HP_01B GC Column(2) : DB-1701 ID:.53mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
Arochlor 1016	400	216	54 *	56-123
Arochlor 1260	800	527	66	40-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:1 outside limits out of 4 total.

COMMENTS: _____

FORM III LCP

3LCC

SOIL PCB LABORATORY CONTROL SPIKE RECOVERY

Lab Name: SWL-TULSA Contract: PEST_PCB

Code: SWOK Case No: NUS1 SDG No: 21359

Lab Sample ID: LD0228SB2
LCS Aliquot:30.0g
Conc. Extract Volume: 5000 uL
Injection Volume: 1.00 uL
Sulfur Cleanup:(y/n) N

LCS Lot No: 12-236-5
Date Extracted: 02/28/95
Date Analyzed: 03/06/95
Dilution Factor:1.00
pH: 7.00

Instrument ID(1) : HP_04A GC Column(1) :DB-1701 ID:.32mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
Arochlor 1016	400	237	59	56-123
Arochlor 1260	800	499	62	40-131

Instrument ID(2) : HP_01B GC Column(2) : DB-1701 ID:.53mm

COMPOUND	AMOUNT ADDED (ug/Kg)	AMOUNT RECOVERED (ug/Kg)	% REC #	QC LIMITS
Arochlor 1016	400	216	54 *	56-123
Arochlor 1260	800	523	65	40-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

LCS Recovery:1 outside limits out of 4 total.

COMMENTS: _____

FORM III LCP

6E

PESTICIDE INITIAL CALIBRATION OF SINGLE COMPONENT ANALYTES

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

Instrument ID: HP 08B Level (x low): low 1.0 mid 4.0 high 16.0

GC Column: DB-17 ID: 0.32(mm) Date(s) Analyzed: 02/23/95 02/23/95

COMPOUND	CALIBRATION FACTORS LOW	MID	HIGH	MEAN	%RSD
alpha-BHC	71000000	67300000	57900000	65400000	10.3
beta-BHC	38900000	32100000	25700000	32200000	20.5
delta-BHC	62900000	57600000	49800000	56800000	11.6
gamma-BHC (Lindane)	67000000	61900000	52800000	60600000	11.9
Heptachlor	66800000	59300000	50400000	58800000	14.0
Aldrin	61600000	56400000	49000000	55700000	11.4
Heptachlor epoxide	58800000	51500000	43300000	51200000	15.2
Endosulfan I	58100000	52700000	44200000	51700000	13.6
Dieldrin	55200000	50500000	42200000	49300000	13.4
4,4'-DDE	50700000	46200000	39100000	45300000	12.9
Endrin	38500000	35700000	30900000	35000000	11.0
Endosulfan II	47200000	41000000	34100000	40800000	16.1
4,4'-DDD	46800000	42900000	36000000	41900000	13.0
Endosulfan sulfate	47000000	40600000	34400000	40700000	15.5
4,4'-DDT	40400000	38900000	34400000	37900000	8.2
Methoxychlor	20100000	16900000	13200000	16700000	20.6
Endrin ketone	46500000	44700000	37500000	42900000	11.1
Endrin aldehyde	42100000	35100000	29000000	35400000	18.5
alpha Chlordane	60300000	52400000	43600000	52100000	16.0
gamma Chlordane	61500000	53300000	45300000	53400000	15.2
Tetrachloro-m-xylene	64100000	55100000	44600000	54600000	17.9
Decachlorobiphenyl	63600000	51700000	40000000	51800000	22.8

* Surrogate calibration factors are measured from Standard Mix A analyses

%RSD must be less than or equal 20.0% for all compounds except the surrogates, where %RSD must be less than or equal to 30.0%. Up to two target compounds, but not surrogates, may have %RSD greater than 20.0% but less than or equal to 30.0%.

8D
PESTICIDE ANALYTICAL SEQUENCE

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

GC Column: DB-17 ID: 0.32(mm) Init. Calib. Date(s): 02/23/95 02/23/95

Instrument ID: HP 08B

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 7.99 DCB: 22.80

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01	PIBLKB1	PIBLKB1	02/23/95	1553	7.99	22.79
02	RESCB1	RESCB1	02/23/95	1624	7.99	22.79
03	PEMB1	PEMB1	02/23/95	1655	7.99	22.79
04	AR1660B1	AR1660B1	02/23/95	1728	7.99	22.79
05	AR1221B1	AR1221B1	02/23/95	1759	7.99	22.79
06	AR1232B1	AR1232B1	02/23/95	1830	7.99	22.79
07	AR1242B1	AR1242B1	02/23/95	1901	7.99	22.79
08	AR1248B1	AR1248B1	02/23/95	1933	7.99	22.80
09	AR1254B1	AR1254B1	02/23/95	2004	7.99	22.79
10	TOXAPHB1	TOXAPHB1	02/23/95	2035	7.99	22.80
11	INDALB1	INDALB1	02/23/95	2107	7.99	22.80
12	INDBLB1	INDBLB1	02/23/95	2138	7.99	22.80
13	INDAMB1	INDAMB1	02/23/95	2209	7.99	22.80
14	INDBMB1	INDBMB1	02/23/95	2241	7.99	22.80
15	INDAHB1	INDAHB1	02/23/95	2312	7.99	22.80
16	INDBHB1	INDBHB1	02/23/95	2343	7.99	22.80
17	PIBLKB2	PIBLKB2	02/24/95	0014	7.99	22.80
18	PEMB2	PEMB2	02/24/95	0046	7.99	22.80
19	PIBLKB3	PIBLKB3	02/24/95	0732	7.99	22.79
20	INDAMB2	INDAMB2	02/24/95	0803	7.99	22.79
21	INDBMB2	INDBMB2	02/24/95	0834	7.99	22.79
22	AR1254B2	AR1254B2	02/24/95	0936	7.99	22.79
23	PIBLKB4	PIBLKB4	02/24/95	1712	7.99	22.79
24	PEMB3	PEMB3	02/24/95	1743	7.99	22.78
25	PIBLKB5	PIBLKB5	02/25/95	0235	7.99	22.79
26	INDAMB3	INDAMB3	02/25/95	0306	7.99	22.79
27	INDBMB3	INDBMB3	02/25/95	0337	7.99	22.79
28	PBLKWX	PBLKWX	02/25/95	0440	7.98	22.79
29	LCSW	LCSW	02/25/95	0511	7.98	22.79
30	LCSDW	LCSDW	02/25/95	0543	7.98	22.78
31	RB-01	21359-02	02/25/95	0850	7.98	22.80
32	PIBLKB6	PIBLKB6	02/25/95	0953	7.99	22.80

QC LIMITS
TCX = Tetrachloro-m-xylene (+/- 0.05 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.10 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

8D
PESTICIDE ANALYTICAL SEQUENCE

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: SDG No.: 21359

GC Column: DB-17 ID: 0.32(mm) Init. Calib. Date(s): 02/23/95 02/23/95

Instrument ID: HP 08B

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 7.99 DCB: 22.80

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01	PEMB4	PEMB4	02/25/95	1024	7.99	22.80
02	AR1254B3	AR1254B3	02/25/95	1126	7.99	22.80

QC LIMITS

TCX = Tetrachloro-m-xylene (+/- 0.05 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.10 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

PESTICIDE ANALYTICAL SEQUENCE

Name: SWL-TULSA Contract: PEST PCB

Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

Column: DB-17 ID: 0.32(mm) Init. Calib. Date(s): 03/01/95 03/02/95

Instrument ID: HP 04A

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 7.20 DCB: 23.01

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01	PIBLKA1	PIBLKA1	03/01/95	1932	7.20	23.01
02	RESCA1	RESCA1	03/01/95	2003	7.20	23.01
03	PEMA1	PEMA1	03/01/95	2034	7.20	23.01
04	AR1660A1	AR1660A1	03/01/95	2106	7.20	23.01
05	AR1221A1	AR1221A1	03/01/95	2137	7.20	23.01
06	AR1232A1	AR1232A1	03/01/95	2208	7.20	23.01
07	AR1242A1	AR1242A1	03/01/95	2240	7.20	23.02
08	AR1248A1	AR1248A1	03/01/95	2311	7.20	23.01
09	AR1254A1	AR1254A1	03/01/95	2342	7.20	23.01
10	TOXAPHA1	TOXAPHA1	03/02/95	0013	7.20	23.01
11	INDALA1	INDALA1	03/02/95	0045	7.20	23.01
12	INDBLA1	INDBLA1	03/02/95	0116	7.20	23.01
13	INDAMA1	INDAMA1	03/02/95	0147	7.20	23.01
14	INDBMA1	INDBMA1	03/02/95	0218	7.20	23.01
15	INDAHA1	INDAHA1	03/02/95	0250	7.20	23.01
16	INDBHA1	INDBHA1	03/02/95	0321	7.20	23.01
17	PIBLKA2	PIBLKA2	03/02/95	0352	7.20	23.01
18	PEMA2	PEMA2	03/02/95	0424	7.20	23.01
19	PIBLKA3	PIBLKA3	03/06/95	1934	7.20	23.01
20	PEMA3	PEMA3	03/06/95	2006	7.19	23.00
21	PBLKSE	PBLKSE	03/06/95	2037	7.19	23.00
22	LC0228SB1	LC0228SB1	03/06/95	2140	7.19	23.00
23	LD0228SB1	LD0228SB1	03/06/95	2211	7.19	23.00
24	LC0228SB2	LC0228SB2	03/06/95	2242	7.19	23.01
25	LD0228SB2	LD0228SB2	03/06/95	2314	7.19	23.00
26	LFSB03185205	21359-01	03/06/95	2345	7.20	23.00
27	LF-SB04-0810	21361-01	03/07/95	0016	7.20	23.00
28	LFSB05125145	21361-02	03/07/95	0048	7.19	23.00
29	PIBLKA4	PIBLKA4	03/07/95	0150	7.20	23.00
30	INDAMA2	INDAMA2	03/07/95	0221	7.20	23.00
31	INDBMA2	INDBMA2	03/07/95	0253	7.20	23.00
32	AR1660A2	AR1660A2	03/07/95	0324	7.20	23.00

QC LIMITS

TCX = Tetrachloro-m-xylene (+/- 0.05 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.10 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

8D
PESTICIDE ANALYTICAL SEQUENCE

Lab Name: SWL-TULSA Contract: PEST PCB

Lab Code: SWOK Case No.: NUS1 SAS No.: _____ SDG No.: 21359

GC Column: DB-1701 ID: 0.32(mm) Init. Calib. Date(s): 03/01/95 03/02/95

Instrument ID: HP 04B

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 7.23 DCB: 21.37

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01	PIBLKB1	PIBLKB1	03/01/95	1932	7.23	21.38
02	RESCB1	RESCB1	03/01/95	2003	7.23	21.38
03	PEMB1	PEMB1	03/01/95	2034	7.23	21.38
04	AR1660B1	AR1660B1	03/01/95	2106	7.23	21.38
05	AR1221B1	AR1221B1	03/01/95	2137	7.23	21.38
06	AR1232B1	AR1232B1	03/01/95	2208	7.23	21.38
07	AR1242B1	AR1242B1	03/01/95	2240	7.23	21.38
08	AR1248B1	AR1248B1	03/01/95	2311	7.23	21.38
09	AR1254B1	AR1254B1	03/01/95	2342	7.23	21.38
10	TOXAPHB1	TOXAPHB1	03/02/95	0013	7.23	21.37
11	INDALB1	INDALB1	03/02/95	0045	7.23	21.38
12	INDBLB1	INDBLB1	03/02/95	0116	7.23	21.38
13	INDAMB1	INDAMB1	03/02/95	0147	7.23	21.37
14	INDBMB1	INDBMB1	03/02/95	0218	7.23	21.37
15	INDAHB1	INDAHB1	03/02/95	0250	7.23	21.37
16	INDBHB1	INDBHB1	03/02/95	0321	7.23	21.37
17	PIBLKB2	PIBLKB2	03/02/95	0352	7.23	21.37
18	PEMA2	PEMA2	03/02/95	0424	7.23	21.37
19	PIBLKB3	PIBLKB3	03/06/95	1934	7.23	21.36
20	PEMB3	PEMB3	03/06/95	2006	7.23	21.35
21	PBLKSE	PBLKSE	03/06/95	2037	7.22	21.35
22	LC0228SB1	LC0228SB1	03/06/95	2140	7.22	21.35
23	LD0228SB1	LD0228SB1	03/06/95	2211	7.22	21.35
24	LC0228SB2	LC0228SB2	03/06/95	2242	7.22	21.35
25	LD0228SB2	LD0228SB2	03/06/95	2314	7.22	21.35
26	LFSB03185205	21359-01	03/06/95	2345	7.23	21.35
27	LF-SB04-0810	21361-01	03/07/95	0016	7.22	21.35
28	LFSB05125145	21361-02	03/07/95	0048	7.22	21.35
29	PIBLKB4	PIBLKB4	03/07/95	0150	7.23	21.35
30	INDAMB2	INDAMB2	03/07/95	0221	7.23	21.35
31	INDBMB2	INDBMB2	03/07/95	0253	7.23	21.35
32	AR1660B2	AR1660B2	03/07/95	0324	7.23	21.35

QC LIMITS
TCX = Tetrachloro-m-xylene (+/- 0.05 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.10 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

F.2 TAL INORGANIC ANALYTICAL RESULTS

Halliburton NUS
CORPORATION INTERNAL CORRESPONDENCE

C-49-03-5-233

TO: JEAN-LUC GLORIEUX **DATE:** MARCH 29, 1995

FROM: TRACY ROBERTS **COPIES:** D.V. FILE

SUBJECT: INORGANIC DATA VALIDATION - TAL METALS AND CYANIDE
CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SDG 21359

SAMPLES: 3/Soil/

LF-SB03-18.5-20.5 LF-SB04-0810 LB-SB05-12.5-14.5

1/Aqueous/

RB-01

Overview

The sample set for CTO 203 SDG 21359 NSB New London, Groton, Connecticut, consists of three (3) soil samples and one aqueous quality control field blank sample. These samples were analyzed for Target Analyte List (TAL) metals. Field duplicate samples were not included with this data package.

The samples were collected by Halliburton NUS Corporation on February 16, 17, and 18, 1995 and analyzed by Southwest Laboratories of Oklahoma under Naval Energy and Environmental Support Activity (NEESA) Level D Quality Assurance/Quality Control (QA/QC) criteria. All analyses were conducted using the Contract Laboratory Program (CLP) Statement of Work (SOW) ILM02.1 analytical and reporting protocols. The data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verification
  • Laboratory Method and Field Blank Analyses
* • ICP Interference Check Sample Results
* • Laboratory and Field Duplicate Precision
* • Laboratory Control Sample Results
* • ICP Serial Dilution Results
* • Detection Limits
* • Sample Quantitation

* All quality control criteria were met for this parameter.

All analyses with the exception of mercury and cyanide, were analyzed via ICP methodology. Evaluation of quality control parameters associated with analytes commonly analyzed via Graphite Furnace Atomic Absorption (GFAA) methodology was inherently non-applicable and thus, not conducted.

Sample aliquots for matrix spike analysis are designated by the field crew with a frequency of one per twenty samples of similar matrix. No matrix spike analyses were requested with this sample set, hence, the sample data were not evaluated for this parameter.

The attached Table 1 summarizes the validation recommendations which were based on the following information:

LABORATORY BLANK ANALYSES

The following analytes were detected as contaminants in the laboratory method blanks at the maximum concentrations indicated:

Analyte	Maximum Concentration	Action Level
calcium [2]	35.216 ug/L	176.08 ug/L
calcium	33.2 ug/L	166 ug/L, 33.2 mg/kg
barium [1]	1.1 ug/L	1.1 mg/kg
magnesium [2]	9.613 ug/L	48.065 ug/L
sodium [1]	72.5 ug/L	72.5 mg//kg
zinc [1]	2.8 ug/L	2.8 mg/kg

1 Concentration was reported in a field blank.
2 Concentration was reported in an aqueous preparation blank.

Samples Affected: All

An action level of 5X the maximum contaminant level has been used to evaluate the sample data. Dilution factors, digestion aliquot and percent solids were all considered during the application of the action levels. Positive results for calcium and magnesium less than the validation action level were qualified, "B".

ADDITIONAL COMMENTS

Positive results less than 2X IDL for arsenic, barium, beryllium, and cadmium were qualified as estimated, "J", as per Region I validation protocol. Positive results at these levels for these analytes were estimated as a result of inherent uncertainty involved in analyte quantitation.

No other problems were noted.

EXECUTIVE SUMMARY

Laboratory Performance: Calcium and magnesium were qualified due to laboratory method and field blank contamination.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", prepared for the Hazardous Site Evaluation Division, June 13, 1988 revision as intended for use within USEPA Region I, and the NEESA document entitled "Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program" (NEESA 20.2-047B; 6/88).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NEESA Guidelines and the Quality Assurance Project Plan (QAPP)."

Halliburton NUS Corporation

Tracy Roberts
Chemist/Data Validator

Halliburton NUS Corporation

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Regional Worksheets
3. Appendix C - Support Documentation

C-49-03-5-233

NEW LONDON
SDG 21359
TABLE 1 - RECOMMENDATION SUMMARY

Aluminum		Magnesium	A[1]
Antimony		Manganese	
Arsenic		Mercury	
Barium		Nickel	
Beryllium		Potassium	
Cadmium		Selenium	
Calcium		Silver	
Chromium	A[1]	Sodium	
Cobalt		Thallium	
Copper		Vanadium	
Iron		Zinc	
Lead		Cyanide	

If field is left blank, the qualifier is "A", accept all data.

A[1] - Accept data, but qualify affected results undetected, "U", as a result of blank contamination.

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID:			LF-SB03-18.5-20.5		LF-SB04-0810		LF-SB05-12.5-14.5	
LABORATORY ID:			21359.01		21361.01		21361.02	
TAL METAL SOILS (MG/KG)								
ANALYTE	CRDL	IDL						
ALUMINUM	40	2.8	15200		9780		18400	
ANTIMONY	12	0.8	1.3	U	0.87	U	1.0	U
ARSENIC	2	0.8	9.0		0.94	J	4.5	
BARIUM	40	0.2	43.3		114		51.2	
BERYLLIUM	1	0.2	0.77		0.29	J	0.70	
CADMIUM	1	0.2	0.32	J	0.22	U	0.26	U
CALCIUM	1000	4.8	8530		1660		1070	
CHROMIUM	2	0.2	36.1		17.8		23.3	
COBALT	10	0.2	10.2		8.7		9.5	
COPPER	5	0.2	13.5		13.1		13.8	
IRON	20	2.8	25600		15200		17800	
LEAD	0.6	0.2	8.6		8.1		9.6	
MAGNESIUM	100	1.6	8060		4750		3790	
MANGANESE	3	0.2	326		298		248	
MERCURY	0.1	0.1	0.16	U	0.11	U	0.13	U
NICKEL	8	0.2	20.9		9.5		11.2	
POTASSIUM	1000	9	4500		3700		1150	
SELENIUM	1	0.6	2.3		0.81		1.4	
SILVER	2	0.4	0.64	U	0.44	U	0.52	U
SODIUM	1000	2.2	7190		99.9		93.7	
THALLIUM	2	0.8	1.8		0.87	U	1.0	U
VANADIUM	10	0.2	40.3		29.1		38.2	
ZINC	4	0.2	57.3		47.7		38.3	
CYANIDE	0.5	0.5	0.80	U	0.54	U	0.65	U
% SOLIDS:			62.0		92.0		78.0	

CTO 203, NSB NEW LONDON, GROTON, CONNECTICUT
SOUTHWEST LABORATORY OF OKLAHOMA

CLIENT ID: RB-01
LABORATORY ID: 21359.02

TAL METAL WATERS (UG/L)

ANALYTE	CRDL	IDL		
ALUMINUM	200	14.0	14.0	U
ANTIMONY	60	4.0	4.0	U
ARSENIC	10	4.0	4.0	U
BARIUM	200	1.0	1.1	J
BERYLLIUM	5	1.0	1.0	U
CADMIUM	5	1.0	1.0	U
CALCIUM	5000	8.0	39.2	B
CHROMIUM	10	1.0	1.0	U
COBALT	50	1.0	1.0	U
COPPER	25	1.0	1.0	U
IRON	100	14.0	14.0	U
LEAD	3	1.0	1.0	U
MAGNESIUM	5000	8.0	17.3	B
MANGANESE	15	1.0	1.0	U
MERCURY	0.2	0.20	0.20	U
NICKEL	40	1.0	1.0	U
POTASSIUM	5000	45.0	45.0	U
SELENIUM	5	3.0	3.0	U
SILVER	10	2.0	2.0	U
SODIUM	5000	11.0	72.5	
THALLIUM	10	4.0	4.0	U
VANADIUM	50	1.0	1.0	U
ZINC	20	1.0	2.8	
CYANIDE	10	10.0	10.0	U

APPENDIX B

REGIONAL WORKSHEETS

REGION I
Data Review Worksheets

Site Name Ventron
Reference Number C-19-030-233

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) SWOK data package rec at Region I has been reviewed and the quality assurance and perform data summarized. The data review included:

Case No. 21359 SAS No. —
SDG. No. 21359 Matrix 3501 / 1Ag
No. of Samples 4

Sampling Date(s) 2-16, 2-18
Shipping Date(s) 2-17, 2-20
Date Rec'd by Lab 2-18, 2-21

Traffic Report Nos: LF-SB03-18.5-20.5, LF-SB04-08.0, LF-SB05-12.5-14.5
Trip Blank No.: none
Equipment Blank No.: RB-01
Field Dup Nos: none

SOW No. ILM02.1 requires that specific analytical work be done and associated reports be provided by the laboratory to the Regions, I IV, and SMO. The general criteria used to determine the performance based on an examination of:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- ICP Interference Check Results
- Matrix Spike Recoveries
- Laboratory Duplicates
- Field Duplicates
- Lab Control Sample Result
- Furnace AA Results
- ICP Serial Dilution Resul
- Detection Limit Results
- Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
R - Reject data due to quality control criteria.
U - Analyte not detected.

Reviewer: Troy Roberts

Date: 3-27-95

3-30-95
JAS

REGION I
Data Review Worksheets

I. DATA COMPLETENESS

MISSING INFORMATION	DATE REQ CONTRACTOR	DATE REC
none		

II. HOLDING TIMES

Complete table for all samples and circle the analysis data for samples not within criteria

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
LF-SB03-18.5-20.5	2-16-95	2-22	2-28	2-27		NA
RB-01	2-16-95	2-23	2-28	2-27	<2	NA
LF-SB04-08.0	2-17-95	2-22	2-28	2-27		NA
LF-SB05-12.5-14.5	2-17-95	2-22	2-28	2-27		NA

METALS - 180 DAYS FROM SAMPLE COLLECTION
MERCURY - 28 DAYS FROM SAMPLE COLLECTION
CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results estimated (J) and non-detects are estimated (UJ).

2. If holding times are grossly exceeded, the reviewer determine that non-detects are unusable (R).

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria Criteria met - no action

List the analytes which did not meet the percent recovery (%R) cri for Initial or Continuing Calibration.

DATE	INSTRUMENT	ANALYTE	%R	ACTION	SAMPLES AFFEC

ACTIONS:

If any analyte does not meet the %R criteria follow the actions below:

For Positive Results:

	Accept	Estimate (J)	Reject (R)
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%

For Non-detected Results:

	Accept	Estimate (UJ)	Reject (R)
Metals	90-125%R	75-89%R	<75%R, >125%R
Mercury	80-135%R	65-79%R	<65%R, >135%
Cyanide	85-130%R	70-84%R	<70%R, >130%

REGION I
Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

A. Did the laboratory use the proper number of standards for calibration as described in the SOW? Yes

B. Were calibrations performed at the beginning of each analysis? Yes

C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes

D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN ≥ 0.995? Yes

E. Was a standard at 2xCRDL analyzed for all ICP analyses? Yes

If No,

CFAA interpreted as opposed to flame AA [A]

The data may be affected. Use professional judgement to determ the severity of the effect and qualify the data accordingly. List any actions below and list the samples affected.

Criteria met - no action

Correlation Coefficients

Arsenic NA
Selenium NA
Thallium NA
Lead NA
Mercury
Cyanide 0.999996, 0.99993
MSA 0.9998

REGION I
Data Review Worksheet

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in Sections 1 & 2 below. A sepa worksheet should be used for soil and water blanks.

1. Laboratory Blanks MATRIX: _____

DATE	ICB/CCB#	PREP BY	ANALYZE	CONC./UNITS
	See data validation letter			

2. Equipment/Trip Blanks

DATE	PREP BY	ANALYZE	CONC./UNITS
	See data validation letter		

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 10 samples and for each digestion batch? Yes

B. Was a calibration blank run every 10 samples or every 2 hours whichever is more frequent? Yes

If No,

The data may be affected. Use professional judgement to determi the severity of the effect and qualify the data accordingly. Lis any actions below, and list the samples affected.

See validation text.

27 B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highe concentration of that element's contamination in any blank. The acti level for samples which have been concentrated or diluted should multiplied by the concentration/dilution factor. No positive samp result should be reported unless the concentration of the analyte in t sample exceeds the Action Level (AL). Specific actions are as follow

1. When the concentration is greater than the IDL, but less than t Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Leve. report the sample concentration unqualified.

MATRIX: _____ MATRIX: _____

ELEMENT	MAX. CONC. / UNITS	AL/ UNITS	ELEMENT	MAX. CONC. / UNITS	AL/ UNITS

LABORATORY BLANK ANALYSES

The following analytes were detected as contaminants in the laboratory method blanks at the maximum concentrations indicated:

Analyte	Maximum Concentration	Action Level
calcium [2]	35.216 ug/L	176.08 ug/L
calcium	33.2 ug/L	166 ug/L, 33.2 mg/kg
barium [1]	1.1 ug/L	1.1 mg/kg
magnesium [2]	9.613 ug/L	48.065 ug/L
sodium [1]	72.5 ug/L	72.5 mg//kg
zinc [1]	2.8 ug/L	2.8 mg/kg

1 Concentration was reported in a field blank.
2 Concentration was reported in an aqueous preparation blank.

Samples Affected: All

NOTE: Blanks analyzed during a soil case must be converted to mg/kg i order to compare them with the sample results.

$$\text{Conc. in ug/L} \times \frac{\text{Volume diluted to (100ml)}}{\text{Weight digested (1gram)}} \times \frac{1L}{1000ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can than be compared to sample results.

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria

List any elements in the ICS AB solution which did not meet the crit for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED
	No action			

ACTIONS:

If an element does not meet the %R criteria , follow the actions str below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent? Yes

If no,

The data may be affected. Use professional judgement to determ the severity of the effect and qualify the data accordingly. Disc any actions below and list the samples affected.

No action

REGION I
Data Review Worksheets

V B. ICP INTERFERENCE CHECK SAMPLE (Section 3)

1. Report the concentration of any elements detected in the solution > 2xIDL that should not be present.

ELEMENT	CONC. DETECTED IN THE ICS	CONC. OF INTERFERENTS IN THE ICS			
		AL	CA	FE	MG
Not applicable					

Estimate the concentration produced by the interfering element i affected samples. See guidelines for examples. List the sa affected by interferences below:

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (ug/L)	SAMPLE INTERFERENT CONC.				ESTIMATED INTERF. (ug/L)
			AL	CA	FE	MG	

ACTIONS:

1. In general, the sample data can be accepted without qualificati the sample concentrations of Al, Ca, Fe, and Mg are less than 5 their respective levels in the ICS solution.

2. Estimate (J) positive results for affected elements for samples levels of interferents 50% or more of that in the ICS solution.

3. Reject (R) positive results if the reported concentration is entirely to the interfering element.

4. Estimate (UJ) non-detected results for which false negatives suspect.

Give explanations for any actions taken below:

Not applicable

VI. MATRIX SPIKE

SR # NA MATRIX: NA

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spikes sample result
SR - sample result

NA - not applicable as no MS samples were requested for this data set.

Analyte	SSR	SR	S	%R	Action

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceeds the spike concentration by a factor of 4 or more, no action is taken.

2. If any analyte does not meet the %R criteria follow the actions stated below:

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

3. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or N NA

B. Was a post digestion spike analyzed for elements that did not meet required criteria for matrix spike recovery? Yes or N NA

A separate worksheet should be used for each matrix spike pair.

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria duplicate precision. For soil duplicates, calculate the CRDL in mg/ using the sample weight, volume and percent solids data for the samp Indicate what criteria was used to evaluate precision by circling eit the RPD or CRDL for each element.

MATRIX: _____

Element	CRDL water ug/L	CRDL soil mg/kg	Sample # LCS	Duplicate# LCSD	RPD	Action
Aluminum	200		Criteria met - no action			
Antimony	60					
Arsenic	10		See support documentation			
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Laboratory Duplicate Actions should be applied to all other samples o the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >20 for waters and >35% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) positiv results for elements whose absolute difference is >CRDL, (2xCRDL fo soils). If both samples are non-detected, the RPD is not calculate (NC).

nondetects

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair For soil duplicates, calculate the CRDL in mg/kg using the sample wei volume and percent solids data for the sample. Indicate what crit was used to evaluate the precision by circling either the RPD or CRDL each element.

MATRIX: NA

Element	CRDL water ug/L	CRDL soil mg/kg	Sample #	Duplicate#	RPD	Action
Aluminum	200		Field duplicates not included			
Antimony	60					
Arsenic	10		Not applicable			
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD > for waters and >50% for soils.

2. If sample results are less than 5x the CRDL, estimate (J) posit results and (UJ) nondetected results for elements whose absol difference is >2xCRDL, (4xCRDL for soils). If both samples are detected, the RPD is not calculated (NC).

II. LABORATORY CONTROL SAMPLE

1. Aqueous LCS

List any LCS recoveries not within the 80-120% criteria and the samp affected.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED
Criteria met - no action				
See support documentation				

2. Solid LCS

List any analytes that were not within the control windows set by EPA for the solid LCS sample. The 80-120% criteria is not used evaluate solid LCS results.

ELEMENT	LCS CONC.	CONTROL WINDOWS	ACTION	SAMPLES AFFECTED
Criteria met - no action				
See support documentation				

ACTIONS:

AQUEOUS LCS	Percent Recovery <50%	51-79%	>120%
Positive Results	R	J	J
Non-detected Results	R	UJ	A

SOLID LCS	<EPA Control Windows	>EPA Control Windows
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples? Yes or

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

1. Duplicate Precision

--NA-- Duplicate injections and one-point analytical spikes were performed for all samples: duplicate injections agreed within 20%.

--NA-- Duplicate injections and/or spikes were not performed for the following samples/elements: _____

--NA-- Duplicate injections did not agree within ± 20% for samples/elements: _____

2. Post Digestion Spike Recoveries

--NA-- Spike recoveries met the 85-115% recovery criteria for all samples.

--NA-- Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements: _____

--NA-- MSA was used to quantitate analytical results when contractually required.

_____ Correlation coefficients ≥0.995, accept results

_____ Correlation coefficients <0.995 for sample numbers/elements: _____

--NA-- Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside ± 20 % RSD or CV.

2. If the sample absorbance is <50% of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<10%	11%-84%	>115%
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.

4. Estimate (J) sample results if correlation coefficient was <0.99

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

✓ Serial Dilutions were performed for each matrix and resul of the diluted sample analysis agreed within ten percent the original undiluted analysis.

_____ Serial Dilutions were not performed for the following:

_____ Serial Dilutions were performed, but analytical results d not agree within 10% for analyte concentrations greater th 50x the IDL before dilution.

Report all results below that do not meet the required laborato criteria for ICP serial dilution analysis.

MATRIX: Soil / Aqueous

ELEMENT	IDL	50xIDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTI
			Criteria met- no action			
Aluminum						
Barium			See support documentation			
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Nickel						
Potassium						
Silver						
Sodium						
Vanadium						
Zinc						

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

XII. DETECTION LIMIT RESULTS

1. Instrument Detection Limits

✓ Instrument Detection Limit results were present and found less than the Contract Required Detection Limits.

_____ IDLs were not included in the data package on Form XI.

_____ IDLs were present, but the criteria was not met for following elements: _____

2. Reporting Requirements

_____ Were sample results on Form I reported down to the IDL not the CRDL for all analytes? Yes

NA Were sample results that were analyzed by ICP for Se, Tl, As, or Pb at least 5x IDL. Yes

_____ Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes

If No,

The reported results may be inaccurate. Make the necessary cha on the data summary tables and request that the laboratory resubmi- corrected data.

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

✓ Sample results fall within the linear range for ICP and wit the calibrated range for all other parameters.

_____ Sample results were beyond the linear range/ calibration ra of the instrument for the following samples/elemen

_____

In the space below, please show a minimum of one sample calculat per method:

ICP Analyte: Aluminum
Sample: LF-SB03-19.5-20.5
p-114 $\bar{X}$: 4755,~~00~~ $\bar{X}$ = 4739433 ug/L / 5
4731800
4731400 = 947887 mg/kg / .624 (% solids)
= 15190
Form I = 15200

FURNACE

MERCURY

CYANIDE

Cyanide and mercury results were reported in concentrations rather than absorbances, hence, a sample calculation could not be performed.

For soil samples, the following equation may be necessary to conve raw data values (usually reported in ug/L) to actual sample co centrations (mg/kg):

The lab is required to use 1 gram sample (wet weight) to 200 ml.

Wet weight concentration =

$$\text{digest conc. in } \frac{ug}{L} \times \frac{200ml}{1\ gm} \times \frac{1L}{1000\ ml} \times \frac{1000gm}{1kg} \times \frac{1mg}{1000ug} = \frac{mg}{kg}$$

In addition the sample results are converted to dry weight using t percent solids calculations:

$$\frac{\text{Wet weight conc.}}{\%\text{solids}} \times 100 = \text{final concentration, dry weight (mg/k}$$

APPENDIX C

SUPPORT DOCUMENTATION

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

SDG NARRATIVE

CONTRACT:NUS
CASE:21359
SDG:21359

DATE:03/06/95
SOW NO.:ILMO2.1
EPISODE NO.:21359,21361

INORGANIC METAL FRACTION:

3 soil/1 water samples were submitted for ICP, CN and Hg analysis. The samples analyses were completed according to SOW(ILM02.1).

No major problems occurred during the digestion or analyses of these samples.

Initial and Continuing Calibration Checks: No problems.

Initial and Continuing Calibration Blanks: The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: CA, Tl. No action required.

Linearity near the CRDL (CRA & CRI): No problems.

Preparation Blanks: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Soil Ca, Tl. H2O MG, Ca. No action required.

Lab Control Spikes: No problems.

Duplicate(s) (and MSD): No problems.

Serial Dilution (ICP): No problems.

Sincerely,

Deborah J. Beree for...
Jason D. Ruckman
Inorganic Program Manager

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359 SAS No.: _____ SDG No.:21359_

SOW No.: ILM02

EPA Sample No.	Lab Sample ID
_35901_____	__2135901_____
_35902_____	__2135902_____
_36101_____	__2136101_____
_36102_____	__2136102_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:
____BATCH_NUMBERS:_ICP_SOIL_950224I2,_H2O_950224I6;_HG_SOIL_950222HG4,_____
____H2O_950223HG4;_CN_SOIL_9502271201,_H2O_9502271202_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Deborah J. Beree for... Name: Jason D. Ruckman

Date: March 06, 1995 Title: Inorganic Program Manager

CHAIN OF CUSTODY RECORD

[redacted]

3&1

PROJECT NO.: 5082

SITE NAME: NSB-NLON

SAMPLERS (SIGNATURE): [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40z glass TCL VOA	8 oz glass jar TCL SVOC, Pest/PCB						REMARKS
Area A Landfill	2/17/95	1600		✓	[redacted]	2	1	[redacted]						
↓	2/18/95	1424		✓	[redacted]	2	1	[redacted]						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
[signature]	2-20-95 1630				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Shipped to SW Lab of OK FedEx AB# 2299 779 016	
		[signature]	2-21-95 1000		

Order No. 70440 (0693)

3c

CHAIN OF CUSTODY RECORD

[redacted]

PROJECT NO.: 5082

SITE NAME: NSB-NLON

SAMPLERS (SIGNATURE): [illegible]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	2oz glass jar TCL VOC	8oz glass jar TCL SVOC Pest/PCB	40 ml vial TCL VOC	1L Amber TCL SVOC	1L Amber TCL Pest/PCB	[redacted]	[redacted]	REMARKS
Area A Landfill	2/16/95	11 15		✓	[redacted]	3	2	[redacted]						
↓	2/16/95	13 50		✓	BW ~~EF~~ [redacted]	8			2	2	2	[redacted]	[redacted]	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
[illegible]	2/17/95 1630	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE): [illegible]	DATE / TIME: 2/18/95 0900	REMARKS: A.B # 380377327	5°C

Order No. 70440 (0693)

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

35901

ab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

ab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

atrix (soil/water): SOIL_ Lab Sample ID: 2135901___

evel (low/med): LOW__ Date Received: 02/18/95

Solids: _62.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	15200			P
7440-36-0	Antimony_	1.3	U		P
7440-38-2	Arsenic__	9.0			P
7440-39-3	Barium___	43.3	B		P
7440-41-7	Beryllium	0.77	B		P
7440-43-9	Cadmium__	0.32	B		P
7440-70-2	Calcium__	8530			P
7440-47-3	Chromium_	36.1			P
7440-48-4	Cobalt___	10.2	B		P
7440-50-8	Copper___	13.5			P
7439-89-6	Iron____	25600			P
7439-92-1	Lead____	8.6			P
7439-95-4	Magnesium	8060			P
7439-96-5	Manganese	326			P
7439-97-6	Mercury__	0.16	U		CV
7440-02-0	Nickel___	20.9			P
7440-09-7	Potassium	4500			P
7782-49-2	Selenium_	2.3			P
7440-22-4	Silver___	0.64	U		P
7440-23-5	Sodium___	7190			P
7440-28-0	Thallium_	1.8	B		P
7440-62-2	Vanadium_	40.3			P
7440-66-6	Zinc____	57.3			P
_____	Cyanide__	0.80	U		CA
_____	_____	_____			

olor Before: BLACK____ Clarity Before: _____ Texture: MEDIUM

olor After: YELLOW___ Clarity After: _____ Artifacts: _____

omments:
EPA_SAMPLE_ID_35901_=_CLIENT_ID_LF-SB03-18.5-20.5

FORM I - IN

ILMO2.1

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

36101

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): SOIL_ Lab Sample ID: 2136101___

Level (low/med): LOW__ Date Received: 02/21/95

% Solids: _91.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	9780	_		P_
7440-36-0	Antimony_	0.87	U		P_
7440-38-2	Arsenic__	0.94	B		P_
7440-39-3	Barium___	114	_		P_
7440-41-7	Beryllium	0.29	B		P_
7440-43-9	Cadmium__	0.22	U		P_
7440-70-2	Calcium__	1660	_		P_
7440-47-3	Chromium_	17.8	_		P_
7440-48-4	Cobalt___	8.7	B		P_
7440-50-8	Copper___	13.1	_		P_
7439-89-6	Iron____	15200	_		P_
7439-92-1	Lead____	8.1	_		P_
7439-95-4	Magnesium	4750	_		P_
7439-96-5	Manganese	298	_		P_
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	9.5	_		P_
7440-09-7	Potassium	3700	_		P_
7782-49-2	Selenium_	0.81	B		P_
7440-22-4	Silver___	0.44	U		P_
7440-23-5	Sodium___	99.9	B		P_
7440-28-0	Thallium_	0.87	U		P_
7440-62-2	Vanadium_	29.1	_		P_
7440-66-6	Zinc____	47.7	_		P_
	Cyanide__	0.54	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:
EPA_SAMPLE_ID_36101_=_CLIENT_ID_LF-SB04-0810

FORM I - IN

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

36102

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): SOIL_ Lab Sample ID: 2136102___

Level (low/med): LOW__ Date Received: 02/21/95

% Solids: _77.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	18400			P
7440-36-0	Antimony_	1.0	U		P
7440-38-2	Arsenic__	4.5			P
7440-39-3	Barium___	51.2	B		P
7440-41-7	Beryllium	0.70	B		P
7440-43-9	Cadmium__	0.26	U		P
7440-70-2	Calcium__	1070	B		P
7440-47-3	Chromium_	23.3			P
7440-48-4	Cobalt___	9.5	B		P
7440-50-8	Copper___	13.8			P
7439-89-6	Iron____	17800			P
7439-92-1	Lead____	9.6			P
7439-95-4	Magnesium	3790			P
7439-96-5	Manganese	248			P
7439-97-6	Mercury__	0.13	U		CV
7440-02-0	Nickel___	11.2			P
7440-09-7	Potassium	1150	B		P
7782-49-2	Selenium_	1.4			P
7440-22-4	Silver___	0.52	U		P
7440-23-5	Sodium___	93.7	B		P
7440-28-0	Thallium_	1.0	U		P
7440-62-2	Vanadium_	38.2			P
7440-66-6	Zinc____	38.3			P
_____	Cyanide__	0.65	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:
EPA_SAMPLE_ID_36102_=_CLEINT_ID_LF-SB05-12.5-14.5

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

35902

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): WATER Lab Sample ID: 2135902___

Level (low/med): LOW__ Date Received: 02/18/95

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	14.0	U		P_
7440-36-0	Antimony_	4.0	U		P_
7440-38-2	Arsenic__	4.0	U		P_
7440-39-3	Barium___	1.1	B		P_
7440-41-7	Beryllium	1.0	U		P_
7440-43-9	Cadmium__	1.0	U		P_
7440-70-2	Calcium__	39.2	B		P_
7440-47-3	Chromium_	1.0	U		P_
7440-48-4	Cobalt___	1.0	U		P_
7440-50-8	Copper___	1.0	U		P_
7439-89-6	Iron____	14.0	U		P_
7439-92-1	Lead____	1.0	U		P_
7439-95-4	Magnesium	17.3	B		P_
7439-96-5	Manganese	1.0	U		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	1.0	U		P_
7440-09-7	Potassium	45.0	U		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.0	U		P_
7440-23-5	Sodium___	72.5	B		P_
7440-28-0	Thallium_	4.0	U		P_
7440-62-2	Vanadium_	1.0	U		P_
7440-66-6	Zinc____	2.8	B		P_
_____	Cyanide__	10.0	U		CA
_____	_____	_____	_	_____	__

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

EPA_SAMPLE_ID_35902_=_CLIENT_ID_RB-01

U.S. EPA - CLP

3
BLANKS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	14.0	U	14.0	U	14.0	U	14.0	U	2.800	U	P
Antimony	4.0	U	4.0	U	4.0	U	4.0	U	0.800	U	P
Arsenic	4.0	U	4.0	U	4.0	U	4.0	U	0.800	U	P
Barium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Calcium	27.3	B	31.0	B	31.0	B	33.2	B	5.654	B	P
Chromium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Cobalt	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Copper	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Iron	14.0	U	14.0	U	14.0	U	14.0	U	2.800	U	P
Lead	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Magnesium	8.0	U	8.0	U	8.0	U	8.0	U	1.600	U	P
Manganese	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Mercury	0.2	U	0.2	U	0.2	U			0.100	U	CV
Nickel	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Potassium	45.0	U	45.0	U	45.0	U	45.0	U	9.000	U	P
Selenium	3.0	U	3.0	U	3.0	U	3.0	U	0.600	U	P
Silver	2.0	U	2.0	U	2.0	U	2.0	U	0.400	U	P
Sodium	11.0	U	11.0	U	11.0	U	11.0	U	2.200	U	P
Thallium	4.0	U	4.0	U	-4.2	B	4.0	U	-0.935	B	P
Vanadium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	CA

FORM III - IN

U.S. EPA - CLP

3
BLANKS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			14.0	U					14.000	U	P
Antimony			4.0	U					4.000	U	P
Arsenic			4.0	U					4.000	U	P
Barium			1.0	U					1.000	U	P
Beryllium			1.0	U					1.000	U	P
Cadmium			1.0	U					1.000	U	P
Calcium			29.0	B					35.216	B	P
Chromium			1.0	U					1.000	U	P
Cobalt			1.0	U					1.000	U	P
Copper			1.0	U					1.000	U	P
Iron			14.0	U					14.000	U	P
Lead			1.0	U					1.000	U	P
Magnesium			8.0	U					9.613	B	P
Manganese			1.0	U					1.000	U	P
Mercury	0.2	U	0.2	U	0.2	U			0.200	U	CV
Nickel			1.0	U					1.000	U	P
Potassium			45.0	U					45.000	U	P
Selenium			3.0	U					3.000	U	P
Silver			2.0	U					2.000	U	P
Sodium			11.0	U					11.000	U	P
Thallium			4.0	U					4.000	U	P
Vanadium			1.0	U					1.000	U	P
Zinc			1.0	U					1.000	U	P
Cyanide	10.0	U	10.0	U	10.0	U			10.000	U	CA

U.S. EPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No: _____ SDG No.: 21359_

ICP ID Number: TJA#2_____ ICS Source: EPA-LV91____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum	500000	500000	466508	466208.8	93.2	470393	473152.9	94.6
Antimony	0	0	-4	-0.6		-1	-3.1	
Arsenic	0	0	1	0.1		0	2.3	
Barium	0	500	0	481.0	96.2	0	481.5	96.3
Beryllium	0	500	0	454.6	90.9	0	446.2	89.2
Cadmium	0	1000	1	881.9	88.2	2	838.7	83.9
Calcium	500000	500000	438841	438165.5	87.6	420227	421685.9	84.3
Chromium	15	500	1	462.9	92.6	1	454.9	91.0
Cobalt	0	500	-1	447.1	89.4	-1	439.8	88.0
Copper	0	500	1	507.4	101.5	5	514.8	103.0
Iron	200000	200000	175130	174580.3	87.3	171807	172413.0	86.2
Lead	0	1000	2	903.4	90.3	1	879.0	87.9
Magnesium	500000	500000	493721	491937.9	98.4	481360	482723.2	96.5
Manganese	36	500	0	463.9	92.8	0	458.5	91.7
Mercury								
Nickel	0	1000	0	873.6	87.4	0	841.4	84.1
Potassium	0	0	10	23.2		-5	17.1	
Selenium	0	0	5	6.1		7	2.6	
Silver	0	1000	0	1001.6	100.2	0	1008.0	100.8
Sodium	0	0	12	14.0		2	7.1	
Thallium	0	0	-1	-6.5		-4	-6.3	
Vanadium	0	500	0	458.6	91.7	0	456.1	91.2
Zinc	1000	1000	2	941.4	94.1	3	930.1	93.0

FORM IV - IN

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

LCSSD

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: 100.0 % Solids for Duplicate: _100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		410.6966		404.1376		1.6		P
Antimony		103.6838		101.6386		2.0		P
Arsenic		413.2972		406.5554		1.6		P
Barium		411.0336		403.8084		1.8		P
Beryllium		10.3420		10.1786		1.6		P
Cadmium		9.6886		9.5714		1.2		P
Calcium	1000.0	3921.2836		3858.6878		1.6		P
Chromium		41.8442		41.0886		1.8		P
Cobalt		100.5490		99.0470		1.5		P
Copper		53.0732		52.1198		1.8		P
Iron		202.1524		200.8322		0.7		P
Lead		98.5390		97.2554		1.3		P
Magnesium	1000.0	4056.3296		3989.0414		1.7		P
Manganese		103.9130		102.2138		1.6		P
Mercury	0.1	0.4905		0.4900		0.1		CV
Nickel		97.8424		96.6220		1.3		P
Potassium	1000.0	3893.5554		3851.0024		1.1		P
Selenium		405.5922		399.4118		1.5		P
Silver		10.3040		10.2032		1.0		P
Sodium	1000.0	3907.7730		3853.2390		1.4		P
Thallium		398.5144		390.7618		2.0		P
Vanadium		100.8972		98.8016		2.1		P
Zinc		101.8298		100.2924		1.5		P
Cyanide		4.8137		4.5055		6.6		CA

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6
DUPLICATES

EPA SAMPLE NO.

LCSWD

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		1985.0610		2002.3430		0.9		P
Antimony		506.3560		516.9890		2.1		P
Arsenic		2082.7870		2107.7600		1.2		P
Barium		1948.8620		1972.0250		1.2		P
Beryllium		49.8830		50.6980		1.6		P
Cadmium		48.8710		49.3950		1.1		P
Calcium	5000.0	19606.9140		19836.0700		1.2		P
Chromium		203.4440		205.7920		1.1		P
Cobalt		489.8920		496.5950		1.4		P
Copper		243.7980		247.0630		1.3		P
Iron		980.4100		993.5670		1.3		P
Lead		487.7390		495.8440		1.6		P
Magnesium	5000.0	20176.8730		20441.2190		1.3		P
Manganese		497.4420		504.5050		1.4		P
Mercury								NR
Nickel		484.1640		490.5290		1.3		P
Potassium	5000.0	19086.2070		19613.3960		2.7		P
Selenium		2159.1200		2187.0340		1.3		P
Silver	10.0	49.3140		50.5180		2.4		P
Sodium	5000.0	18695.3220		19079.7560		2.0		P
Thallium		1941.3400		1980.7710		2.0		P
Vanadium		484.1530		490.6200		1.3		P
Zinc		502.9980		506.8170		0.8		P
Cyanide		95.1100		94.9380		0.2		CA

U.S. EPA - CLP

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LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Solid LCS Source: EPA0287_____

Aqueous LCS Source: EPA0392_____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	2000.0	1985.06	99.3	400.0	410.7		320.0	480.0	102.7
Antimony	500.0	506.36	101.3	100.0	103.7		80.0	120.0	103.7
Arsenic	2000.0	2082.79	104.1	400.0	413.3		320.0	480.0	103.3
Barium	2000.0	1948.86	97.4	400.0	411.0		320.0	480.0	102.7
Beryllium	50.0	49.88	99.8	10.0	10.3		8.0	120.0	103.0
Cadmium	60.0	48.87	81.5	10.0	9.7		8.0	12.0	97.0
Calcium	20000.0	19606.91	98.0	4000.0	3921.3		3200.0	4800.0	98.0
Chromium	200.0	203.44	101.7	40.0	41.8		32.0	48.0	104.5
Cobalt	500.0	489.89	98.0	100.0	100.5		80.0	120.0	100.5
Copper	250.0	243.80	97.5	50.0	53.1		40.0	60.0	106.2
Iron	1000.0	980.41	98.0	200.0	202.2		160.0	240.0	101.1
Lead	500.0	487.74	97.5	100.0	98.5		80.0	120.0	98.5
Magnesium	20000.0	20176.87	100.9	4000.0	4056.3		3200.0	4800.0	101.4
Manganese	500.0	497.44	99.5	100.0	103.9		80.0	120.0	103.9
Mercury				0.5	0.5		0.4	0.6	100.0
Nickel	500.0	484.16	96.8	100.0	97.8		80.0	120.0	97.8
Potassium	20000.0	19086.21	95.4	4000.0	3893.6		3200.0	4800.0	97.3
Selenium	2000.0	2159.12	108.0	400.0	405.6		320.0	480.0	101.4
Silver	50.0	49.31	98.6	10.0	10.3		8.0	12.0	103.0
Sodium	20000.0	18695.32	93.5	4000.0	3907.8		3200.0	4800.0	97.7
Thallium	2000.0	1941.34	97.1	400.0	398.5		320.0	480.0	99.6
Vanadium	500.0	484.15	96.8	100.0	100.9		80.0	120.0	100.9
Zinc	500.0	503.00	100.6	100.0	101.8		80.0	120.0	101.8
Cyanide				5.0	4.8		4.0	6.0	96.0

U.S. EPA - CLP

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LABORATORY CONTROL SAMPLE

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Solid LCS Source: EPA0287_____

Aqueous LCS Source: EPA0392_____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	2000.0	2002.34	100.1	400.0	404.1		320.0	480.0	101.0
Antimony	500.0	516.99	103.4	100.0	101.6		80.0	120.0	101.6
Arsenic	2000.0	2107.76	105.4	400.0	406.6		320.0	480.0	101.6
Barium	2000.0	1972.02	98.6	400.0	403.8		320.0	480.0	100.9
Beryllium	50.0	50.70	101.4	10.0	10.2		8.0	120.0	102.0
Cadmium	60.0	49.39	82.3	10.0	9.6		8.0	12.0	96.0
Calcium	20000.0	19836.07	99.2	4000.0	3858.7		3200.0	4800.0	96.5
Chromium	200.0	205.79	102.9	40.0	41.1		32.0	48.0	102.7
Cobalt	500.0	496.59	99.3	100.0	99.0		80.0	120.0	99.0
Copper	250.0	247.06	98.8	50.0	52.1		40.0	60.0	104.2
Iron	1000.0	993.57	99.4	200.0	200.8		160.0	240.0	100.4
Lead	500.0	495.84	99.2	100.0	97.3		80.0	120.0	97.3
Magnesium	20000.0	20441.22	102.2	4000.0	3989.0		3200.0	4800.0	99.7
Manganese	500.0	504.50	100.9	100.0	102.2		80.0	120.0	102.2
Mercury				0.5	0.5		0.4	0.6	100.0
Nickel	500.0	490.53	98.1	100.0	96.6		80.0	120.0	96.6
Potassium	20000.0	19613.40	98.1	4000.0	3851.0		3200.0	4800.0	96.3
Selenium	2000.0	2187.03	109.4	400.0	399.4		320.0	480.0	99.8
Silver	50.0	50.52	101.0	10.0	10.2		8.0	12.0	102.0
Sodium	20000.0	19079.76	95.4	4000.0	3853.2		3200.0	4800.0	96.3
Thallium	2000.0	1980.77	99.0	400.0	390.8		320.0	480.0	97.7
Vanadium	500.0	490.62	98.1	100.0	98.8		80.0	120.0	98.8
Zinc	500.0	506.82	101.4	100.0	100.3		80.0	120.0	100.3
Cyanide				5.0	4.5		4.0	6.0	90.0

U.S. EPA - CLP

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ICP SERIAL DILUTION

EPA SAMPLE NO.

35901L

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): SOIL_ Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	47394.18		46977.65		0.9		P
Antimony	4.00	U	20.00	U			P
Arsenic	27.97		30.52	B	9.1		P
Barium	135.06	B	134.60	B	0.3		P
Beryllium	2.40	B	5.00	U	100.0		P
Cadmium	1.00	B	5.00	U	100.0		P
Calcium	26606.32		26931.95		1.2		P
Chromium	112.55		114.96		2.1		P
Cobalt	31.94	B	33.90	B	6.1		P
Copper	42.23		44.54	B	5.5		P
Iron	79888.03		80704.83		1.0		P
Lead	26.83		29.83		11.2		P
Magnesium	25147.55		25007.21		0.6		P
Manganese	1017.67		1027.58		1.0		P
Mercury							NR
Nickel	65.20		65.56	B	0.6		P
Potassium	14032.33		13802.89	B	1.6		P
Selenium	7.15		15.00	U	100.0		P
Silver	2.00	U	10.00	U			P
Sodium	22436.80		24208.39	B	7.9		P
Thallium	5.66	B	20.00	U	100.0		P
Vanadium	125.78		125.81	B	0.0		P
Zinc	178.86		183.66		2.7		P

U.S. EPA - CLP

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ICP SERIAL DILUTION

EPA SAMPLE NO.

35902L

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

Matrix (soil/water): WATER Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	14.00	U	70.00	U			P
Antimony	4.00	U	20.00	U			P
Arsenic	4.00	U	20.00	U			P
Barium	1.13	B	5.00	U	100.0		P
Beryllium	1.00	U	5.00	U			P
Cadmium	1.00	U	5.00	U			P
Calcium	39.18	B	163.68	B	317.8		P
Chromium	1.00	U	5.00	U			P
Cobalt	1.00	U	5.00	U			P
Copper	1.00	U	5.00	U			P
Iron	14.00	U	70.00	U			P
Lead	1.00	U	5.00	U			P
Magnesium	17.30	B	40.00	U	100.0		P
Manganese	1.00	U	5.00	U			P
Mercury							NR
Nickel	1.00	U	5.00	U			P
Potassium	45.00	U	225.00	U			P
Selenium	3.00	U	15.00	U			P
Silver	2.00	U	10.00	U			P
Sodium	72.55	B	99.30	B	36.9		P
Thallium	4.00	U	20.00	U			P
Vanadium	1.00	U	5.00	U			P
Zinc	2.79	B	5.62	B	101.4		P

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Instrument Detection Limits (Quarterly)

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

ICP ID Number: TJA#2_____ Date: 01/05/95

Flame AA ID Number : _____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.22		200	14.0	P
Antimony	206.83		60	4.0	P
Arsenic	189.04		10	4.0	P
Barium	493.41		200	1.0	P
Beryllium	313.04		5	1.0	P
Cadmium	226.50		5	1.0	P
Calcium	317.93		5000	8.0	P
Chromium	267.72		10	1.0	P
Cobalt	228.61		50	1.0	P
Copper	324.75		25	1.0	P
Iron	271.44		100	14.0	P
Lead	220.35		3	1.0	P
Magnesium	279.08		5000	8.0	P
Manganese	257.61		15	1.0	P
Mercury			0.2		NR
Nickel	231.60		40	1.0	P
Potassium	766.49		5000	45.0	P
Selenium	196.02		5	3.0	P
Silver	328.07		10	2.0	P
Sodium	588.99		5000	11.0	P
Thallium	190.68		10	4.0	P
Vanadium	292.40		50	1.0	P
Zinc	213.86		20	1.0	P

Comments:

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Instrument Detection Limits (Quarterly)

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

ICP ID Number: _____ Date: 01/27/95

Flame AA ID Number : PS200A_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.30		0.2	0.2	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

FORM X - IN

ILMO2.

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Instrument Detection Limits (Quarterly)

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.: 21359_ SAS No.: _____ SDG No.: 21359_

ICP ID Number: _____ Date: 01/25/95

Flame AA ID Number : PS200B_____

Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.30		0.2	0.2	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

FORM X - IN ILMO2.

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35901	02/24/95	1.00	200
36101	02/24/95	1.00	200
36102	02/24/95	1.00	200
LCSS	02/24/95	1.00	200
LCSSD	02/24/95	1.00	200
PBS	02/24/95	1.00	200

FORM XIII - IN ILMO2.1

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35902	02/24/95		100
LCSW	02/24/95		100
LCSWD	02/24/95		100
PBW	02/24/95		100

FORM XIII - IN ILMO2.1

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35901	02/22/95	0.20	100
36101	02/22/95	0.20	100
36102	02/22/95	0.20	100
LCSS	02/22/95	0.20	100
LCSSD	02/22/95	0.20	100
PBS	02/22/95	0.20	100

FORM XIII - IN ILMO2.1

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35902	02/23/95		100
PBW	02/23/95		100

FORM XIII - IN ILMO2.1

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: CA

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35901	02/27/95	1.00	50
36101	02/27/95	1.00	50
36102	02/27/95	1.00	50
LCSS	02/27/95	1.00	50
LCSSD	02/27/95	1.00	50
PBS	02/27/95	1.00	50

FORM XIII - IN ILMO2.1

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PREPARATION LOG

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: _____

Lab Code: SWOK__ Case No.:_21359_ SAS No.: _____ SDG No.:21359_

Method: CA

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
35902	02/27/95		50
LCSW	02/27/95		50
LCSWD	02/27/95		50
PBW	02/27/95		50

FORM XIII - IN ILMO2.1