



SHIELDALLOY METALLURGICAL CORPORATION

December 17, 2008

John J. Hayes, Jr.
U.S. Nuclear Regulatory Commission
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Re: Transmittal of Storage Yard Geotechnical Investigation Work Plan

Dear Mr. Hayes:

Please find enclosed one hard copy and one electronic copy (on CD) of the "Storage Yard Geotechnical Investigation Work Plan," prepared for Shieldalloy Metallurgical Corporation (SMC). The intent of this document is to describe geotechnical investigation activities to be conducted in response to a draft RAI provided by the Nuclear Regulatory Commission (NRC) to SMC in November 2008 that indicated additional geotechnical information was necessary to further support stability, settlement and liquefaction analyses. These analyses will ultimately be presented in Rev. 1b of the Decommissioning Plan.

This document is being presented for informational purposes only. SMC expects the investigations will be conducted in mid to late January.

In the meantime, if you have any questions/comments or if I can provide you with additional information, please call me at (856)362-8680.

Sincerely,

David R. Smith
Radiation Safety Officer

cc:

Hoy E. Frakes – Shieldalloy Metallurgical Corporation (via e-mail)
David J. White – Shieldalloy Metallurgical Corporation (via e-mail)
Barbara E. Flowers – Shieldalloy Metallurgical Corporation (w/ enclosure)
Matias F. Travieso-Diaz, Esq. – Pillsbury Winthrop Shaw Pittman (via e-mail)

Carol D. Berger, CHP – Integrated Environmental Management, Inc (via e-mail)
Jean Oliva, PE – TRC Environmental (via e-mail)
Mark Roberts – USNRC Region I (w/ enclosure)



STORAGE YARD GEOTECHNICAL INVESTIGATION WORK PLAN

DECOMMISSIONING PLAN SHIELDALLOY METALLURGICAL CORPORATION NEWFIELD, NEW JERSEY

Prepared for
Shieldalloy Metallurgical Corporation
Newfield, New Jersey

Prepared by
TRC
Windsor, Connecticut

TRC Project No. 105106.000100.000000
December 2008

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1.0 INTRODUCTION

This work plan describes the geotechnical investigations to be conducted in the Storage Yard area at the Shieldalloy Metallurgical Corporation (SMC) facility in Newfield, New Jersey. This work plan details the approach and procedures that will be followed to ensure the geotechnical investigation objective described in Section 1.1 below is achieved in a manner consistent with relevant U.S. Nuclear Regulatory Commission (NRC) guidance.

Processing of ores that contain natural radioactivity was performed at the Newfield facility for a number of years pursuant to a radioactive materials license issued by the NRC. The facility's operations resulted in the presence at the site of ferrocolumbium slag, baghouse dust, and other materials containing uranium, thorium and their progeny. Those materials have been stored since their generation in the eastern portion of the plant property, in an area referred to as the Storage Yard.

As part of the site-wide decommissioning plan (DP), SMC proposes to consolidate these materials within the Storage Yard and cover them with an engineered barrier to provide for their long term management. A site plan of the Storage Yard, presented in Figure 1, shows the locations of the existing material stockpiles and the outline of the proposed engineered barrier area. Access to the Storage Yard is and will remain restricted, and the area will be maintained and monitored in accordance with the terms and conditions of a Long Term Control (LTC) License to be issued by the NRC.

In August 2008, SMC submitted an interim draft of the engineered barrier design for NRC review and comment. In draft Requests for Additional Information (RAIs) provided by the NRC to SMC in November 2008, the NRC indicated that additional information from subsurface geotechnical investigations (either existing geotechnical investigations or additional investigations to be conducted) was necessary to further support stability, settlement and liquefaction analyses. The NRC referenced Regulatory Guide 3.11, Rev 3 (ML082380144) as one source of guidance on the information needed to support the liquefaction analysis.

1.1 Objective

The objective of the activities described in this work plan is to sufficiently characterize the geotechnical properties of the soil underlying the proposed engineered barrier to support the performance of stability, settlement and liquefaction analyses for the engineered barrier design. To meet this objective, this work plan presents a description of previously collected geotechnical data and a sampling and analysis plan for the collection of the additional geotechnical information to assist in such characterization.

1.2 Summary of Previous Investigations

Shallow soil borings (generally 6 to 8 feet below ground surface) were previously performed during Superfund environmental investigations within the Storage Yard conducted in 1990. Deeper geotechnical data (generally collected to depths of approximately 25 feet below ground surface, but some as deep as 140 feet) were also collected as part of these environmental investigations, including well installations in areas outside of but adjacent to the Storage Yard. During the environmental investigations, soil samples were analyzed for various environmental parameters. Figure 1 shows both the soil boring and monitoring well locations. Available boring logs for those locations are presented in Appendix A.

Data from historical soil borings and monitoring well installations indicate that the geology of the Storage Yard area of the site is primarily comprised of medium to fine sand. Gravel, clay, and traces of silt have been encountered in a few borings at various depths, but these soil types comprise only a small percentage of the soils found at this location.

Numerous sampling events of the monitoring wells have shown that the depth to ground water ranges from an average of approximately 6 feet in the southeast corner to 14 feet in the northwest corner of the Storage Yard area. Figure 1 shows the locations of the existing monitoring wells around the Storage Yard area.

1.3 Proposed Investigation

The purpose of additional geotechnical sampling will be to further define the soil geotechnical characteristics under the proposed engineered barrier. Therefore, sampling will

extend to a depth of 30 feet or more below grade, to an elevation of approximately 72 feet relative to the vertical datum NGVD 1929. The exact depth at each sample location will be dependent on the local ground elevation. The proposed depth below ground surface for each boring is listed in Table 1.

Five geotechnical boring locations are proposed at the locations shown on Figure 1. The proposed locations were selected in accordance with the guidance in NRC Regulatory Guide 3.11 (ML082380144) so as to more fully delineate subsurface geologic conditions beneath the engineered barrier area while performing investigations in those areas within the Storage Yard that are accessible to drilling equipment. In accordance with the NRC guidance, geotechnical boring locations were chosen approximately along the engineered barrier axis and at critical locations perpendicular to the axis to establish geologic cross-sections that cover the entire barrier footprint. Based on historical boring logs, it is expected that medium to fine sands will be the predominant soil types beneath the engineered barrier.

Samples will be collected for analyses of structural characteristics, as detailed in Table 2. At each of the boring locations, blow counts will be recorded from the Standard Penetration Resistance Test (SPT) (ASTM D1586) on a continuous basis; soil classification, grain size, and Atterberg limits will be analyzed every two feet; triaxial shear and consolidation tests will be analyzed only on cohesive silts and clays, if present; and Shelby tube samples (ASTM D1587) will be collected from cohesive silts and clay layers, if present. If visual inspection of the samples indicates a dramatic change in soil type, the number of samples may be adjusted for that boring location.

Table 1: Geotechnical Boring Depths

Boring Number	Ground Surface Elevation (ft above sea level)	Depth of Boring (ft below ground surface)
GB-1	102	30
GB-2	106	34
GB-3	110	38
GB-4	108	36
GB-5	102	30

Table 2: Geotechnical Analysis Frequency

Analysis	Method	Frequency
Standard Penetration Blow Counts	ASTM D 1586	Every 2 feet; continuous
Soil Classification	ASTM D 2487	Every 2 feet; continuous
Grain Size Analysis (w/Hydrometer)	ASTM D 422	Every 2 feet; continuous
Atterberg Limits	ASTM D 4318	Every 2 feet; continuous
Triaxial Shear (Consolidated, Undrained)	ASTM D 4767	As necessary
Incremental Consolidation	ASTM D 2435	As necessary

2.0 SAMPLING AND ANALYSIS

To provide soil parameters for a detailed analysis of soil static and dynamic stability, settlement, and liquefaction during the design life of the engineered barrier, the procedures outlined in the following subsections will be implemented.

2.1 Soil Sampling

A track-mounted hollow-stem auger rig utilizing 8-inch outside diameter augers will be used for the geotechnical borings. Split-spoon soil samples will be collected from the borings at 2-foot intervals on a continuous basis to the bottom of the boring (estimated to be at least 30 feet below ground surface, see Table 1). The SPT consists of a 2-inch outside diameter by 1.375-inch inside diameter split-spoon sampler with a 140-pound hammer free-falling 30-inches in accordance with ASTM D 1586. Blow counts will be recorded and the soil samples will be geologically logged by a TRC field geologist/scientist.

A TRC field geologist/scientist will collect samples in accordance with Table 1 and Section 3.1 of this report. Before soils are placed in the sample bags, Integrated Environmental Management, Inc. (IEM) will screen the soil samples for radioactivity content pursuant to IEM Radiation Safety Procedure No. RSP-034, "Screening for Radium in Soil", as modified for work at the Newfield site. Any soil with screening levels that are statistically in excess of background levels will not be submitted for laboratory analysis. Leftover clean soils from the auger spoils and split-spoon sampler will be spread on the ground surface after logging.

2.2 Sample Identification

Soil samples will be assigned a field identification number that will reference the boring location and sample depth. The following is an example of a soil sample identification number:

Sample Identification:

Example: GB-1 (2-4)

where: GB - Geotechnical Boring
1 - Location Number per the Map Grid
(2-4) - Sample Depth (feet below grade)

2.3 Sample Analysis

At each boring location, samples will be collected every two (2) feet and analyzed at an off-site laboratory pursuant to the following industry standards: for soil classification (ASTM D 2487), grain size (ASTM D 422), and Atterberg limits (ASTM D 4318). Triaxial shear (ASTM D 4767) and incremental consolidation analyses (ASTM D 2435) will be performed if silts and clay soils are encountered.

If visual inspection of the samples indicates a dramatic change in soil type, the number and frequency of samples will be increased as appropriate for that boring location.

3.0 SAMPLE HANDLING AND QA/QC PROCEDURES

This section describes sample management methodologies and QA/QC procedures associated with the sampling efforts.

3.1 Sample Handling and Shipping

One-gallon zip-top polyethylene bags will be used to contain the split-spoon soil samples. The samples will be double-bagged to ensure no leakage. For 2-foot interval split-spoon samples, one bag should be sufficient to contain the sample.

After visual logging, photographing, and soil classification, each sample will be transferred to a stainless-steel bowl and mixed with a stainless-steel spoon to homogenize the sample. The soil will then be transferred to the polyethylene bag. Bags will be labeled with a permanent marker at the time of sampling. The information recorded on the label will include:

- Project name/project number/location;
- Sample identifier/number;
- Analysis to be performed;
- Date of collection;
- Number of containers (i.e., 1 of 2, etc.); and
- Sampler's initials.

After the sample bags for a given sampling event have been filled, they will be screened for radiological constituents in accordance with IEM Radiation Safety Procedure RSP-034, as modified for the radionuclides of interest at the Newfield site, with only those samples that are statistically similar to background released for laboratory analysis. (The actual release criteria will be determined at the time of sample collection and will be based upon the screening results of samples collected from known background areas.) The screened samples will then be placed in a storage container such as a cooler to protect them from damage (cooling the samples is not necessary). Samples will be delivered to the off-site laboratory for analysis as soon as practical after the sampling event.

3.2 Chain-of-Custody Records

A sample is considered to be under custody if:

- it is in your possession, or
- it is in your view, after being in your possession, or
- it was in your possession and you locked it up, or
- it is in a designated secure area.

TRC will maintain a traceable chain-of-custody record from sample collection until laboratory analysis. Part of this process involves the completion of a chain-of-custody record for each sample. A chain-of-custody record will accompany the sample from the field to the laboratory. The laboratory will maintain one file copy and a copy of the completed original will be returned to TRC along with the analytical report. This record will be used to document sample custody transfer from the sampler, to a shipper, or to the laboratory, and also to verify the date of sample receipt by the laboratory.

3.3 Laboratory Sample Custody

TRC will notify the laboratory of upcoming field sampling activities and subsequent sample transfer to the laboratory. This notification will include information concerning the number and type of samples to be shipped, as well as the anticipated sample arrival date. In the event of discrepant documentation, the laboratory will immediately contact TRC as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken bags. This assessment will be recorded as part of the incoming chain-of-custody procedure.

A laboratory chain-of-custody record will accompany the sample or sample fraction through final analysis for sample control.

The laboratory will return any unused soil sample volumes to the SMC Radiation Safety Officer (RSO) after analysis is completed.

3.4 Field Quality Control Samples

Field quality control samples are not required under this geological boring work plan.

3.5 Laboratory Quality Control Samples

The laboratory that performs the analyses will maintain a Quality Assurance Program and associated written quality plan. The plan will include the following components at a minimum:

- organizational chart;
- corrective action process/procedures;
- floor plan and equipment information, including preventative maintenance;
- professional profiles of key employees;
- discussion of Standard Operating Procedures (SOPs) used by the laboratory, including SOPs for sample handling within the laboratory;
- list of all laboratory equipment;
- discussion of instrument calibration procedures;
- discussion of analytical calibration standards;
- list of analytical methods used by the laboratory, with associated reporting limits and accuracy and precision standards;
- sample tracking procedures; and
- description of the routine use of quality control check samples.

3.6 Laboratory Documentation

The data package from the laboratory will contain, at a minimum, the following information:

- methods of analysis provided;
- sample collection, preparation and analysis dates;
- sample results; and
- chain of custody from the time of collection, through receipt at the lab.

3.7 Field Equipment Decontamination Procedures

Sampling equipment used to obtain samples for laboratory analysis during environmental investigations, (i.e. auger bits, spoons, and bowls), will be decontaminated using the following procedures:

- Wash and scrub with low phosphate detergent (Alconox) in tap water;
- Rinse with tap water;
- Distilled and deionized water rinse;
- Air dry on clean polyethylene sheeting;
- Wrap in aluminum foil, shiny side out for transport (if not being used immediately).

Decontamination rinsates will be collected and contained for subsequent determination of proper handling and/or disposal. All equipment will be monitored for residual contamination pursuant to SMC Radiation Safety Procedure No. RSP-009, "Contamination Control" and decontaminated as necessary.

Radiological screening of soil samples, equipment, and personnel will be in accordance with IEM Radiation Safety Procedure No. RSP-034 as modified for this specific investigation.

3.8 Field Instrument Calibration Procedures

No field instruments are expected to be used by TRC personnel during this investigation. The calibration, maintenance and daily operational testing of field instrumentation used for radiological screening will be as described in IEM Radiation Safety Procedure No. RSP-008, "Instrumentation".

4.0 RECORD KEEPING

Record keeping will include the management of on-site monitoring data and sampling documentation within permanent field logbooks as well as the maintenance of project-related information within project files. Documentation management procedures are described below.

4.1 Field Logbooks

TRC will oversee the maintenance of field logbooks. Field logbooks will be bound books, preferably with consecutively numbered pages. Field logbooks will be maintained by the field investigation team members to provide a daily record of significant events, observations, and measurements during any field investigation activities and will be signed and dated daily.

Information pertinent to the field investigations and/or sampling will be recorded in the logbooks and entries will include the following information (at a minimum):

- Name and title of author, date and time of entry, and physical/ environmental conditions during field activity;
- Names of the other members of the field crew;
- Names and titles of any subcontractors or site visitors;
- Type of sampling activity;
- Location of sampling activity;
- Description of sampling point(s);
- Date and time of sample collection;
- Sample media (i.e., soil);
- Sample collection method;
- Number and volume of sample(s) taken;
- Analyses to be performed;
- Sample identification number(s);
- Field observations;
- Any field measurements made, such as blow counts and soil classification; and

- References for maps and photographs of the sampling site(s).

Original data recorded in the field logbooks will be written with waterproof ink. None of the logbooks will be destroyed or discarded, even if they are illegible or contain inaccuracies. Photocopies of field book entries will be made and kept in the TRC project file.

If an error is made on an accountable document assigned to an individual, that individual will make corrections by crossing a line through the error and entering the correct information and initialing the cross-out. The erroneous information will not be obliterated. Any subsequent error discovered on an accountable document will be corrected by the person who made the entry, and will be initialed and dated, as appropriate.

4.2 Project File

The TRC Project Manager will serve as file custodian. The project file will contain all incoming materials related to the project such as sketches, correspondence, authorizations, and logs. These documents will be placed in the project file as soon as possible. If correspondence is needed for reference by project personnel, a copy will be made rather than manipulating the original.

Examples of the types of records that will be maintained in the project file are:

- Field documents;
- Correspondence;
- Photographs;
- Laboratory data;
- Reports; and
- Subcontract agreements.

4.3 Laboratory Reporting

The data packages will contain, at a minimum, the following information:

- methods of analysis and method conformance summary;
- sample collection, preparation and analysis dates;
- sample results; and
- external chain of custody.

4.4 Survey

Sampling locations will be marked in the field using a flag that designates the name of the sampling location. Locations will be documented by GPS having sub-meter accuracy and reference to existing fixed features, such as buildings.

FIGURES

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE RECORD
TITLED:
“STORAGE YARD
ENGINEERED BARRIER,
EXISTING CONDITIONS WITH PROPOSED
GEOTECHNICAL BORING LOCATIONS.
FIGURE 1”**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE**

D-01X

APPENDIX A

Dan Raviv Associates, Inc.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

WELL NO.

SC # 11

SHEET NO. 1 OF 3

PROJECT NO.: 83C152

CONTRACTOR: VANCE SKINNER
WATER SUPPLY

PROJECT NAME: SHIELDALLOY

LOCATION: NEWFIELD, NJ

GRADE ELEVATION:

START (DATE): 31 AUG 88

FINISH (DATE): 1 SEPT 88

DRILLER: BILL SKINNER

DRAI GEOL.: K. GAGNON

		DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES	
TYPE:		SPUT SPOON		RIG TYPE: FAIRBANK MP1500	
INSIDE DIAMETER (IN.):		3		BIT TYPE: 6" DRAG	
HAMMER WEIGHT (LB.):		140		DRILL MUD: QUIK-GEL	
HAMMER FALL (IN.):		24		SAMPLER TYPE: SPUT SPOON	
DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 6 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
1					0-3' LITH FROM TRENCH DUG NEARBY
2					SAND, brown-green. Mostly medium grained, mod. sorting. Lots of fine to med. clay fragments. Some 6-12" pieces of clay.
3					SAND, dk. brown. Some roots and organics. Only clay are large pieces.
4					SAND, brown/red. Medium grained, x-well sorted. Some clay.
5	10				Same sand as above.
6	11	15"			
7	20				
	30				
	19				
	24	18"			As above. Slightly more red in color.
	26				

GROUND WATER LEVEL DATA

SUMMARY

DATE	TIME	ELAPSED (HOUR)	DEPTH (FEET) FROM GRADE TO:			OVERBURDEN (LIN FT.)	ROCK CORED (LIN FT.)	SAMPLES
			BOTTOM OF CASING	BOTTOM OF HOLE	GROUND WATER			
			27'	27'	17.48	27	0	

Dan Raviv Associates, Inc.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

WELL NO. SC # 11

SHEET NO. 2 OF 3

DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 6 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
8	38				
	25				
9	58	24"			SAND, brown. Fine to coarse grained, poorly sorted. Some fine gravel, occasional medium gravel
	60				
	70				
10	30				
	54	12"			SAND (80%), yellow-brown. Coarse to fine grained, poorly sorted. Well-rounded. Gravel (10%), fine grained. Clay matrix
	52				
	38				
12	46				
	48	10"			SAND and GRAVEL, dk. brown. Poorly sorted, well-rounded. Moist.
13	40				
	26				
14	24				
	30				As above, lighter brown, more clay. Very moist.
15	22	8"			
	20				
16	5				
	20				
17	24	4"			SAND, brown/red. Medium grained, better sorted. Very moist.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

SHEET NO. 3 OF 3

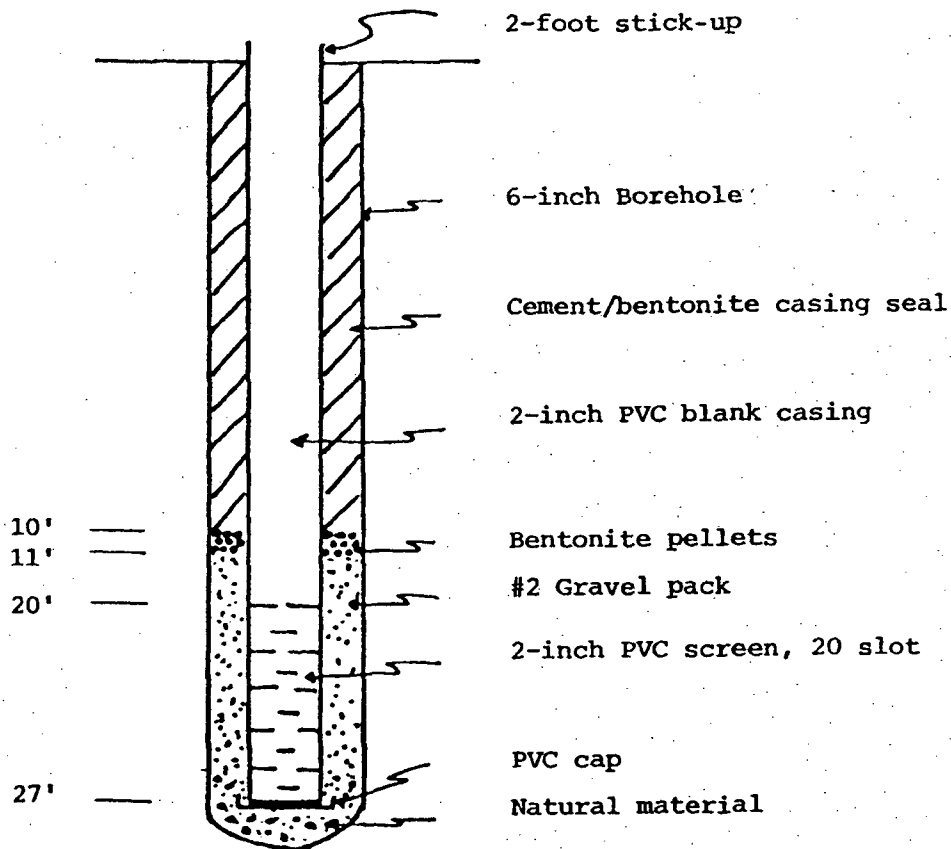
SHEET NO. 3 OF 3

DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 6 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
18	16				
27					Lithology not recorded below 18'
					Total depth drilled and cased. 2" PVC well

PROJECT Shieldalloy SUBJECT Well Construction Details

COMPUTATION SC11

COMPUTED BY Keith Gagnon DATE 15 Dec. 88 CHECKED BY _____ DATE _____



NOT TO SCALE

Total Depth Drilled : 27'

Total Depth Cased : 27'

Dan Raviv Associates, Inc.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

WELL NO.

SC 12

SHEET NO. 1 OF 2

PROJECT NO.: 83C152

CONTRACTOR: Vance Skinner
Water Supply

PROJECT NAME: Shield Alloy

LOCATION: Newfield, NJ

GRADE ELEVATION:

START (DATE): 2 Sept 88

FINISH (DATE): 2 Sept 88

DRILLER: Bill Skinner

DRA GEOL.: K. GARNON

TYPE:	DRIVE SAMPLER	CORE BARREL	DRILLING EQUIPMENT & PROCEDURES
INSIDE DIAMETER (IN.): HAMMER WEIGHT (LB.): HAMMER FALL (IN.):	SPLIT SPOON 3 140 24		RIG TYPE: FAIRBANKS M-1500 BIT TYPE: 6" O.D. G DRILL MUD: GULF-66L SAMPLER TYPE: SPLIT SPOON

DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 8 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
1	10	12"			SAND, lt. yellow-brown. (100%) Medium grained, x-well Sorted. Well-rounded, some blaze organics
2	11	12"			Same as above, but no organics and increasing red in color with depth
3	10	12"			6" SAND, yellow brown. Well sorted, med. grained. Trace of fine gravel and clay
4	9	12"			6" Same sand. More yellow color, less clay
5					Drilled to 5'
6	46	10"			SAND, yellow-brown. Poorly sorted, mostly medium grained. Some fine gravel. Moist
7	66				Drilled to 8'

GROUND WATER LEVEL DATA						SUMMARY	
DATE	TIME	ELAPSED (HOUR)	DEPTH (FEET) FROM GRADE TO:			OVERBURDEN (LIN FT.)	ROCK CORED (LIN FT.)
			BOTTOM OF CASING	BOTTOM OF HOLE	GROUND WATER		
			25	25	12	25	0
						SAMPLES	

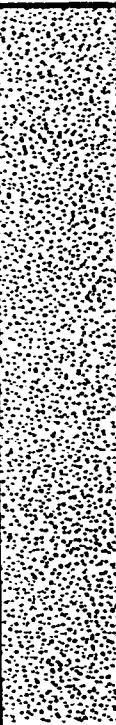
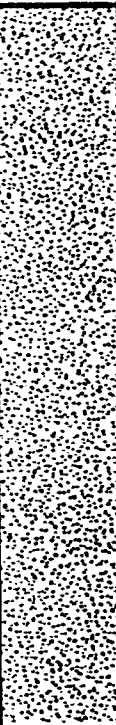
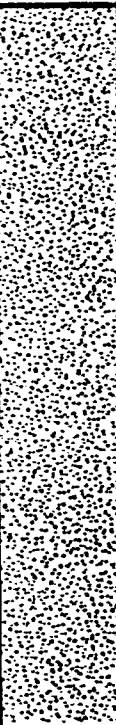
Dan Raviv Associates, Inc.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

WELL NO. SC12

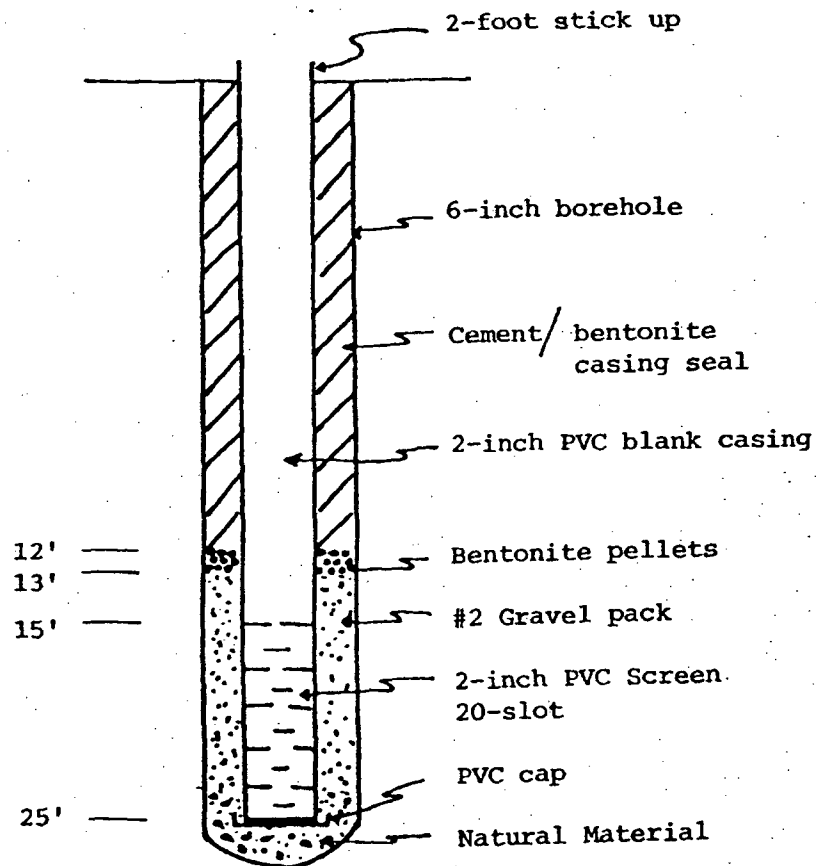
SHEET NO. 2 OF 2

DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 8 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
8	42	18"			Same as 5-6' interval. More red in color
9	50				
	57				
10	76	18"			SAND, dk. yellow-brown. Poorly sorted, mostly med. grained. Well-rounded. Some clay matrix. Very wet.
	48				
	54				
11	46	18"			
	40				
12					
25					Lithology not recorded below 12'
					Total depth drilled and cased. 2" - PVC well

PROJECT Shieldalloy SUBJECT Well Construction Details

COMPUTATION SC12

COMPUTED BY Keith Gagnon DATE 12/15/88 CHECKED BY _____ DATE _____



NOT TO SCALE

Total Depth Drilled : 25'

Total Depth Cased : 25'

57 E. Willow Street Millburn, NJ 07041

WELL NO.

SC 13

SHEET NO. 1 OF 2

PROJECT NO.: 83C152

CONTRACTOR: Vance Skinner
Water Supply

PROJECT NAME: *Shield Alloy*

LOCATION: Newfield, NJ

GRADE ELEVATION:

START (DATE): 9 SEPT 88

FINISH (DATE): 10 SEPT 98

DRILLER: BILL SKINNER

DRAI GEOL.: K. GAGNON

TYPE:
INSIDE DIAMETER (IN.):
HAMMER WEIGHT (LB.):
HAMMER FALL (IN.):

DRIVE SAMPLER

CORE BARREL

DILLING EQUIPMENT & PROCEDURES

SPLIT SPOON

$$\begin{array}{r} 3 \\ 140 \\ 24 \end{array}$$

RIG TYPE: FALLING MAT 1500

BIT TYPE: 6" dia

DRILL MUD: QUICK-GEL

SAMPLER TYPE: SPLIT SPOON

DEPTH
(FEET)
FROM
GRADE

**SAMPLER
BLOWS
PER 8 IN.**

**SAMPLE
NUMBER &
RECOVERY**

STRATA
DEPTH
(FEET)

GRAPHIC LOG

VISUAL CLASSIFICATION AND REMARKS

Clay (see page 2)

GROUND WATER LEVEL DATA

SUMMARY

DATE

TIME

ELAPSED
(HOUR)

DEPTH (FEET) FROM GRADE TO:

**BOTTOM
OF CASING**

**BOTTOM
OF HOLE**

GROUND WATER

OVERBURDEN (LIN FT.) 26

ROCK CORED (LIN FT.) 2

SAMPLES

25

26

Dan Raviv Associates, Inc.

57 E. Willow Street Millburn, NJ 07041

WELL COMPLETION REPORT

WELL NO. SC 13

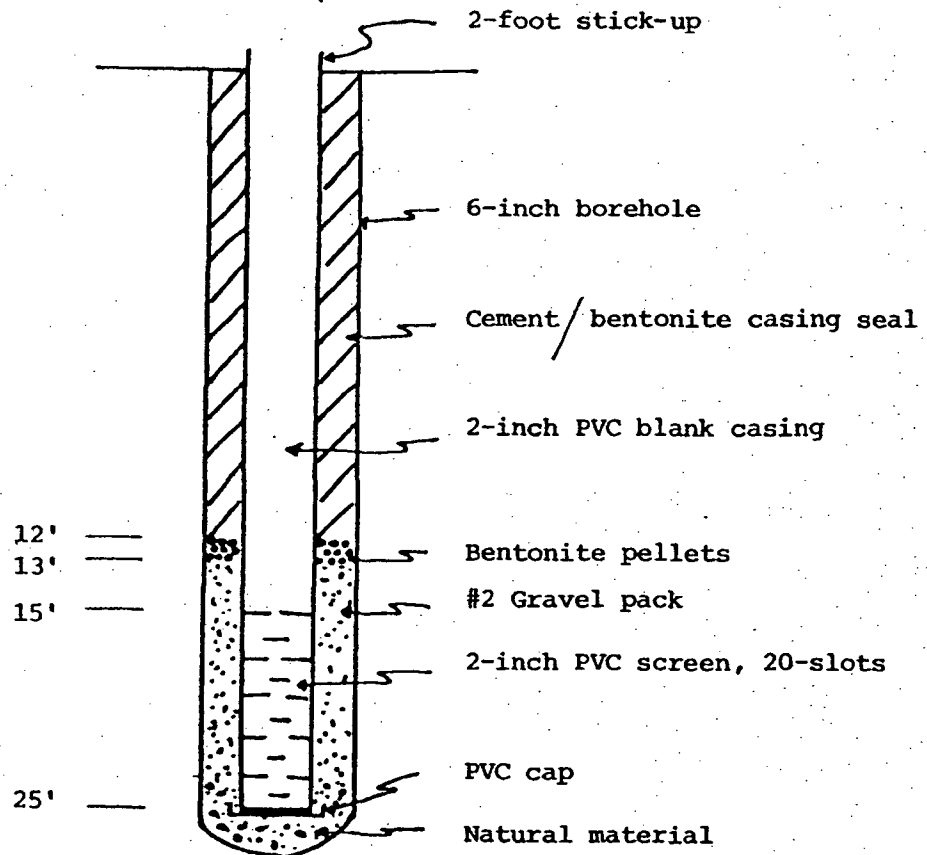
SHEET NO. 2 OF 2

DEPTH (FEET) FROM GRADE	SAMPLER BLOWS PER 8 IN.	SAMPLE NUMBER & RECOVERY	STRATA DEPTH (FEET)	GRAPHIC LOG	VISUAL CLASSIFICATION AND REMARKS
8	45	12"			3" CLAY, hard, grey/tan. With med. gravel (well-rounded)
	40				9" SAND, dk. yellow-brown.
9	60				Poorly sorted, mostly med. grained. Clay matrix. Dry, compact. Some fine gravel.
	17				
	42				
10	49	10"			SAND, dk. yellow-brown. Mostly medium grained, less gravel. Very well compacted. Some matrix clay. Very moist.
	55				
11					
26'					Lithology not recorded below 11'
					Total depth drilled: 26'
					Total depth cased: 25'
					2" PVC well

PROJECT Shieldalloy SUBJECT Well Construction Details

COMPUTATION SC 13

COMPUTED BY Keith Gagnon DATE 15Dec88 CHECKED BY _____ DATE _____



NOT TO SCALE

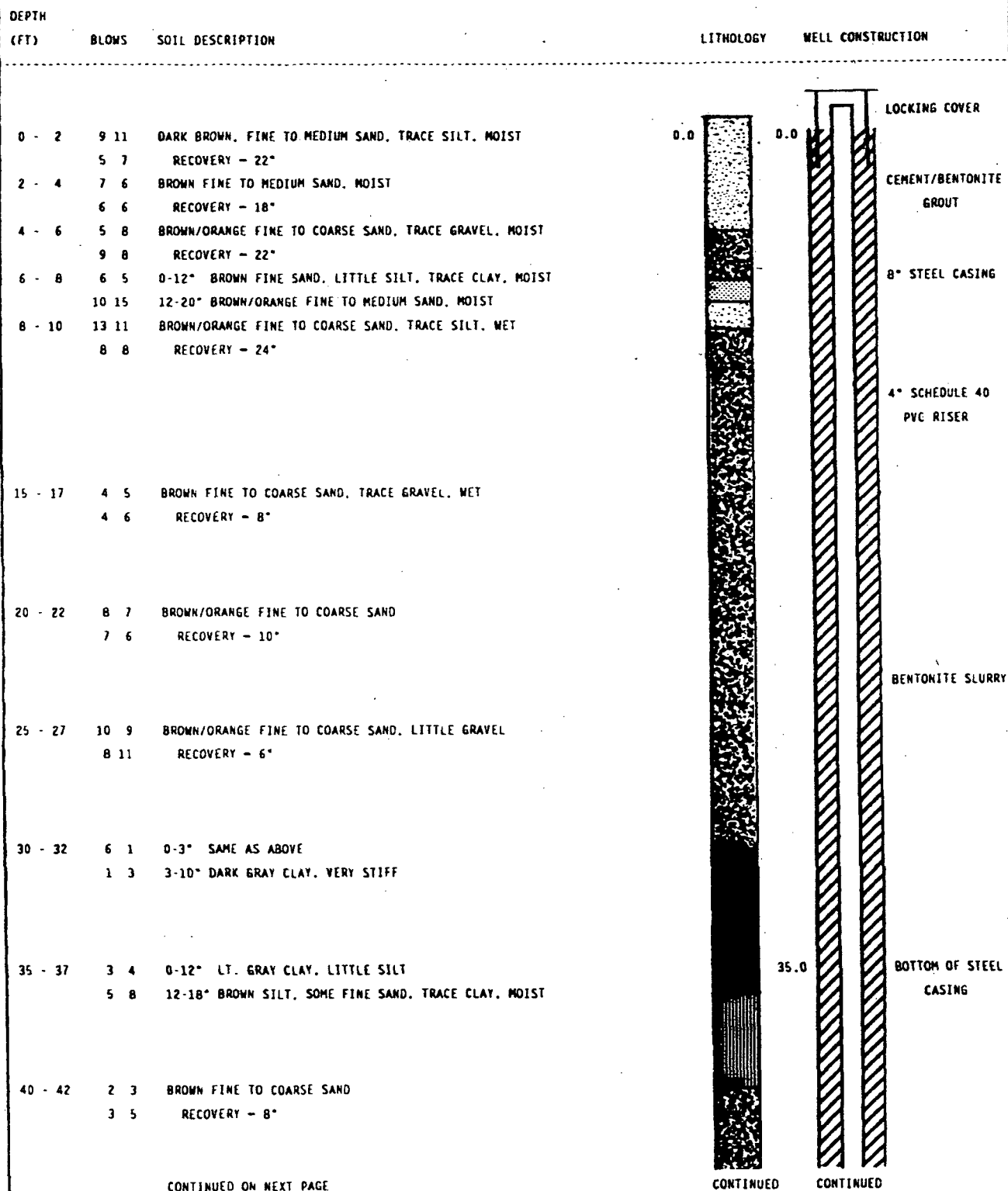
Total Depth Drilled: 26'

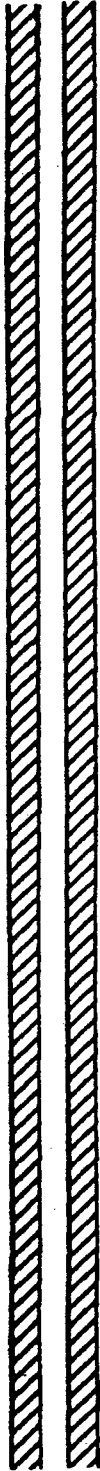
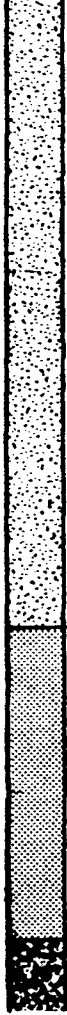
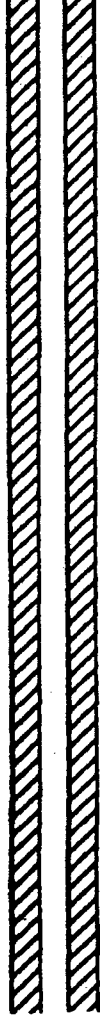
Total Depth Cased : 25'

BORING NO.: SC-12D
 PROJECT NO.: 7650-N51
 PROJECT: SHIELD ALLOY
 CLIENT: SMC
 LOCATION: NEWFIELD, NJ
 BORING DEPTH: 142 FT

CONTRACTOR: EMPIRE SOILS
 DRILLERS: KENNEY, EDWARDS
 TRC INSPECTOR: MCMORROW
 DRILLING METHOD: MUD ROTARY
 GROUND ELEVATION: 102.16
 INNER CASING ELEVATION: 103.19

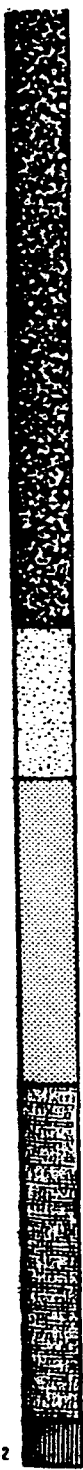
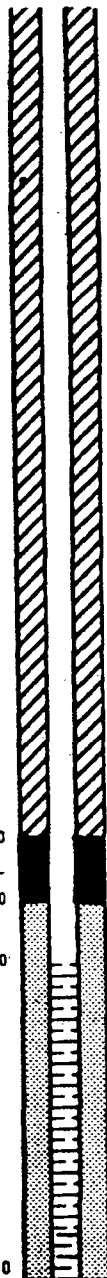
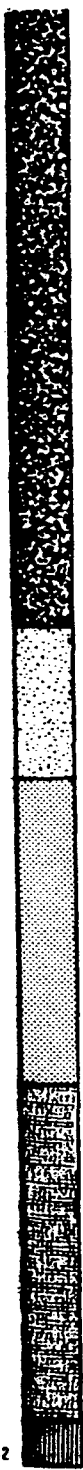
DATE STARTED: 11/16/90
 DATE COMPLETED: 11/19/90
 WATER TABLE LEVEL: 9.0 FT
 LOCATION: N 258008.45
 E 1901049.83
 NJDEP PERMIT NUMBER: 3135226-0



DEPTH (FT)	BLOWS	SOIL DESCRIPTION	LITHOLOGY	WELL CONSTRUCTION
45 - 47	2 8 9 13	BROWN FINE TO COARSE SAND RECOVERY - 12"		
50 - 52	3 5 30 30	LT. BROWN FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 4"		
55 - 57	5 11 15 20	SAME AS ABOVE WITH THIN WHITE LAYERS OF SILT THROUGHOUT RECOVERY - 14"		
60 - 62	10 15 20 20	LT. BROWN TO WHITE FINE TO MEDIUM SAND RECOVERY - 14"		
65 - 67	9 15 21 21	LT. BROWN FINE TO MEDIUM SAND RECOVERY - 12"		
70 - 72	10 15 33 37	SAME AS ABOVE RECOVERY - 8"		
75 - 77	22 24 28 32	SAME AS ABOVE RECOVERY - 12"		
80 - 82	20 19 17 18	BROWN FINE SAND, TRACE SILT RECOVERY - 2"		
85 - 87	10 12 11 20	LT. BROWN FINE SAND, TRACE SILT RECOVERY - 22"		
90 - 92	15 29 16 18	LT. BROWN FINE TO COARSE SAND RECOVERY - 12"		
CONTINUED ON NEXT PAGE			CONTINUED	CONTINUED

4" SCHEDULE 40
PVC RISER

BENTONITE SLURRY

DEPTH (FT)	BLOWS	SOIL DESCRIPTION	LITHOLOGY	WELL CONSTRUCTION
95 - 97	19 21 32 29	LT. BROWN FINE TO COARSE SAND RECOVERY - 12"		
100 - 102	35 42 67 65	BROWN/ORANGE FINE TO COARSE SAND, TRACE SILT RECOVERY - 8"		
105 - 107	25 52 67 100	SAME AS ABOVE RECOVERY - 14"		
110 - 112	34 100/5	SAME AS ABOVE RECOVERY - 8"		
115 - 117	100/5	BROWN/RED FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 3"		
120 - 122	12 11 19 28	BROWN FINE SAND, LITTLE SILT RECOVERY - 10"		
125 - 127	12 22 20 18	LT. BROWN FINE SAND, LITTLE SILT RECOVERY - 12"		
130 - 132	6 6 9 9	DARK GRAY FINE SAND AND SILT RECOVERY - 14"		
135 - 137	5 6 5 8	SAME AS ABOVE RECOVERY - 20"		122.0 BENTONITE SEAL
140 - 142	3 5 12 16	0-18" SAME AS ABOVE 18-24" DARK GRAY SILT, SOME CLAY END OF BORING - 142 FT		124.0 TOP OF SAND 126.0 TOP OF SCREEN 4" PVC SCREEN 10-SLOT SAND PACK 136.0 BOTTOM OF WELL

142

BORING NO.: SC-11S (R)
 PROJECT NO.: 7850-N51
 PROJECT: SHIELDALLOY
 CLIENT: SMC
 LOCATION: NEWFIELD, NJ
 BORING DEPTH: 24 FT

CONTRACTOR: UNI-TECH DRILLING
 DRILLERS: FRECK
 SMC INSPECTOR: VALENTI
 DRILLING METHOD: MUD ROTARY
 GROUND ELEVATION: 106.91 FT
 CASING ELEVATION: 108.12 FT

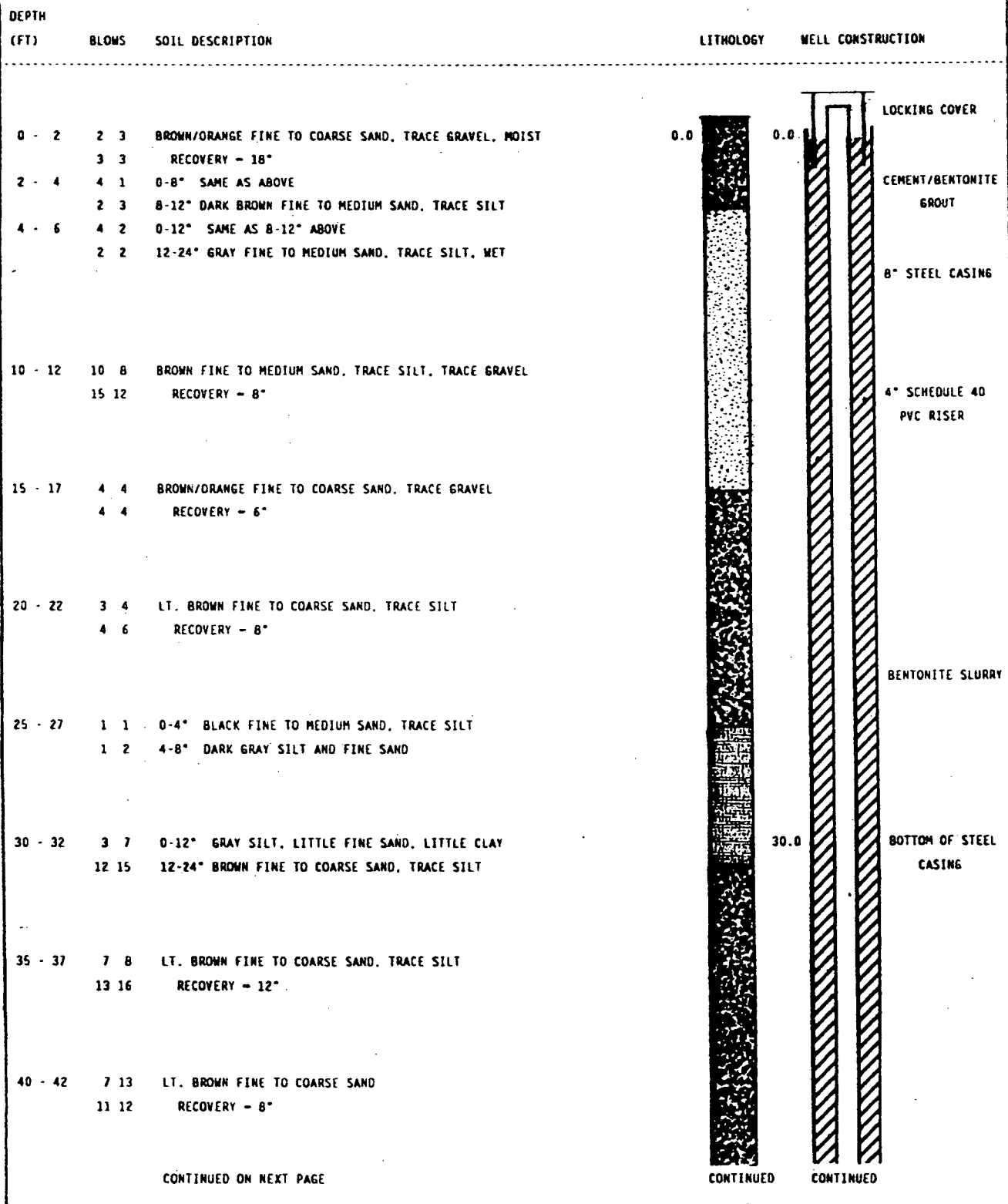
DATE STARTED: 7/1/82
 DATE COMPLETED: 7/1/82
 STATIC WATER LEVEL: 91.10 FT
 NJDEP PERMIT NUMBER: 31-39500

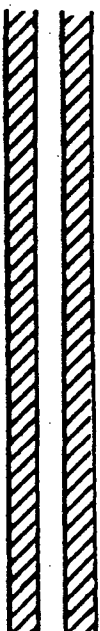
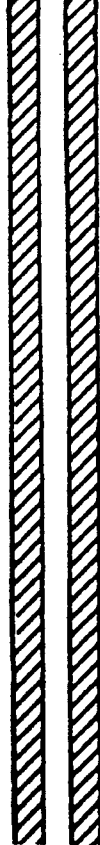
DEPTH (FT)	BLOWS		SOIL DESCRIPTION	WELL CONSTRUCTION
0 - 2			AUGERED TO 5'	0.0' LOCKING COVER
5 - 7	3 6	4 7	ORANGE TO LIGHT BROWN SILTY SAND WITH GRAVEL	5' BENTONITE SEAL 7' Top of Sand Pack 9' Top of Screen
10 - 12	2 5	4 2	ORANGE-LIGHT BROWN SILTY SAND WITH GRAVEL	4" SCHEDULE 40 10-SLOT PVC SCREEN
15 - 17	2 3	2 3	ORANGE-TAN GRAVEL	MORIE #1 GRAVEL PACK
20 - 22	3 6	3 7	ORANGE-TAN GRAVEL	24' Bottom of Screen
END OF BORING = 24'				

BORING NO.: SC-13D
 PROJECT NO.: 7650-NS1
 PROJECT: SHIELD ALLOY
 CLIENT: SMC
 LOCATION: NEWFIELD, NJ
 BORING DEPTH: 142 FT

CONTRACTOR: EMPIRE SOILS
 DRILLERS: KENNEY, EDWARDS
 TRC INSPECTOR: MCMORROW
 DRILLING METHOD: MUD ROTARY
 GROUND ELEVATION: 99.67
 INNER CASING ELEVATION: 101.99

DATE STARTED: 11/20/90
 DATE COMPLETED: 11/21/90
 WATER TABLE LEVEL: 5.5 FT
 LOCATION: N 257662.57
 E 1901067.82
 NJDEP PERMIT NUMBER: 3135227-8



DEPTH (FT)	BLOWS	SOIL DESCRIPTION	LITHOLOGY	WELL CONSTRUCTION
45 - 47	10 14 17 25	LT. BROWN FINE TO COARSE SAND RECOVERY - 8"		
50 - 52	8 19 21 24	LT. BROWN FINE TO COARSE SAND, TRACE SILT RECOVERY - 10"		
55 - 57	8 14 21 25	SAME AS ABOVE RECOVERY - 10"		
60 - 62	5 15 18 19	SAME AS ABOVE. COLORS RANGE FROM REDDISH BROWN, TO WHITE, TO LT. BROWN 60.0 BACK TO REDDISH BROWN. RECOVERY - 8"		
65 - 67	15 20 30 30	REDDISH BROWN FINE TO MEDIUM SAND, TRACE COARSE SAND, TRACE SILT RECOVERY - 12"		
70 - 72	21 44 64 62	SAME AS ABOVE RECOVERY - 18"		
75 - 77	23 36 34 39	SAME AS ABOVE RECOVERY - 14"		
80 - 82	23 30 50/5"	SAME AS ABOVE RECOVERY - 14"		
85 - 87	20 30 33 37	SAME AS ABOVE RECOVERY - 12"		
90 - 92	17 35 32 30	RED FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 12"		
CONTINUED ON NEXT PAGE			CONTINUED	CONTINUED

4" SCHEDULE 40
PVC RISER

BENTONITE SLURRY

DEPTH (FT)	BLOWS	SOIL DESCRIPTION	LITHOLOGY	WELL CONSTRUCTION
95 - 97	22 30 16 30	0-12" RED/BROWN FINE TO COARSE SAND, TRACE SILT 12-18" RED/BROWN FINE SAND, LITTLE SILT, TRACE CLAY		
100 - 102	13 20 24 36	RED/BROWN FINE TO COARSE SAND, TRACE SILT RECOVERY - 14"		
105 - 107	21 63 53 69	BROWN/ORANGE FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 16"		
110 - 112	15 29 45 50/1"	SAME AS ABOVE RECOVERY - 18"		
115 - 117	17 80 100/5"	BROWN/ORANGE FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 12"		
120 - 122	8 20 22 22	LT. BROWN FINE TO MEDIUM SAND WITH STRINGS OF GRAY CLAY AT 2" RECOVERY - 8"		
125 - 127	13 23 33 30	LT. BROWN FINE SAND, TRACE SILT RECOVERY - 12"		
130 - 132	WOB 17 25 24	DARK GRAY FINE SAND, TRACE SILT RECOVERY - 14"		
135 - 137	5 8 17 16	SAME AS ABOVE RECOVERY - 20"		
140 - 142	6 6 10 9	DARK GRAY SILT AND CLAY RECOVERY - 24" END OF BORING - 142 FT		

142

WOODWARD-MOORHOUSE & ASSOCIATES, INC.

LOG OF WELL W 3SHEET 1 OF 4

PROJECT <u>Shielded Monitoring Well Program</u>			PROJECT NO. <u>72C75AW</u>		ELEVATION AND DATUM			
LOCATION <u>Approx 100 ft east of concrete apron on east side of Dept 124</u>			SURVEYING AGENCY					
DRILLING AGENCY <u>V. Skinner Water Supply Systems</u>			DATE STARTED <u>10 MAY 1974</u>		DATE FINISHED <u>17 MAY 1974</u>			
DRILLING EQUIPMENT <u>Ensling 1500 S Hydraulic Rotary 20 ft rod lengths</u>			COMPLETION DEPTH <u>142 ft</u>		RUCK DEPTH			
SIZE AND TYPE OF BIT <u>5 inch drag bit, 8 inch reamer</u>			NO. SOIL SAMPLES <u>29</u>		UNDIST. CURE			
CASING <u>4 inch (nominal) white PVC 1120, 3sch 40</u>			NO. WATER SAMPLES <u>7</u>		FIELD COMMERCIAL			
SAMPLER <u>cuttings collected from wash over a 5 ft interval</u>			DRILLER <u>Bill Skinner } driller</u> <u>Tom Koffner } driller</u> <u>John Kobrich } helper</u>					
<u>5 ft long, 4 inch (telescoping) brass screened for wash</u>			INSPECTOR <u>Bruce S. Yane</u>					
ELEV. FT.	CASING	ROD	DESCRIPTION	pH	CONDUCTIVITY μ mhos/cm	DEPTH. FT.	SAMPLE NO.	REMARKS
	4 inch white PVC casing		Gravelly, Clayey SAND; medium grained; poorly sorted; subangular-subround; dark red-brown; orange-brown mud matrix; gravel up to 2 inch diam, mixed w/ black top soil			1	COMP - WP	START 10 MAY 1974 1545 1/4 bag Revert Augured to set conductor pipe
			Gravelly, Clayey SAND; medium grained; poorly sorted; subangular-subround; dark red brown; orange-brown mud matrix; granule size gravel			2	COMP - WP	dark red brown wash
			Gravelly, Clayey SAND; medium grained; poorly sorted; subangular-subround; dark red brown; orange-brown mud matrix; granule size gravel			3	COMP - WP	dark red brown wash
	4 inch PVC screen		Gravelly, Clayey SAND; medium grained; poorly sorted; subangular-subround; dark orange brown; orange brown mud matrix; granule size gravel	7.0	980	4	COMP - WP	light orange brown wash Marsh funnel 42 sec
	4 inch white PVC casing		Clayey, Gravelly SAND; medium grained; moderately sorted; subangular-subround; dark orange brown; orange brown mud matrix; granule size gravel			5	COMP - WP	FINISH 10 MAY 1974 1715 START 13 MAY 1974 0830 1/4 bag Revert
			SAND; medium grained; moderately sorted; subangular-subround; dark orange brown; orange brown mud matrix; granule size gravel			6	COMP - WP	
			Sandy GRAVEL; granule size; poorly sorted; subangular-subround; light red brown; orange brown and white mud matrix; medium grained sand			7	COMP - WP	
	4 inch PVC screen		10 R 5/4 Pale Reddish Brown					

ELEV. FT.	CASING	ROD	DESCRIPTION	pH	CON- DUC- TIVITY μ mhos/cm	DEPTH, FEET	SAMPLE NO.	REMARKS
	Lunch white PVC casing	2	Sandy, Clayey GRAVEL; granule size; very poorly sorted; subangular- subround; light red brown; orange- brown and white mud matrix; med- ium grained sand 10 R 5/4 Pale Red Brown CLAY, grayish black, white and orange-brown	6.8	605	35	7 COMP	dark orange brown wash
						40	8 COMP-TREX2	W3-2 water sample, 42 Marsh funnel 46 sec screen had to be pushed past clay layer
			Sandy, Clayey GRAVEL; granule size; very poorly sorted; subangular- subround; light red brown; orange- brown and white mud matrix; medium grained sand 10 R 5/4 Pale Reddish Brown			45	9 COMP-UP	red brown wash
			Gravelly, Clayey SAND; medium grained; very poorly sorted; subangular-subround; light red brown; orange-brown mud matrix; granule size gravel 10 R 5/4 Pale Reddish Brown			50	10 COMP-UP	red brown wash
		3	Clayey SAND; medium grained; moderately sorted; subangular- subround; light red brown; orange- brown mud matrix 10 R 5/4 Pale Reddish Brown			55	11 COMP-UP	red brown wash
			Clayey SAND; fine grained; well sorted; subangular-subround; light red brown; orange brown mud matrix 10 R 5/4 Pale Reddish Brown	4.5	128	60	12 COMP-TREX2	red brown wash
			SAND; medium grained; moderately sorted; subangular- subround; light red brown; orange-brown and white mud matrix 10 R 5/4 Pale Reddish Brown			65	13 COMP-UP	1/4 bag Revert red brown wash
			SAND; medium grained; poorly sorted; subangular- subround; light red brown; orange brown and white mud matrix 10 R 5/4 Pale Reddish Brown			70	14 COMP-UP	red brown wash
		4	Clayey SAND; medium grained; poorly sorted; subangular- subround; light red brown; orange brown and white mud matrix 10 R 5/4 Pale Reddish Brown			75	15 COMP-UP	red brown wash
			Clayey SAND; medium grained; poorly sorted; subangular- subround; light red brown; orange brown and white mud matrix 10 R 5/4 Pale Reddish Brown	4.5	74	80	16 COMP-TREX2	Marsh funnel 40 sec red brown wash W3-4 water sample, 42

ELEV. FT.	CASING	ROD	DESCRIPTION	pH	CON- DUC- TIVITY μ mhos/cm	DEPTH, FEET	SAMPLE NO.	REMARKS
						80		START MAY 1974 0630 Marsh funnel 41 sec
			Gravelly SAND; medium grained; poorly sorted; subangular-subround; light red brown; orange brown and white mud matrix; salmon pink clay lumps 10 R 5/4 Pale Reddish Brown			17	COMP - WP	light brown wash
			Gravelly SAND; medium grained; poorly sorted; subangular-subround; light red brown; orange brown and white mud matrix; salmon pink clay lumps; granule eye gravel 10 R 5/4 Pale Reddish Brown			18	COMP - WP	considerable amount of salmon pink clay in wash
			Gravelly SAND; medium grained; poorly sorted; subangular-subround; light red brown; orange brown and white mud matrix; salmon pink + orange brown clay lumps; granule eye gravel 10 R 5/4 Pale Reddish Brown			19	COMP - WP	light brown wash
			Gravelly SAND; medium grained; poorly sorted; subangular-subround; light red brown; orange brown + white mud matrix; salmon pink clay lumps; granule eye gravel 10 R 5/4 Pale Reddish Brown	5.5	60	20	COMP - TARS(?)	W3-5 water sample, 48 light brown wash Marsh funnel 42 sec 1/5 bag Revert
			SAND; medium grained; moderately well sorted; subangular-subround; light red brown; orange brown + salmon pink mud matrix 10 R 5/4 Pale Reddish Brown			21	COMP - WP	} bit bucking (Jersey stone) dark red brown wash light brown wash
			SAND; medium grained; poorly sorted; subangular-subround; dark red brown; Fe ₂ O ₃ matrix; iron oxide crust on sand grains 10 R 4/6 Moderate Reddish Brown			105	COMP - WP	
			SAND; coarse grained; poorly sorted; subangular-subround; dark red brown; Fe ₂ O ₃ matrix; iron oxide crust on sand grains 10 R 4/6 Moderate Reddish Brown			22	COMP - WP	red brown wash
			Clayey SAND; fine grained; very poorly sorted; subangular-subround; orange brown; orange brown and white mud matrix, cohesive 5 YR 5/6 Light Brown			110	COMP - WP	red brown wash
			Clayey SAND; fine grained; very poorly sorted; subangular-subround; orange brown; orange brown mud matrix; orange brown, white, and pink clay lumps cohesive 5 YR 5/6 Light Brown	5.5	54	23	COMP - TARS(?)	light brown wash Marsh funnel 40 sec
			Sandy, Clayey GRAVEL; granule eye very poorly sorted; subangular-subround; dark red brown; orange brown and red mud matrix; cohesive; fine sand 10 R 4/6 Moderate Reddish Brown			115	COMP - WP	red brown wash orange brown clay in wash orange brown wash 1/4 bag Revert
			Gravelly, Clayey SAND; fine sand; very poorly sorted; subangular-subround			120	COMP - WP	} bit bucking and advancing very slowly dark red brown wash, clay lumps in wash dark red brown wash
						25	COMP - WP	
						26	WP	

ELEV. FT.	CASING	ROD	DESCRIPTION	pH	CON- DUC- TIVITY μ mhos/cm	DEPTH, FEET	SAMPLE NO.	REMARKS
	#2 Gravel Backfill		dark red brown, orange brown mud matrix; red clay lumps; cohesive; granule size gravel 10R ~ 1/6 Moderate Reddish Brown Clayey SAND: fine grained; well sorted; subangular - subround; orange gray; gray black mud matrix; orange brown, red & white clay lumps; cohesive SR 1/2 Grayish Red			130	26 COMP	dark red brown wash
			Clayey SAND: fine grained; well sorted; subangular - subround; orange gray; gray black mud matrix; orange brown, red & white clay lumps; cohesive SR 1/2 Grayish Red			135	27 COMP - WP	dark red brown wash considerable amount of clay lumps in wash dark brown wash
			Clayey SAND: fine grained; well sorted; subangular - subround; gray black; gray black mud matrix; orange brown & white clay lumps; cohesive NH Medium Gray	5.5	35	140	28 COMP - SAR(2)	dark brown wash gray brown wash
			Sandy CLAY: fine grained sand; orange brown, red and white clay lumps; gray black NH Medium Dark Gray			140	29 COMP - SAR(2)	← drill starts to go more easily into formation dark gray brown wash black clay drilling up in lumps
								FINISH 14 MAY 1974
								Dummy Sample W3-8, 160ft same as W3-5, 100ft
			GROUT + GRAVEL PACKING					
			0-13 ft cement grout					
			13-22 ft #2 Gravel formation stabilizer					
			22-27 ft cement grout					
			27-37 ft #2 Gravel formation stabilizer					
			37-115 ft cement grout					
			115-142 ft #2 Gravel backfill					

BORING NO.: SB-4
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 10.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 100.1
LOCATION: N 257929.23
E 1901029.22

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	33 25 20 17		0-14" DARK BROWN FINE TO MEDIUM SAND, SOME GRAVEL, TRACE SILT 14-24" BROWN FINE TO MEDIUM SAND, TRACE SILT	
2 - 4	12 19 25 40		BROWN FINE TO MEDIUM SAND, TRACE SILT, TRACE GRAVEL RECOVERY - 24"	
4 - 6	80 55 65 60		SAME AS ABOVE, MOIST RECOVERY - 20"	
6 - 8	68 75 63 45		SAME AS ABOVE RECOVERY - 18"	
8 - 10	10 6 4 4		SAME AS ABOVE, WET RECOVERY - 12"	
			END OF BORING - 10 FT	10.0

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 99.7
LOCATION: N 257916.23
E 1901075.3

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	6 11		BROWN/GRAY FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 24"		0.0
2 - 4	3 3		BROWN FINE TO COARSE SAND, TRACE SILT, TRACE GRAVEL, MOIST RECOVERY - 24"		
4 - 6	5 7		SAME AS ABOVE, MOIST RECOVERY - 24"		
6 - 8	7 6		SAME AS ABOVE, WET AT 7.5 FT. RECOVERY - 20"		
	7 7				
	7 6				
	9 10				
END OF BORING - 8 FT					

BORING NO.: SB-6
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 6.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 100.1
LOCATION: N 257950.09
E 1901138.27

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	6 22 15 10		DARK BROWN FINE TO MEDIUM SAND, LITTLE SILT, TRACE GRAVEL RECOVERY - 24"	
2 - 4	9 6 7 5		BROWN FINE TO MEDIUM SAND, LITTLE SILT, TRACE GRAVEL, MOIST RECOVERY - 24"	
4 - 6	7 8 9 6		0-12" LT. BROWN FINE SAND AND SILT, TRACE CLAY, WET 12-18" BROWN FINE TO MEDIUM SAND, TRACE SILT, MOIST	
			END OF BORING - 6 FT	

BORING NO.: SB-11
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 4.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT. BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/14/90
DATE COMPLETED: 11/14/90
GROUND ELEVATION: 103.0
LOCATION: N 267687.72
E 1901109.52

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	1 4 5 2		TAN/BROWN MEDIUM TO FINE SAND, LITTLE GRAVEL AND SILT, MOIST RECOVERY - 16"	 0.0
2 - 4	2 2 2 2		TAN/ORANGE COARSE TO MEDIUM SAND, LITTLE GRAVEL, TRACE SILT, MOIST RECOVERY - 16"	 4.0
END OF BORING - 4 FT				

BORING NO.: SB-18
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 4.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/08/90
DATE COMPLETED: 11/08/90
GROUND ELEVATION: 97.6
LOCATION: N 257682.1
E 1900737

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	5 10 4 2		BROWN FINE TO MEDIUM SAND, LITTLE SILT, TRACE GRAVEL, MOIST RECOVERY - 20"	 0.0
2 - 4	2 2 1 2		BROWN FINE TO MEDIUM SAND, LITTLE SILT, WET AT 3.5 FT RECOVERY - 24"	 4.0
END OF BORING - 4 FT				

BORING NO.: SB-19
PROJECT NO.: 7650-NS1
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 6.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/09/90
DATE COMPLETED: 11/09/90
GROUND ELEVATION: 100.1
LOCATION: N 257837.03
E 1900900.23

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	7 6		BROWN FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 14"	 0.0
	5 5			
2 - 4	2 2		SAME AS ABOVE, MOIST RECOVERY - 16"	
	1 2			
4 - 6	4 8		SAME AS ABOVE, MOIST RECOVERY - 14"	6.0
	7 8			
END OF BORING - 6 FT				

BORING NO.: SB-20
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 10.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 101.7
LOCATION: N 257965.91
E 1900926.82

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	28 26 26 34		BROWN MEDIUM TO FINE SAND, SOME SILT, LITTLE GRAVEL RECOVERY - 8"	
2 - 4	17 24 17 26		ORANGE MEDIUM TO FINE SAND, SOME FINE GRAVEL, LITTLE SILT RECOVERY - 24"	
4 - 6	18 20 20 24		SAME AS ABOVE RECOVERY - 16"	
6 - 8	20 22 24 26		SAME AS ABOVE RECOVERY - 22"	
8 - 10	20 18 16 16		ORANGE COARSE TO FINE SAND, LITTLE SILT, TRACE GRAVEL, WET RECOVERY - 24"	
				10.0
END OF BORING - 10 FT				

BORING NO.: SB-21
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/09/90
DATE COMPLETED: 11/09/90
GROUND ELEVATION: 106.7
LOCATION: N 268171.29
E 1900936.43

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	10 9		0-16" DARK BROWN FINE TO MEDIUM SAND, LITTLE GRAVEL, TRACE SILT	
	5 5		16-20" WOOD	
2 - 4	3 4		DARK BROWN FINE SAND, SOME SILT, LITTLE GRAVEL	
	8 6		RECOVERY - 12"	
4 - 6	8 13		0-12" SAME AS ABOVE	
	7 6		12-24" FINE TO COARSE SAND, TRACE GRAVEL, TRACE SILT, MOIST	
6 - 8	4 3		SAME AS 12-24" ABOVE, MOIST	
	2 4		RECOVERY - 24"	
END OF BORING - 8 FT				

BORING NO.: SB-22
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 12.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 107.8
LOCATION: N 258320.97
E 1901098.36

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	25 18 17 15		BROWN MEDIUM TO FINE SAND, SOME SILT, LITTLE GRAVEL RECOVERY - 16"	
2 - 4	14 15 10 15		BROWN FINE SAND AND SILT, SOME GRAVEL RECOVERY - 12"	
4 - 6	15 20 24 26		SAME AS ABOVE RECOVERY - 12"	
6 - 8	17 21 23 25		BROWN/ORANGE COARSE TO MEDIUM SAND, SOME GRAVEL, TRACE SILT, MOIST RECOVERY - 24"	
8 - 10	7 6 5 5		SAME AS ABOVE, MOIST RECOVERY - 24"	
10 - 12	4 4 4 4		BROWN/ORANGE COARSE TO MEDIUM SAND, LITTLE GRAVEL AND SILT, WET RECOVERY - 24"	
END OF BORING - 12 FT				12.0

BORING NO.: SB-23
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 10.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

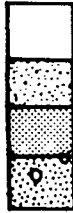
DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 104.6
LOCATION: N 258136.19
E 1901095.32

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	4 14 7 4		BROWN COARSE TO FINE SAND, SOME GRAVEL, LITTLE SILT RECOVERY - 18"	
2 - 4			BROWN MEDIUM TO FINE SAND, LITTLE GRAVEL AND SILT RECOVERY - 2"	
4 - 6	8 20 12 6		NO RECOVERY	
6 - 8	4 5 6 7		NO RECOVERY	
8 - 10	4 5 7 10		BROWN COARSE TO FINE SAND, SOME GRAVEL, TRACE SILT, MOIST RECOVERY - 8"	
END OF BORING - 10 FT				

BORING NO.: SB-24
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/06/90
DATE COMPLETED: 11/06/90
GROUND ELEVATION: 99.1
LOCATION: N 257900.02
E 1901107.82

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2			SAMPLE NOT COLLECTED	 0.0
2 - 4	30 40 16 10		BROWN MEDIUM TO FINE SAND, SOME GRAVEL, TRACE SILT RECOVERY - 18"	
4 - 6	7 11 27 60		BROWN FINE SAND, SOME SILT, LITTLE GRAVEL, TRACE CLAY, MOIST RECOVERY - 24"	
6 - 8	30 30 16 18		BROWN COARSE TO MEDIUM SAND, SOME GRAVEL, LITTLE FINE SAND, TRACE SILT, WET. RECOVERY - 20"	
END OF BORING - 8 FT				

BORING NO.: SB-25
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 111.2
LOCATION: N 258047.65
E 1901778.3

DEPTH (FT)	BLOWS	HNU (PPH)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	6 13 7 10		0-6" GRAY COARSE SAND AND GRAVEL 6-18" FINE TO MEDIUM SAND, LITTLE SILT, TRACE GRAVEL		0.0
2 - 4	8 8 9 9		SAME AS 6-18" ABOVE RECOVERY - 18"		
4 - 6	13 14 12 12		BROWN FINE TO MEDIUM SAND, TRACE GRAVEL, TRACE SILT RECOVERY - 18"		
6 - 8	15 10 7 5		SAME AS ABOVE RECOVERY - 20"		
END OF BORING - 8 FT					8.0

BORING NO.: SB-26
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 100.7
LOCATION: N 257681.27
E 1902000.27

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	11 24 17 12		0-4" BROWN F-C SAND, LITTLE SILT 4-8" GREEN F. SAND AND GRAVEL 8-18" BROWN/GRAY FINE TO MEDIUM SAND, TRACE GRAVEL LT. BROWN FINE TO COARSE SAND AND GRAVEL RECOVERY - 12"	 0.0
2 - 4	12 25 17 13		BROWN FINE TO COARSE SAND, TRACE SILT, TRACE GRAVEL, GREEN STAIN AT 2-6". RECOVERY - 12"	
4 - 6	13 25 14 23		BROWN FINE TO COARSE SAND, TRACE SILT, TRACE GRAVEL, MOIST AT TIP RECOVERY - 20"	
6 - 8	18 7 9 9			8.0

END OF BORING - 8 FT

BORING NO.: SB-27
 PROJECT NO.: 7650-N51
 PROJECT: SHIELD ALLOY
 CLIENT: SMC
 LOCATION: NEWFIELD, NJ

BORING DEPTH: 10.0 FT
 CONTRACTOR: EMPIRE SOILS
 DRILLERS: KENNEY, EDWARDS
 TRC INSPECTOR: MCMORROW
 DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/07/90
 DATE COMPLETED: 11/07/90
 GROUND ELEVATION: 106.4
 LOCATION: N 257837.68
 E 1901838.88

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	2 8 12 6		0-6" BROWN FINE TO MEDIUM SAND, LITTLE GRAVEL 6-12" BLACK MEDIUM TO COARSE SAND, LITTLE FINE SAND, LITTLE GRAVEL	 0.0
2 - 4	8 3 4 3		0-12" BLACK/BROWN FINE TO MEDIUM SAND, LITTLE GRAVEL, TRACE SILT 12-18" FINE SAND, SOME SILT, MOIST	
4 - 6	5 8 10 12		SAME AS 12-18" ABOVE	
6 - 8	25 18 20 22		BROWN FINE TO MEDIUM SAND, TRACE SILT, RECOVERY - 24"	
8 - 10	22 30 43 44		BROWN FINE SAND, SOME SILT, VERY COMPETENT, MOIST	10.0
END OF BORING - 10 FT				

BORING NO.: SB-28
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 108.7
LOCATION: N 257928.17
E 1901954.1

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	12 25 25 24		DARK BROWN FINE TO MEDIUM SAND, TRACE GRAVEL, TRACE SILT RECOVERY - 18"		0.0
2 - 4	25 8 8 10		DARK BROWN FINE TO MEDIUM SAND, LITTLE SILT, TRACE GRAVEL RECOVERY - 12"		
4 - 6	9 7 9 10		BROWN FINE TO COARSE SAND, TRACE GRAVEL RECOVERY - 24"		
6 - 8	12 12 9 12		SAME AS ABOVE RECOVERY - 18"		8.0
END OF BORING - 8 FT					

BORING NO.: SB-31
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/08/90
DATE COMPLETED: 11/08/90
GROUND ELEVATION: 103.2
LOCATION: N 258416.02
E 1900871.08

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
1 - 2.5	5 10 6		AUGERED THROUGH 1 FT OF CONCRETE BROWN/GREEN MEDIUM SAND, SOME GRAVEL, TRACE SILT RECOVERY - 14"	 0.0

BORING NO.: SB-32
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 12.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT. BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

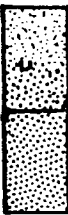
DATE STARTED: 11/08/90
DATE COMPLETED: 11/08/90
GROUND ELEVATION: 103.8
LOCATION: N 258377.57
E 1900912.62

DEPTH (FT)	BLOWS	HNU (PPH)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	12 15		GREENISH BROWN COARSE TO FINE SAND, SOME GRAVEL, TRACE SILT, MOIST RECOVERY - 18"		0.0
	15 18				
2 - 4	12 11		BROWN COARSE TO FINE SAND, SOME GRAVEL, TRACE SILT RECOVERY - 18"		
	10 12				
4 - 6	14 18		ORANGE/BROWN COARSE TO FINE SAND, SOME GRAVEL, TRACE SILT RECOVERY - 20"		
	16 18				
6 - 8	14 15		BROWN/ORANGE COARSE SAND, SOME MEDIUM TO FINE SAND, LITTLE GRAVEL, TRACE SILT, MOIST. RECOVERY - 24"		
	18 16				
8 - 10	14 14		SAME AS ABOVE, MOIST RECOVERY - 24"		
	14 14				
10 - 12	5 5		SAME AS ABOVE, WET RECOVERY - 24"		
	5 5				
END OF BORING - 12 FT					

BORING NO.: SB-33
PROJECT NO.: 7650-MS1
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT, BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/08/90
DATE COMPLETED: 11/08/90
GROUND ELEVATION: 105.0
LOCATION: N 258300.91
E 1900920.88

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	20 35 25 15		BROWN MEDIUM TO FINE SAND, SOME GRAVEL, LITTLE SILT RECOVERY - 12"	 0.0 8.0
2 - 4	8 9 5 8		ORANGE COARSE TO MEDIUM SAND, SOME GRAVEL, TRACE SILT, MOIST RECOVERY - 20"	
4 - 6	7 8 8 9		ORANGE/BROWN MEDIUM SAND, SOME GRAVEL, LITTLE SILT, MOIST RECOVERY - 24"	
6 - 8	6 6 7 8		SAME AS ABOVE RECOVERY - 24"	
END OF BORING - 8 FT				

BORING NO.: SB-34
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT. BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

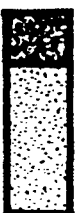
DATE STARTED: 11/08/90
DATE COMPLETED: 11/08/90
GROUND ELEVATION: 103.4
LOCATION: N 268294.13
E 1900825.64

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
1 - 2.5	3 3 4		AUGERED THROUGH 1 FT OF CONCRETE BROWN/ORANGE MEDIUM SAND, SOME GRAVEL, TRACE SILT	
2.5 - 4	3 3 3 3		ORANGE COARSE TO MEDIUM SAND, SOME GRAVEL RECOVERY - 10"	
4 - 6	3 4 9 10		SAME AS ABOVE, MOIST RECOVERY - 24"	
6 - 8	7 8 9 10		SAME AS ABOVE, MOIST RECOVERY - 24"	
END OF BORING - 8 FT				

BORING NO.: SB-52
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

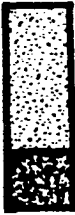
DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 111.0
LOCATION: N 258202.36
E 1901190.74

DEPTH (FT)	BLOWS	HNU (PPH)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	17 27 23 16		DARK BROWN/GREEN FINE TO COARSE SAND, TRACE GRAVEL, TRACE SILT RECOVERY - 18"		0.0
2 - 4	12 8 6 6		BROWN FINE TO MEDIUM SAND, TRACE ROCK FRAGMENTS RECOVERY - 18"		
4 - 6	10 13 12 9		SAME AS ABOVE RECOVERY - 16"		
6 - 8	10 10 13 11		SAME AS ABOVE RECOVERY - 22"		
END OF BORING - 8 FT					8.0

BORING NO.: SB-53
PROJECT NO.: 7650-MS1
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 105.6
LOCATION: N 258180.65
E 1901204.42

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	13 13		BROWN/GREEN FINE TO MEDIUM SAND, TRACE SILT, TRACE GRAVEL RECOVERY - 18"	 0.0
2 - 4	14 6		BROWN/GREEN FINE TO MEDIUM SAND, TRACE SILT, RECOVERY - 16"	
4 - 6	8 7		BROWN FINE TO MEDIUM SAND, TRACE SILT RECOVERY - 24"	
6 - 8	4 5		BROWN FINE TO COARSE SAND, LITTLE GRAVEL RECOVERY - 18"	
	6 9			8.0
	10 12			
	12 12			
END OF BORING - 8 FT				

BORING NO.: SB-54
PROJECT NO.: 7650-NS1
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 8.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 105.4
LOCATION: N 258151.9
E 1901220.14

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	6 19 24 13		BROWN FINE TO COARSE SAND. SOME FRACTURED ROCK. GREEN STAINING AT 6". RECOVERY - 16"		0.0
2 - 4	8 5 5 4		BROWN FINE TO MEDIUM SAND. TRACE SILT RECOVERY - 20"		
4 - 6	3 6 5 6		BROWN FINE TO MEDIUM SAND. TRACE SILT. TRACE GRAVEL RECOVERY - 20"		
6 - 8	7 11 8 8		BROWN FINE TO MEDIUM SAND. LITTLE ROCK FRAGMENT. TRACE SILT. SLIGHT ODOR.		8.0
END OF BORING - 8 FT					

BORING DEPTH: 6.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: MATT.BOB
TRC INSPECTOR: MULLEN, DRAKE
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/14/90
DATE COMPLETED: 11/14/90
GROUND ELEVATION: 99.0
LOCATION: N 257667.3
E 1901286.21

DEPTH (FT)	BLOWS	HMU (PPH)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	20 31 55 80		BROWN GRAVEL AND COARSE SAND WITH GREEN STAINING RECOVERY - 20"		0.0
2 - 4	25 18 12 12		BROWN/GREEN MEDIUM TO FINE SAND RECOVERY - 18"		
4 - 6	5 6 10 12		ORANGE FINE SAND, SOME SILT AND GRAVEL, TRACE CLAY, WET RECOVERY - 20"		6.0
END OF BORING - 6 FT					

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 101.3
LOCATION: N 267666.11
E 1901452.85

DEPTH (FT)	BLOWS	HMU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	1 4		ORANGE COARSE TO MEDIUM SAND, SOME SILT, MOIST	
	4 5			
2 - 4	3 3		ORANGE COARSE TO FINE SAND, LITTLE GRAVEL, TRACE SILT, MOIST	
	2 2			
4 - 6	8 6		MEDIUM TO FINE SAND, LITTLE SILT, TRACE CLAY, MOIST	
	6 5			
END OF BORING - 6 FT				

BORING NO.: SB-79
PROJECT NO.: 7650-N51
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 4.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 108.3
LOCATION: N 257920.88
E 1901572.02

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	2 3 5 5		BROWN FINE TO COARSE SAND, TRACE GRAVEL, TRACE SILT, MOIST RECOVERY - 18"	 0.0
2 - 4	8 11 12 10		SAME AS ABOVE WITH ROCK FRAGMENTS SPLIT SPOON SATURATED	4.0
END OF BORING - 4 FT				

BORING NO.: SB-80
PROJECT NO.: 7650-MS1
PROJECT: SHIELD ALLOY
CLIENT: SMC
LOCATION: NEWFIELD, NJ

BORING DEPTH: 6.0 FT
CONTRACTOR: EMPIRE SOILS
DRILLERS: KENNEY, EDWARDS
TRC INSPECTOR: MCMORROW
DRILLING METHOD: SPLIT SPOONS

DATE STARTED: 11/12/90
DATE COMPLETED: 11/12/90
GROUND ELEVATION: 104.1
LOCATION: N 258162.43
E 1901494.61

DEPTH (FT)	BLOWS	HNU (PPM)	SOIL DESCRIPTION	LITHOLOGY
0 - 2	1 3 3 2		BROWN/BLACK FINE TO MEDIUM SAND, TRACE SILT, MOIST RECOVERY - 18"	
2 - 4	3 3 2 3		SAME AS ABOVE, MOIST RECOVERY - 18"	
4 - 6			BROWN FINE TO COARSE SAND, TRACE SILT, WET AT TIP RECOVERY - 20"	
END OF BORING - 6 FT				

DATE STARTED: 11/09/90
DATE COMPLETED: 11/09/90
GROUND ELEVATION: 99.5
LOCATION: N 257935.01
E 1901188.14

DEPTH (FT)	BLOWS	HMU (PPM)	SOIL DESCRIPTION	LITHOLOGY	
0 - 2	1 1		BROWN FINE TO COARSE SAND, LITTLE GRAVEL, TRACE SILT		0.0
	2 3		RECOVERY - 12"		
2 - 4	5 7		SAME AS ABOVE, MOIST		
	6 6		RECOVERY - 12"		
4 - 6	5 6		0-6" SAME AS ABOVE		6.0
	7 12		6-10" BROWN FINE SAND AND SILT, WET		
			10-14" FINE TO MEDIUM SAND, TRACE SILT		
END OF BORING - 6 FT					