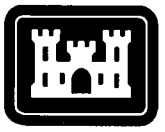
Technical Report GL-98-21
September 1998



US Army Corps of Engineers
Waterways Experiment Station

Final Report: RCRA Facility Investigation Phase II Soils Release Characterization, SWMU 04/02 McComish Gorge, Naval Surface Warfare Center Crane, Indiana

by John Stephen Nohrstedt, Eric M. Farr, Robert W. Magee, Wilmington District

Paul E. Albertson, James H. May, WES

Prepared for Department of the Navy, Southern Division

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Final report

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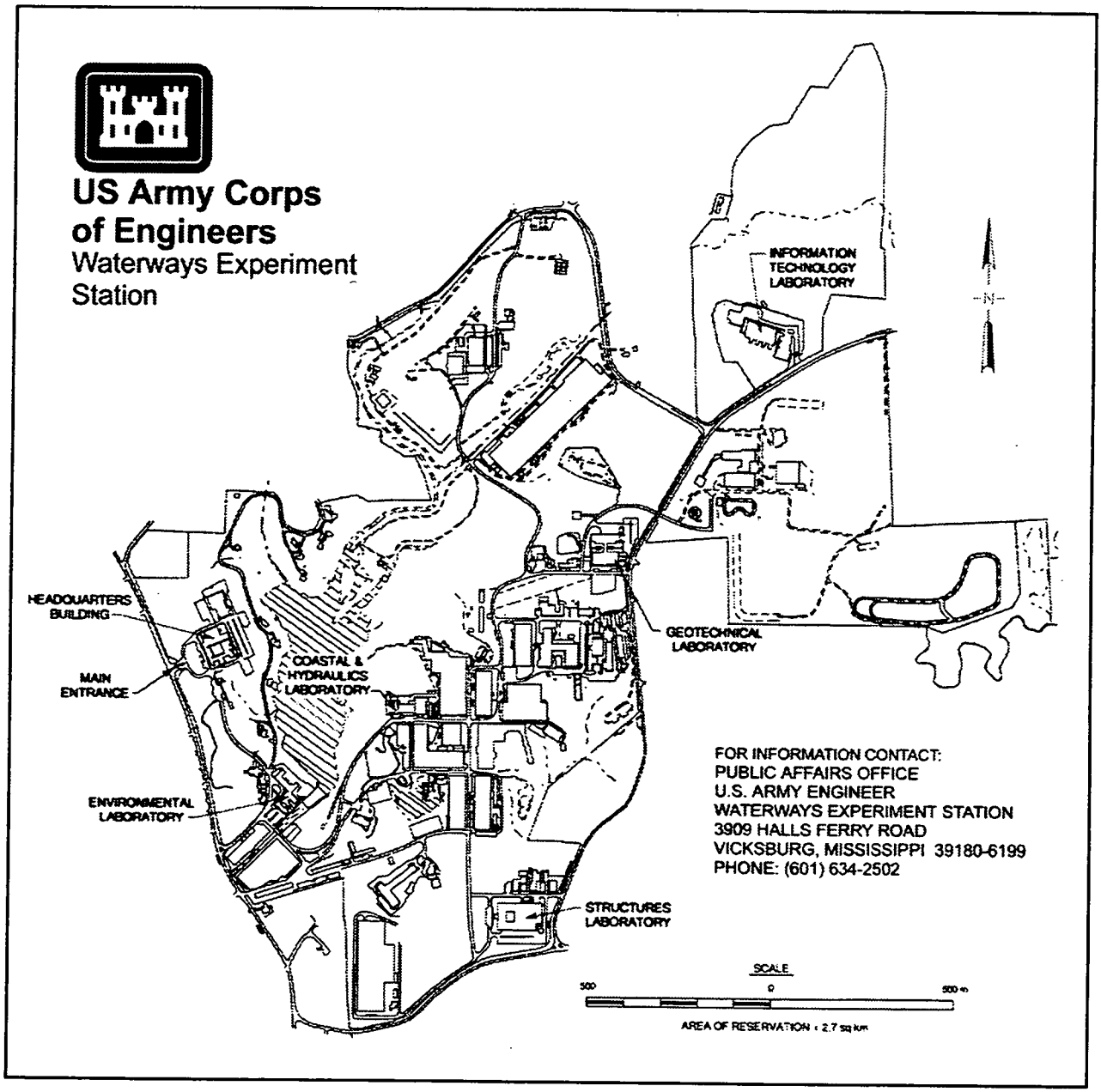

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Preface

A Resource Conservation and Recovery Act Facility Investigation Phase II Soils Study was conducted at the McComish Gorge Site, Naval Surface Warfare Center Crane (NSWCC), Indiana, by personnel of the Geotechnical Laboratory (GL), U.S. Army Engineer Waterways Experiment Station (WES), and Wilmington District (CESAW). The field work was done in October and November 1990; the analytical work in October 1990 and March 1991; the data reduction and draft report writing between March and August 1991; and final revisions in June and July 1998.

The primary author of this report was Mr. John Stephen Nohrstedt. Contributing authors were Messrs. Robert W. Magee and Eric M. Farr, CESAW, and Mr. Paul Albertson and Dr. James H. May, GL, WES. Also contributing to the final report were Mses. Benita Abraham and Evelyn Villanueva, and Mr. Bennie Washington, GL, WES. Mr. Jeffry Ciocco provided oversight for Naval Facilities Engineering Command, and Mr. James Hunsicker, Manager, Environmental Protection Department NSWCC and Mr. Tom Brent, Project Manager, managed the project. Mr. William Murphy was Principal Investigator and Dr. James May was Program Manager for WES.

At the time the field work and draft report were completed, metric units were not used. A conversion factors table for English and metric units is included.

This investigation was performed in the Geotechnical Laboratory, WES, under the supervision of Dr. A. G. Franklin, Chief, Earthquake Engineering and Geosciences Division (EEGD), Dr. Lillian Wakeley, acting Chief, EEGD, and Dr. W. F. Marcuson III, Director.

Director of WES at the time of publication of this report was Dr. Robert W. Whalin. The Commander was COL Robin R. Cababa, EN.

Abbreviations and Acronyms

2,4,DNT	Dinitrotoluene
B-BHC	Beta Berylium Nitrate
CAAA	Crane Ammunition Army Activity
CAR	Corrective Action Requirements
CFR	Code of Federal Regulations
CL	Silty Clay
CV	Cold Vapor
D-BHC	Delta Berylium Nitrate
DNT	Dinitrotoluene
EPA	Environmental Protection Agency
GC	Gas Chromatography
GF	Graphite Furnace
HMTC	Hazardous Materials Technical Center
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HNU	Brand name for a photoionization detector
HPLC	High Pressure Liquid Chromatography
HW	Hazardous Waste
ICHEM	Sterile/Clean Sampling Bottles
ICP	Inductive Coupled Plasma
IRP	Installation Restoration Program
MG	McComish Gorge
MH	Plastic Silt
ML	Non Plastic Silt
NAD	Naval Ammunition Depot
NB	Nitrobenzene
NEESA	Naval Energy & Environmental Support Activity
NSWCC	Naval Surface Warfare Center Crane
NT	Nitrotolulene
NWSCC	Naval Weapons Support Center Crane
OBP	Old Burn Pit
OESO	Ordnance Environmental Support Office
PAH	Polycyclic Aromatic Hydrocarbons

PCB	Polychlorinated Biphenyl
PEP	Propellants, Explosives and Pyrotechnics
PPDDD	Para, Para' Dichlorodiphenyl Dichloroethane
PPDDE	Para, Para' Dichlorodiphenyl Ethane
PPDDT	Para, Para' Dichlorodiphenyl trichloroethane
QA/QC	Quality Assurance/Quality Control
RCRA/HSWA	Resource Conservation and Recovery Act/Hazardous and Solid Waste Amendments
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SC	Clayey Sand
SM	Silty Sand
SP	Gravelly Sand
SWMU	Solid Waste Management Unit
TNB	Trinitrobenezene
TNT	2,4,6-trinitrotoluene
USACE	United States Army Corps of Engineers
USACEWES	United States Army Corps of Engineers Waterways Experiment Station
USATHAMA	United States Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System

Executive Summary

The Naval Surface Warfare Center Crane (NSWCC), Indiana, is a naval facility located in southwestern Indiana. Its mission is to provide material, technical, and logistic support to the Navy. One of its primary and most prominent tasks is to serve as an inland ammunition production, storage and disposal center.

In 1989 NWSCC was given a Final Resource Conservation and Recovery Act (RCRA) Storage Permit. The permit contained Corrective Action Requirements (CAR). These requirements are being fulfilled through the Navy's Installation Restoration Program (IRP). The IRP conforms to the scope and purpose of the National Oil and Hazardous Substances Pollution Contingency Plan, March 1980. The requirements included the need for RCRA Facilities Investigations (RFI) at its hazardous waste disposal units. These units are called Solid Waste Management Units (SWMU). RFI have three phases, Phase I Environmental Monitoring Report, Phase II Release Assessment and Phase III Release Characterization Study. An RFI Phase II, soils investigation was performed at the McComish Gorge (MG) dump site by U.S. Army Corps of Engineers (USACE) personnel. This study is built from three work elements. The field work was done in October and November 1990; the analytical work between October 1990 and March 1991; the data reduction and draft report writing between March and August 1991; and report revised in June 1998.

The MG dump site was used for an unknown period of time between 1942 and 1972. Records of its use are indefinite. Undefined amounts and types of garbage and trash were buried at the site. This rubbish could include wood, paper, construction material, plaster filled warheads, metal shavings, and industrial wastes. Reportedly small arms ammunition was buried here. Today the site is not used and it has revegetated.

The objectives of this study were to (a) describe the soil conditions around the site, and (b) to identify and characterize the operation residuals. To accomplish those goals, 11 auger borings were drilled in 1990. Soil samples were collected at discrete intervals. The physical character of the soils were described. Soils were classified according to the Unified Soil Classification System (USCS). Particle size gradation and natural water content were determined. To determine the chemical character of the soils and to test for the presence of chemical waste residues, soil samples were taken at defined

intervals from the borings. The soil samples were analyzed for the presence of volatile and semivolatile organic compounds; pesticides, herbicides, and PCBs; and inorganic compounds. All analytical methods used were Environmental Protection Agency (EPA) SW-846, with the exception of explosive analysis and total phosphorous analysis. Standard U.S. Army analytical methods were used to determine explosive and total phosphorous concentrations in the soils. Soil samples taken from borings located away from the operational areas were used to establish background conditions. The Quality Control (QC) level selected for this study was a NEESA Level "C."

The site hydrogeologic setting was investigated. Soil descriptions were drawn from 11 auger borings drilled in 1990, 6 groundwater monitoring wells drilled in 1981 and 1 replacement well in 1986, field observations, and physical soil test data. Differences between soil and unconsolidated earth materials of Tertiary Age were not determined. All unconsolidated earth materials were considered soils. Soils across the site ranged from 0 to over 60 ft in thickness. Soil types included clays (CL), silts (ML and MH), and sands (SC, SM, and SP). A unit of modified soil, soils containing plastic, rubber, metal and wood wastes, was found in Borings 1, 2, 5, 6, 7, 8, 9, and 10. A linear, sandy zone of soil was interpreted to represent a paleostream channel deposit. Tests to measure permeabilities of the soil material were run on silty sand soil samples from MG. Permeabilities on the order of 4×10^{-5} cm/sec were measured. The permeabilities of the sandy zones within the described channel were not tested. It is reasonable to presume that intervals within the paleochannel may display permeabilities three to five orders of magnitude greater then those previously measured. In all of the 1990 borings, groundwater was encountered at shallow depths (3-10 ft below the ground surface). Available evidence indicates that groundwater moves by downward vertical infiltration through the clays and silts of the site very slowly. When rock is encountered, groundwater moves laterally along the soil/rock interface until it reaches fractured rock and enters the rock aquifer system. In the paleochannel sand rich zones, groundwater would preferentially move laterally through the sand body. Determining the presence and orientation of this sand body is important to the understanding the MG hydrogeologic environment.

The chemical character of the soils was determined using field monitored parameters and laboratory analysis. All HNU readings, taken in the field and used to detect volatile organics emanating from the soil boring holes, were zero. Although the area was presumed to be contaminant free, the background area was affected by the dumping operations at the site. For statistical comparative purposes, the background data derived from the Old Burn Pit (SWMU No. 05/03) area was used as background data at this site. Analysis of inorganic compounds indicated that releases of arsenic, beryllium, chromium, copper, and iron may have occurred. The only volatile organic compounds detected in the soil samples were determined to be laboratory contaminants. The semivolatile organic compounds 2,4-dinitrotoluene, 2,6-dinitrotoluene, n-nitrosodiphenylamine, and di-n-octylphthalate were detected in soils from the MG. They may represent a release of semivolatile organic compounds. With the exception of concentrations of 2,4,-dinitrotoluene in soils from Boring 1A, all other semivolatile organic compounds were found in "J" level concentrations. Explosive compounds 2,4-DNT and 2,6-DNT were detected in

Boring 1A. Some pesticides and herbicides were found in all soils, but were found in "J" level concentrations. Diazinon was the only pesticide found in the soil samples but not detected in the blank or rinse samples. The only herbicide found in the soil samples but not detected in the blank or rinse samples was 2,4-D. No PCBs were detected in any of the MG soils. MG is not considered to be contaminated with any of the following groups of compounds: volatile organics, pesticides, herbicides, or PCBs. A release of inorganic, semivolatile organic, and explosive wastes to the soils of the MG area is likely to have occurred.

Based upon the results of this study, a Phase III soils study is recommended for the following reasons:

a. Site specific background data are needed to determine the natural variability of the MG soils.

b. The boundaries of the MG site should be determined. Additional borings will be required to accurately delineate the area and depth of actual contamination.

c. Contamination detected in soil boring 04/02-1A-90 and 04/02-02-90 should be delimited.

Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
feet	0.3048	meters
feet per mile	0.1893935	meters per kilometer
inches	2.54	centimeters
miles (U.S. statute)	1.609347	kilometers

1 Introduction

Background

Naval Surface Warfare Center, Crane (NSWCC) is a naval facility located in southwestern Indiana. It is located 40 miles southwest of Bloomington, IN and 74 miles south of Indianapolis, IN. The location of NSWCC is shown in Figure 1. The facility covers approximately 62,463 acres in Davies, Greene, and Martin Counties. It is located in a rural, sparsely populated area. The acreage surrounding the base is either wooded or farmed land. The majority of NSWCC is covered by forest. Its surface topography is that of a rugged dissected plateau cut by well-defined stream valleys. The surface elevations range from 470 ft in the valleys to 800 ft on the ridges.

Facility History

The facility, originally called Naval Ammunition Depot (NAD), Burns City, was opened in 1941 to serve as an inland ammunition production and storage center. The Depot's name was changed to NAD, Crane in 1943. In 1975, the name was changed to Naval Weapons Support Center, Crane and in 1992, the name was changed again to Naval Surface Warfare Center, Crane. Today the Naval Surface Warfare Center Crane (NSWCC) mission is to "Provide quality and responsive engineering, technical and materiel support to the Fleet for combat subsystems, equipment and components, Microelectronic Technology, Microwave Components, Electronic Warfare, Acoustic Sensors Tests, Engineering, Pyrotechnics, Small Arms, Electronic Module Test and Systems Command." Under the Single Service Management Program, a segment of the Center's mission is to provide support (including environmental protection) to the Crane Army Ammunition Activity (CAAA). The Army is tasked with the production and renovation of conventional ammunition and related items, the performance of manufacturing, engineering, and product quality assurance to support production; and the storage, shipment, demilitarization, and disposal of conventional ammunition and related components. Because of the nature of the Army's operations, CAAA contributes significant financial support for the environmental program through an Interservice Support Agreement.

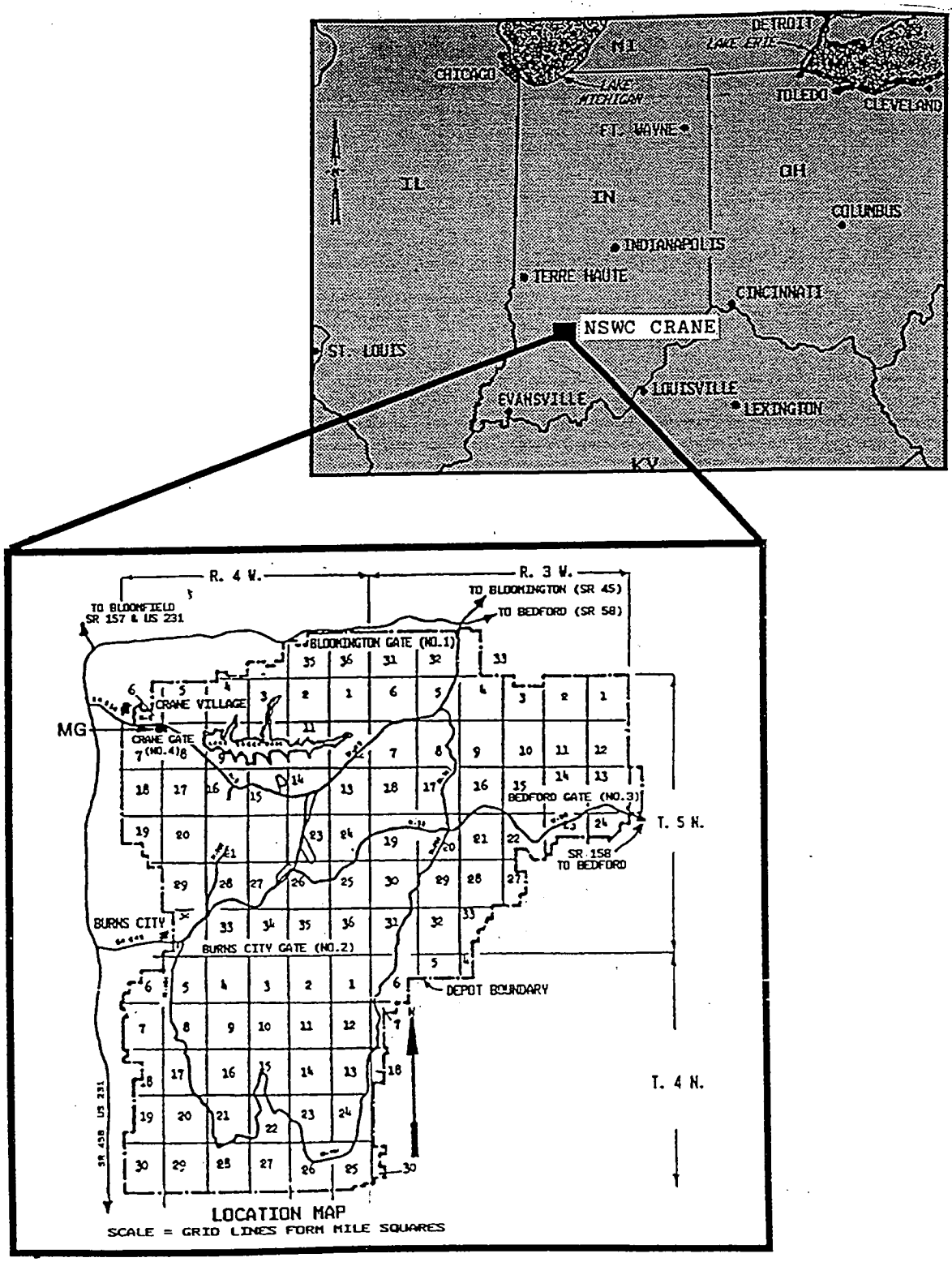


Figure 1. Location map showing the location of NSWCC and McComish Gorge

Investigation

In 1989, the Navy was granted a Final RCRA Storage Permit for its hazardous waste storage facility. As part of the conditions set forth in the Final Permit, NSWCC was to conduct RCRA Facility Investigations (RFI) at 30 Solid Waste Management Units (SWMU). The McComish Gorge is considered to be a past operational SWMU (Figure 1). Surface and shallow subsurface soil investigations are part of that RFI process. The U.S. Army Corps of Engineers' Waterways Experiment Station (USACEWES) conducted the study. The field work was done in October 1990, analytical work was done between October 1990 and January 1991, and the data reduction and report writing was done between December 1990 and August 1991.

Site Setting

The MG dump site was used for an unknown period of time between 1942 and 1972. Records of its use are indefinite. Undefined amounts and types of garbage and trash were buried at the site. This rubbish could include wood, paper, construction material, plaster filled warheads, metal shavings, and industrial wastes. Reportedly small arms ammunition was buried here. Today the site is not used and the site has revegetated (Figure 2).

The MG Site occupies approximately 5 acres. MG is located in the northeast one-fourth of Section 7, T5N, R4W (Figure 1). The disposal site is seen in Figure 3. The area is approximately 500 ft south of the Crane Gate, Gate No. 4.

Project Objective

RFI Phase II studies are release assessment studies. Their purpose is to determine if a chemical release has occurred and to characterize the host medium. This study examined soil samples in two ways. The physical attributes of the soil were characterized and the chemical contaminants in the soil were identified.

The goals of this project were to quickly determine if any lasting effects of the releases could be detected and to investigate the physical properties exhibited by the surface and subsurface earth materials. This objective was reached by concentrating the soil sample collection at probable sites of surface and subsurface contamination. Those samples were tested for the presence of contamination. Conclusions concerning the presence or absence of contamination, the risk posed by those contaminants and the possible future steps to be taken are included.

The compound names and abbreviations are given in Appendix A, Boring Logs in Appendix B, Physical Data in Appendix C, Chain of Custody and

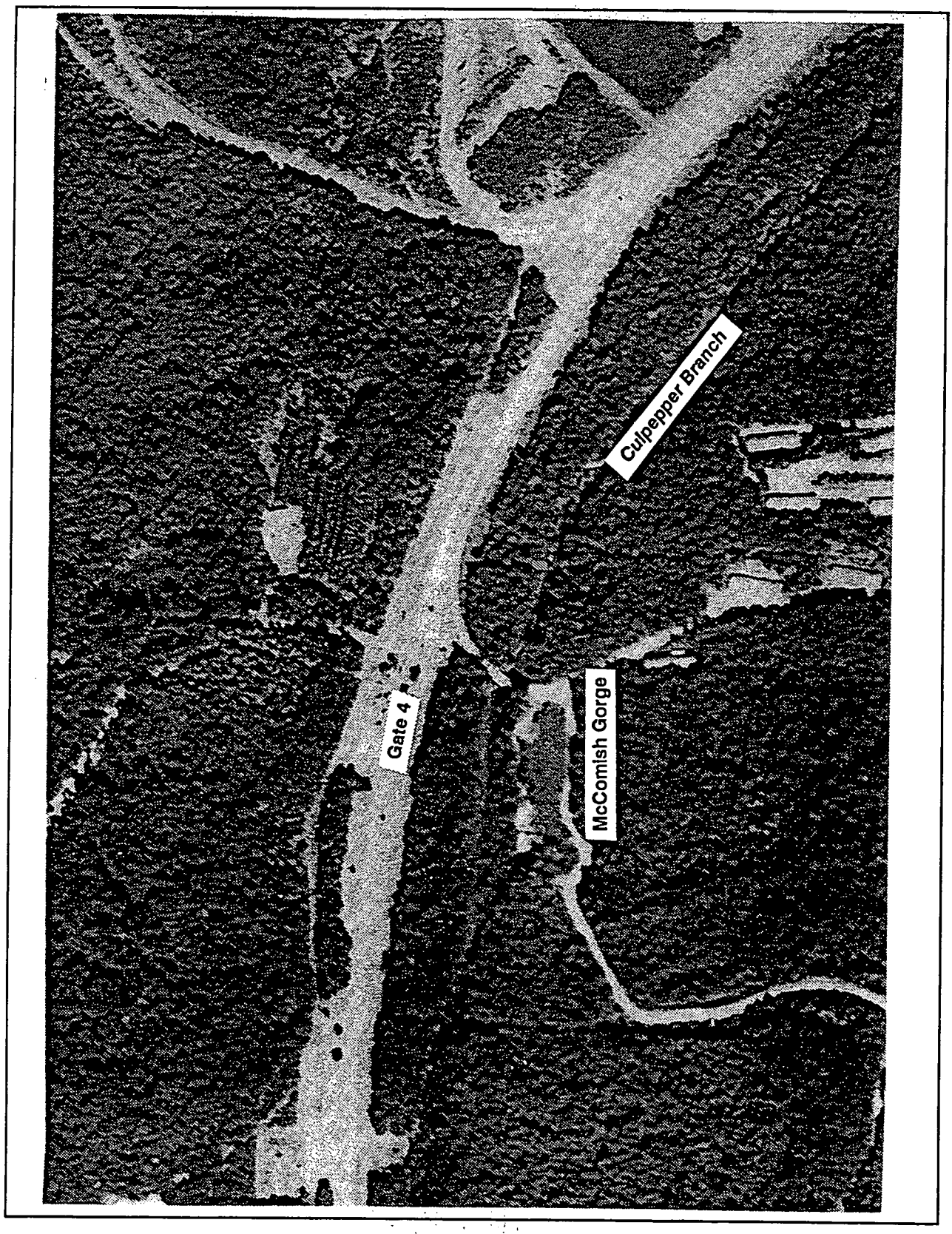


Figure 2. Aerial Photo (08/87) showing revegatated conditions at McComish Gorge

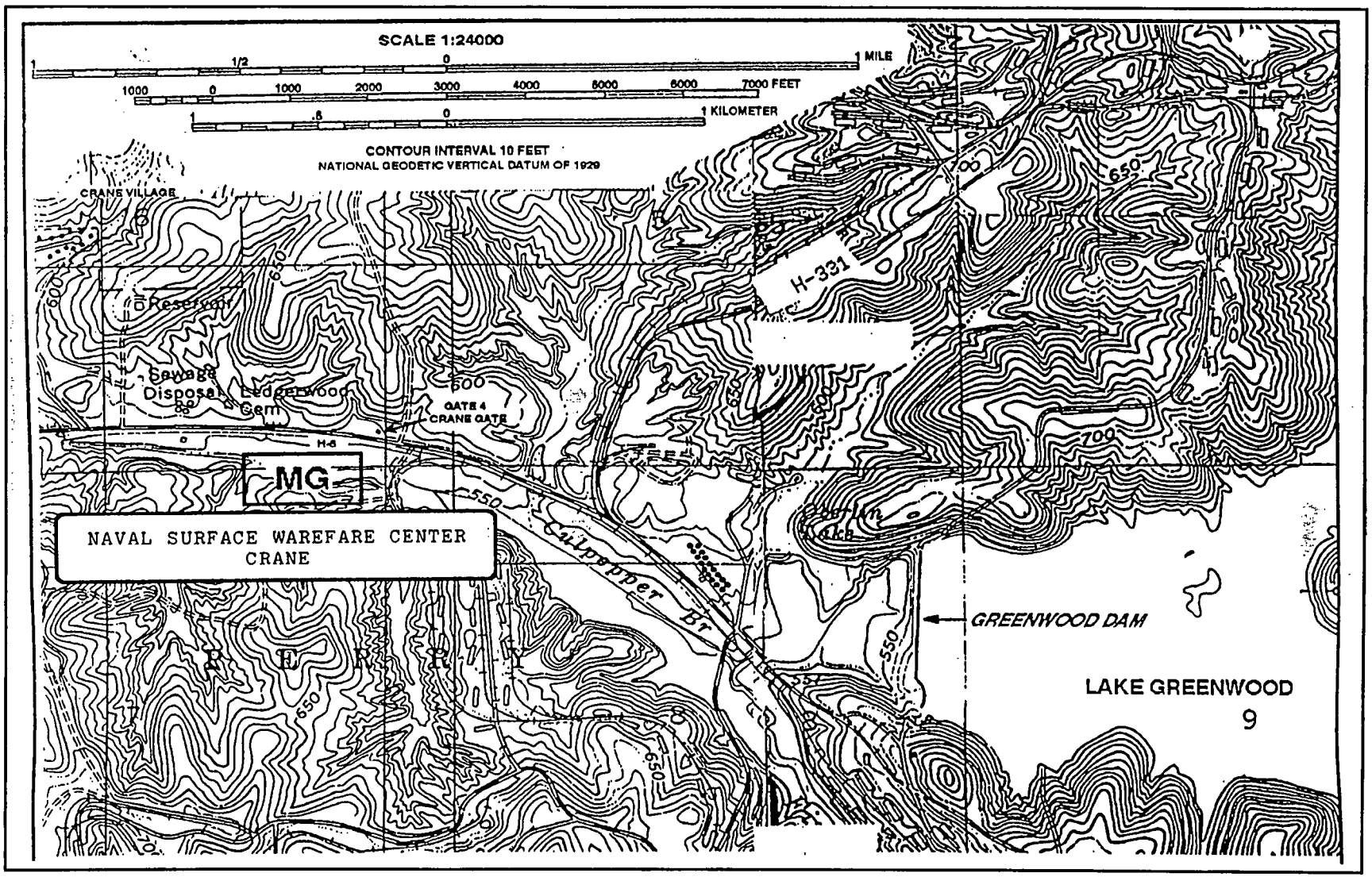


Figure 3. Site map NSWCC, McComish Gorge

Validation Report in Appendix D, and Monitoring Wells Sampling Results in Appendix E.

2 Previous Investigations

An Initial Assessment Study (IAS) was performed at NSWC, Crane, IN during 27 April to 1 May 1981. The purpose of the IAS was to identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous materials operations. The on-site survey was performed by a team of specialists from Naval Energy and Environmental Support Activity (NEESA), Ordnance Environmental Support Office (OESO), and the U.S. Army Corps of Engineers (USACE). The team evaluated information from historical records, aerial photographs, field inspections, and personnel interviews.

During the investigative interviews it was reported that ordnance and nonordnance wastes were placed in MG. Specific quantities and types of wastes were not verifiable. If hazardous wastes were disposed of at MG, then the potential for ground water contamination could exist.

Based upon the findings and conclusions of the IAS the team recommended a Confirmation Study to confirm or deny the presence of contaminants at the MG Site. A list of compounds and abbreviations are listed in Appendix A.

USACE Waterways Experiment Station (WES) conducted a groundwater and soils investigation at the MG Site during the latter part of 1981. Six monitoring wells were located along the perimeter of the disposal site (Figure 4).

The study initiated by USACEWES in 1981 indicated the following:

a. The MG is located on unconsolidated lacustrine deposits which primarily consist of interbedded deposits of sand, silt and clay. The boring logs are presented in Appendix B.

b. The groundwater contour map indicated that the ground water gradient was eastward, toward Culpepper Branch (Figure 5).

c. The depth to the ground water table ranged from approximately 15 ft near the western margin of the site, to less than 5 ft near Culpepper Branch.

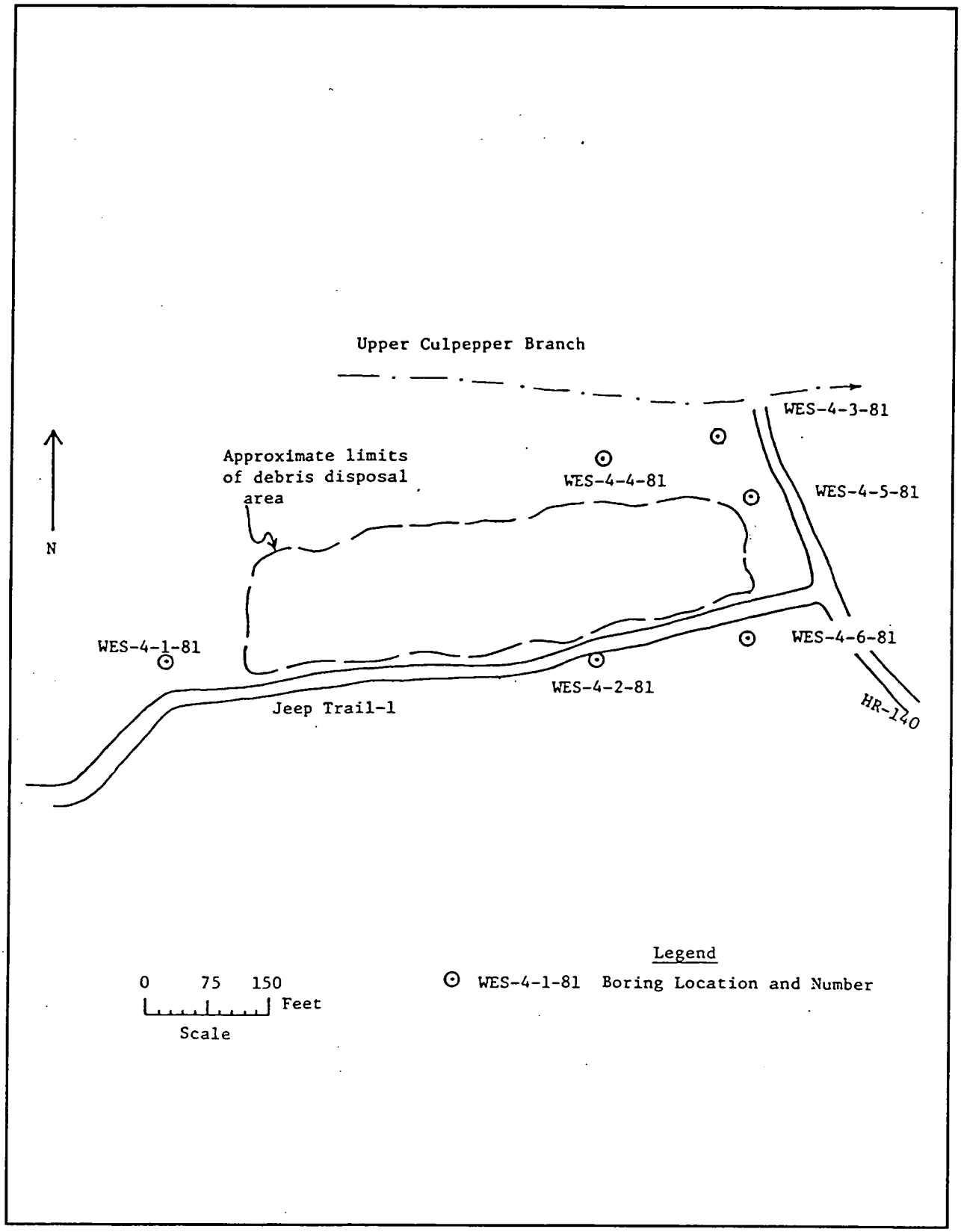


Figure 4. Monitoring well locations at McComish Gorge (modified after Dunbar 1982)

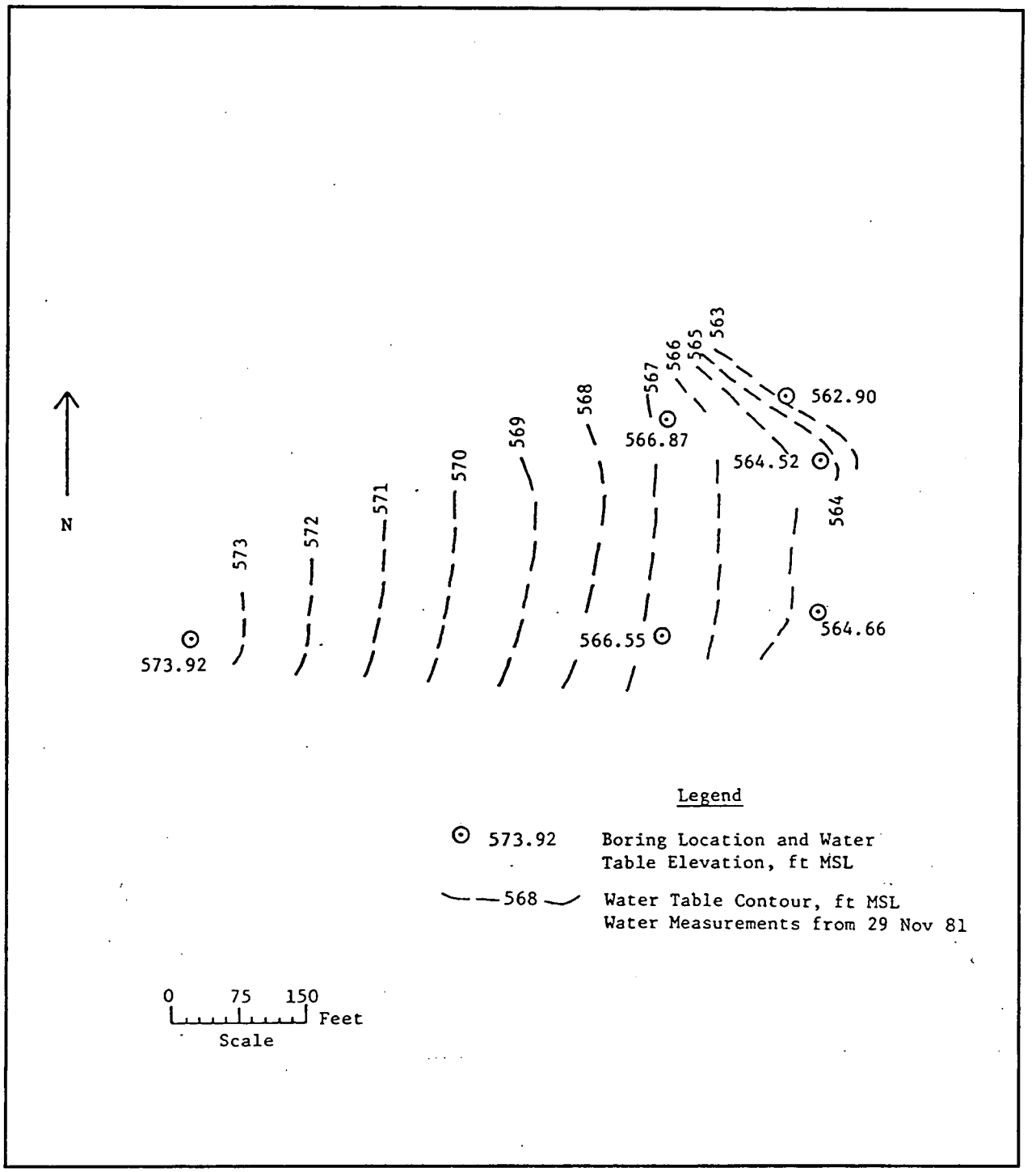


Figure 5. Water table contour map of McComish Gorge (Dunbar 1982)

d. Analysis of groundwater samples indicated metal contamination. The most significant groundwater contaminants were mercury and chromium. (WES 4-1-81 had 0.077 ppm mercury and WES 4-5-81 had 0.1 ppm chromium.) A comparison of the groundwater samples to primary drinking water standards indicated elevated concentrations for cadmium, chromium, fluoride, iron, manganese, mercury, sodium, and sulfate. Groundwater data from December 1981 to January 1985 are presented in Appendix E.

e. It was not possible to determine the extent of groundwater contamination because there were no monitoring wells downgradient of well WES 4-5-81 (one of the wells that showed contamination).

3 Procedures

Approach

The intent of a Phase II study is to evaluate the presence or absence of a release and to characterize the hazardous waste and its constituents. Chemical analysis was done using SW-846 analytical methods. The soil was physically characterized using USACE's geotechnical procedures. This release assessment was accomplished by judiciously selecting sample locations, selecting the appropriate analytes and using proper analytical methods. The study effort focused on verifying the presence of contaminants in the soil column. In order to determine background conditions for inorganic compounds which may be natural constituents of earth materials, surface soil samples were taken in an area of the site removed from the disposal activities.

Soil samples were taken in each boring and used to determine the physical characteristics of the soil. When more than one soil horizon was detected, each soil horizon was sampled.

Stratified samples were taken from vertical soil borings. Eleven borings were drilled using a truck-mounted drilling rig. The boring locations are shown on Figure 6. Those soil samples were used to identify contaminant levels and soil characteristics. For testing of the physical properties of the soils, at least one disturbed soil sample per boring was collected. Soil samples for chemical analysis were taken from the 6 in. to 12 in. interval and from the last 12 in. above the ground water table. Actual sample depths and their sample identification are shown on Figure 7. Sample identification numbers consist of SWMU number, boring number, year sample was taken and sample number. The boring locations were determined from the existing monitoring wells by field personnel. The well and boring coordinates were converted from known latitude and longitude to Indiana State grid coordinates.

Field Methods

Soil borings were placed using a Failing 1500 drilling rig equipped with a hollow stem auger. Samples were taken at specified depths. All sample depths were above the ground-water table and the top of rock. A Shelby tube sampler

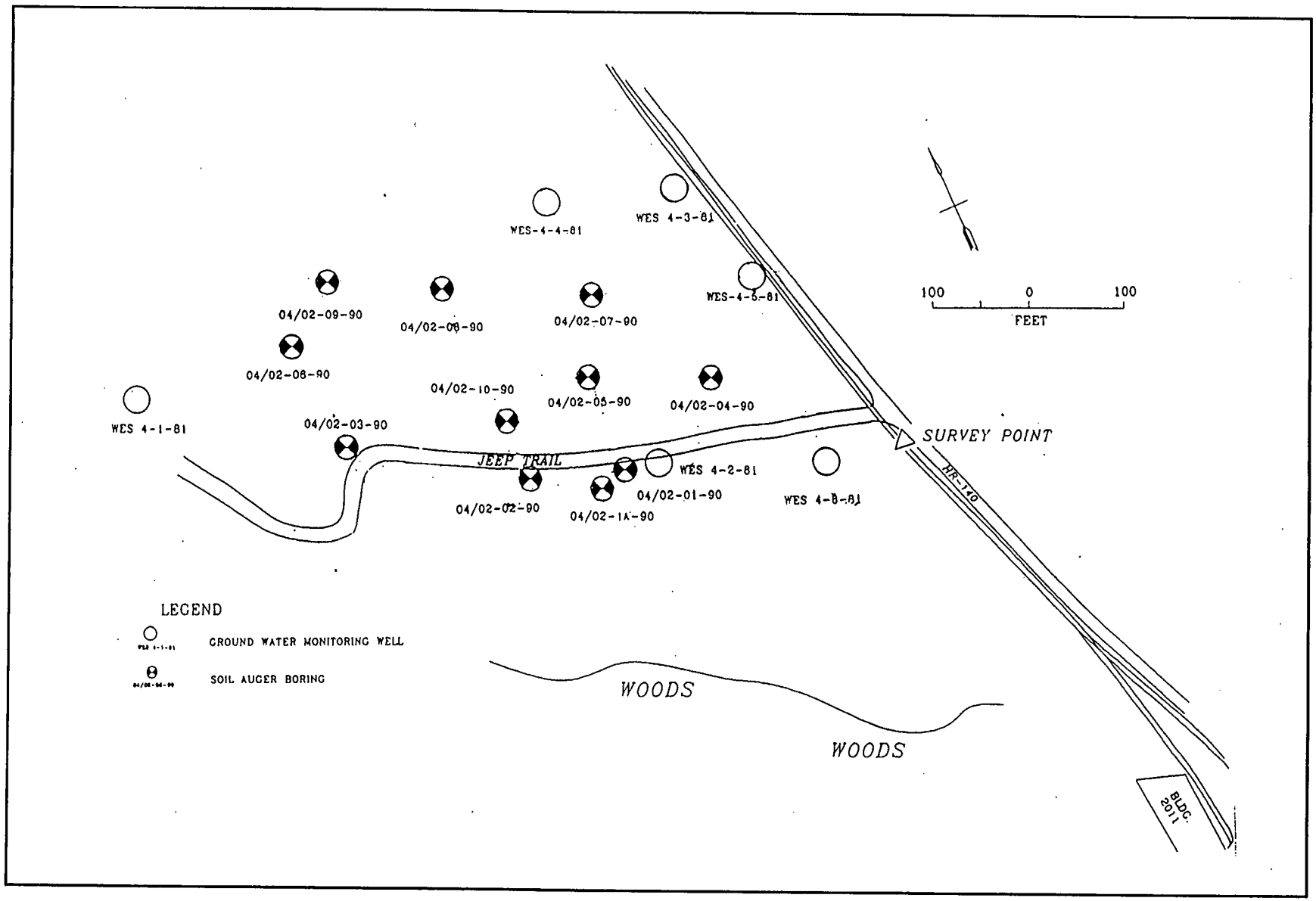
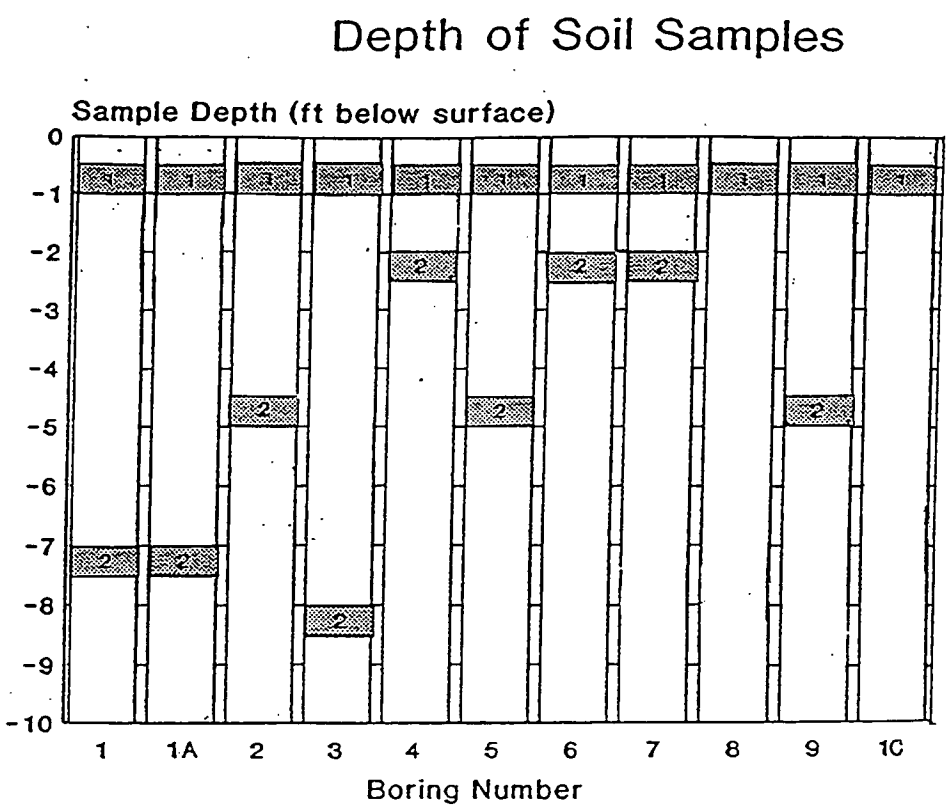


Figure 6. Location map of borings and monitor wells at Crane NSWCC, McComish Gorge site



McComish Gorge (SWMU# 04/02) - NSWC Crane, Indiana
Dates Samples Collected

Boring 1 23 OCT 90	Boring 4 06 NOV 90	Boring 8 01 NOV 90
Boring 1A 25 OCT 90	Boring 5 25 OCT 90	Boring 9 30 OCT 90
Boring 2 23 OCT 90	Boring 6 30 OCT 90	Boring 10 01 NOV 90
Boring 3 25 OCT 90	Boring 7 02 NOV 90	

Figure 7. McComish Gorge - depth of soil samples and dates of collection.

was advanced through a hollow stem auger, pressed to its full length, and then extracted. At the surface the soil was extracted from the sampler, peeled, and bottled in the shortest time possible. Peeling is the process that removes and discards the portion of the sample which is in direct contact with the sampler. Ends of the sample were not used. Samples were analyzed for the presence of inorganics (SW-846 Methods 6010, 7471, 7060 and 7740) and organics (SW-846 Methods 8240 and 8270). Samples for volatile analysis were taken, bottled, and capped within 15 sec from the time the sampler was opened. All other samples were extruded into wide-mouth glass jars or other containers with minimal disturbance of the sample.

Soil samples were collected and placed into sterilized (ICHEM) sample jars, bottles, and vials. Two 8-oz soil samples were collected for inorganics, explosives, pesticides, herbicides, PCBs, and semivolatile compound testing. Two 40-mL samples were taken for volatile organic compound analysis. The sample jars or bottles were then sealed. The sealed containers were placed in locked ice chests (coolers) for storage at a temperature of 4° Celsius. Chemical preservatives were not used. The coolers containing the samples with their accompanying Chain of Custody forms were transported to the analytical lab for analysis (Appendix D). Transport was by an overnight, air freight carrier service. A seal was placed on each cooler to ensure that the samples had not been disturbed during transport to the laboratory.

Following sample collection, the hole was backfilled using a cement bentonite grout. Cuttings, not removed from the hole for sampling, were contained in drums. The drums were identified and left on the site. The identification included information describing the contents of the drum and the boring from which the cuttings were taken. NSWCC took custody of the drums and is responsible for the disposal of their contents.

Chemical Testing

Analyte selection is based on the probability of a contaminant occurring at the site. Rubbish, solid wastes, and possibly liquid wastes were buried. Explosive wastes were reportedly also buried. The principal contaminants could be organics and metal wastes. Groundwater monitoring has been performed at the site and the detected contaminants were metals and organics. The groundwater testing results from December 1981 to January 1985 for MG wells are listed in the Hazardous Materials Technical Center (HMTC) Report (1985). For this investigation, each soil boring had two sets of samples planned. These sample sets consisted of one shallow subsurface sample and one sample from an evident or suspected contaminated zone. When no contaminated zone was found, then the sampled horizon was the first horizon which met one of the following conditions: (a) the base of the disturbed soil zones, (b) the top of the groundwater table or (c) the top of bedrock. Soil samples were taken to determine contaminants found in the soil. A full list of analytical test parameters is shown in Table 1 and the method of analysis for each analyte is shown in Tables 2 and 3. The list of analytical test parameters shown in Table 1 was selected on the basis of the probability of the parameters

Table 1
List of Parameters

Explosives	Inorganics		Organics
HMX	Aluminum	Lead	Volatiles
TNT	Antimony	Magnesium	8270 Semivol
RDX	Arsenic	Manganese	Organochloride
135 TNB	Barium	Mercury	Pesticides & PCB
13 DNB	Beryllium	Nickel	Organophos
246 TNT	Cadmium	Phosphorus	Pesticides
24 DNT	Calcium	Selenium	Chlorinated
26 DNT	Chromium	Silver	Herbicides
NB	Cobalt	Sodium	
2 NT	Copper	Thallium	
3 NT	Iron	Tin	
4 NT		Zinc	
TETRYL			

occurring at the site. The 8240 and 8270 organics were selected because of their common industrial usage. Explosives were selected because historical information indicates they may have been placed here. Pesticides, PCBs, and herbicides are used at NSWCC and they may have been buried at the site. Metal contamination was detected during the sampling program and it is always a possible pollutant at any dump site.

To ensure that the soil samples and their resultant chemical data were representative of the site conditions, a quality control program was enforced. As part of this quality control program, a sample tracking procedure was used. This process started in the field with chain of custody procedures, sample isolation, and preservation. The tracking procedures were continued in the laboratory. A complete laboratory quality assurance/quality control plan was followed. Document management was started upon the receipt of the samples. Log books, bench sheets, and reports were kept. All data were checked by the analyst, the inorganic team leader or the organic team leader, and the laboratory Chief before the data were released. The data were checked for completeness. The completeness check was to ensure that: (a) all samples and analyses had been processed, (b) complete records including Chain of Custody for each analysis and associated QC samples were used, (c) procedures specified in project planning were followed, and (d) all calibrations were performed. The following items are checked:

Table 2
Summary of Methods for Determination of Inorganic Metallic Analysis

Metal Analysis	Technique[1]	Soils Methods from SW-846	
		Extraction[2]	Analysis
Aluminum	ICP	3050	6010
Antimony	ICP	3050	6010
Arsenic	GF	3050	7060
Barium	ICP	3050	6010
Beryllium	ICP	3050	6010
Cadmium	ICP	3050	6010
Calcium	ICP	3050	6010
Chromium	ICP	3050	6010
Cobalt	ICP	3050	6010
Copper	ICP	3050	6010
Iron	ICP	3050	6010
Lead	ICP	3050	6010
Magnesium	ICP	3050	6010
Manganese	ICP	3050	6010
Mercury	CV		7471
Nickel	ICP	3050	6010
Phosphorus	ICP	3050	6010
Selenium	GF	3050	7740
Silver	ICP	3050	6010
Sodium	ICP	3050	6010
Thallium	ICP	3050	6010
Tin	ICP	3050	6010
Zinc	ICP	3050	6010

[1] Abbreviations: GF = Graphite Furnace, CV = Cold Vapor, and ICP = Inductively Coupled Plasma.
[2] Extraction process, when not noted, is included in the analytical method.

Table 3
Summary of Methods for Determination of Organic Compound Analysis

Organic Analysis	Technique	Soils Methods from SW-846	
		Extraction	Analysis
Volatiles	GC/MS	INC.[1]	8240
Semivolatiles	GC/MS	3540/3550	8270
Organochloride Pesticides & PCBs	GC/MS	3540/3550	8080
Organophosphorus Pesticides	GC/MS	3540/3550	8140
Chlorinated Herbicides	GC/MS	INC.[1]	8150

[1] INC. = extraction procedure included in method procedure.

a. Completeness.

b. Duplicate values for precision.

c. Recovery of spikes for accuracy.

d. Method blanks for contamination.

e. Surrogate recoveries for organic analysis.

f. Data for QA check samples.

g. Reasonableness and trends.

If data fell outside of acceptable limits as described in the analytical method's procedures, the sample was rerun if the required amount of sample was available. If the rerun results continued to fall outside acceptable limits and the Quality Assurance (QA) check sample data were good, then data were reported with qualifying explanations. Acceptable data were usually defined by the specific procedural method (i.e., SW-846).

Final data reports went through several review and approval levels. The generated data were finally checked for validity. The data were evaluated with respect to:

a. Detection limits.

b. Control limits for duplicates, spikes, blanks, and surrogates.

c. Data control within control limits and corrective actions.

d. Flagging of consistently out of control data.

A validation report was prepared as a final step in the data preparation process (Appendix D).

Physical Parameter Analysis

Soil samples were characterized using standard U.S. Army Corps of Engineers geotechnical methods. These methods are found in Corps of Engineer manual EM 1110-2-1906, *Laboratory Soils Testing* (Headquarters, Department of the Army (HQDOA) 1970). The soil samples were described and classified in the field by the field crew and in the laboratory by the analyst. The lab classification consisted of a visual classification, a sieve and hydrometer analysis, determination of natural water content, Unified Soil Classification System (USCS) classification, and organic content. The sieve analysis determined the gradation of grain sizes ranging from the number 4 sieve to the number 200 sieve. To determine the percentage of silt and clay in the fine fraction of the sample, hydrometer analytical methods were used.

4 Site Characterization

Geologic Setting

The McComish Gorge is located on the Crawford Upland, a rugged, dissected plateau formed by differential erosion of Pennsylvanian and Mississippian Age sedimentary rocks. The rock units underlying the MG and forming the surrounding hills consist of Mansfield Formation shales and sandstones of the Pennsylvanian Age Raccoon Creek Group. Most of the MG is situated in the dissected alluvial valley of Culpepper Branch. The unconsolidated sediments of the MG site were formed by several processes. During the Pleistocene, the MG was filled with lacustrine (lake) deposits and alluvial (outwash) deposits which are facies included in the Atherton Formation (Grey, Wayne, and Wier 1970). The facies relationships of the Atherton Formation are shown on Figure 8. (Wayne 1963). Colluvium derived from the hillslopes and soil reworked by man in association with the disposal activity also compose the site.

Study Approach

The geology of the McComish Gorge site was characterized with 6 groundwater monitoring well borings (Dunbar 1982), the 11 auger soil borings described in paragraph "Field Methods," field observations and physical soil test data. The locations of the borings and geologic sections are presented on Figure 9. Geologic Sections A-A', B-B', C-C' D-D', E-E', F-F', and G-G' (Figures 10, 11, 12, 13, 14, 15, and 16, respectively) present the 1981 ground water monitoring well boring logs and the 1990 soil auger boring logs. The detailed individual soil auger boring logs are presented in Appendix B. Geologic Section D-D', (Figure 13) is modified from Dunbar 1982. Descriptions of the section and the drilling logs were presented in the Dunbar (1982) report. The geologic sections are self explanatory and collectively portray the relationships of the soil types at the MG site.

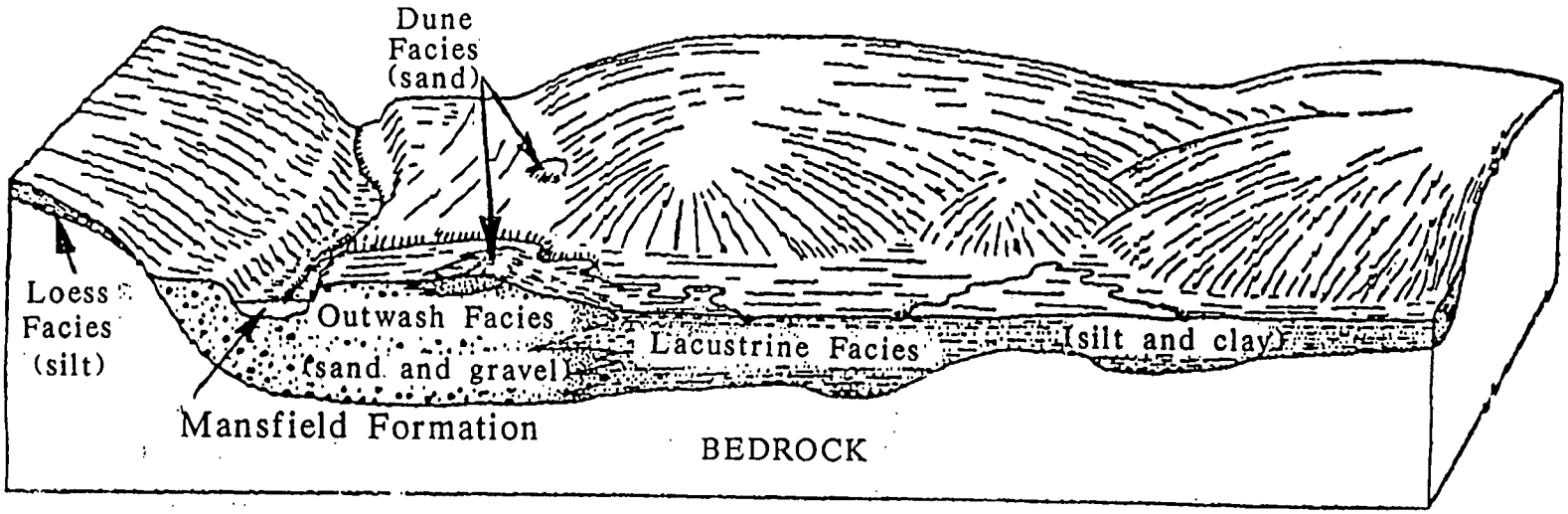


Figure 8. Block diagram depicting the facies of the Atherton formation

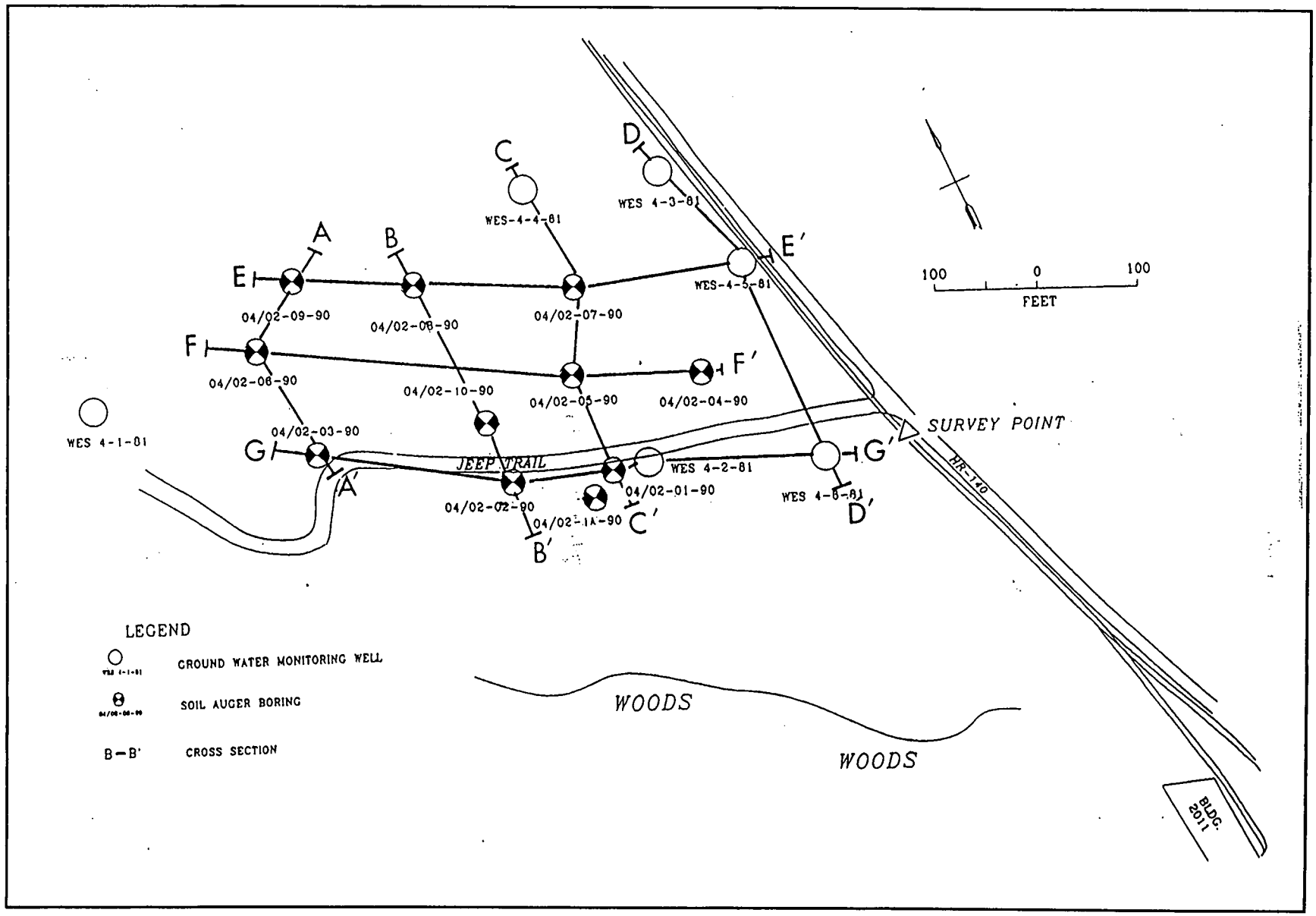


Figure 9. Location map of wells, borings, and geologic cross sections at NSWCC, McComish Gorge site

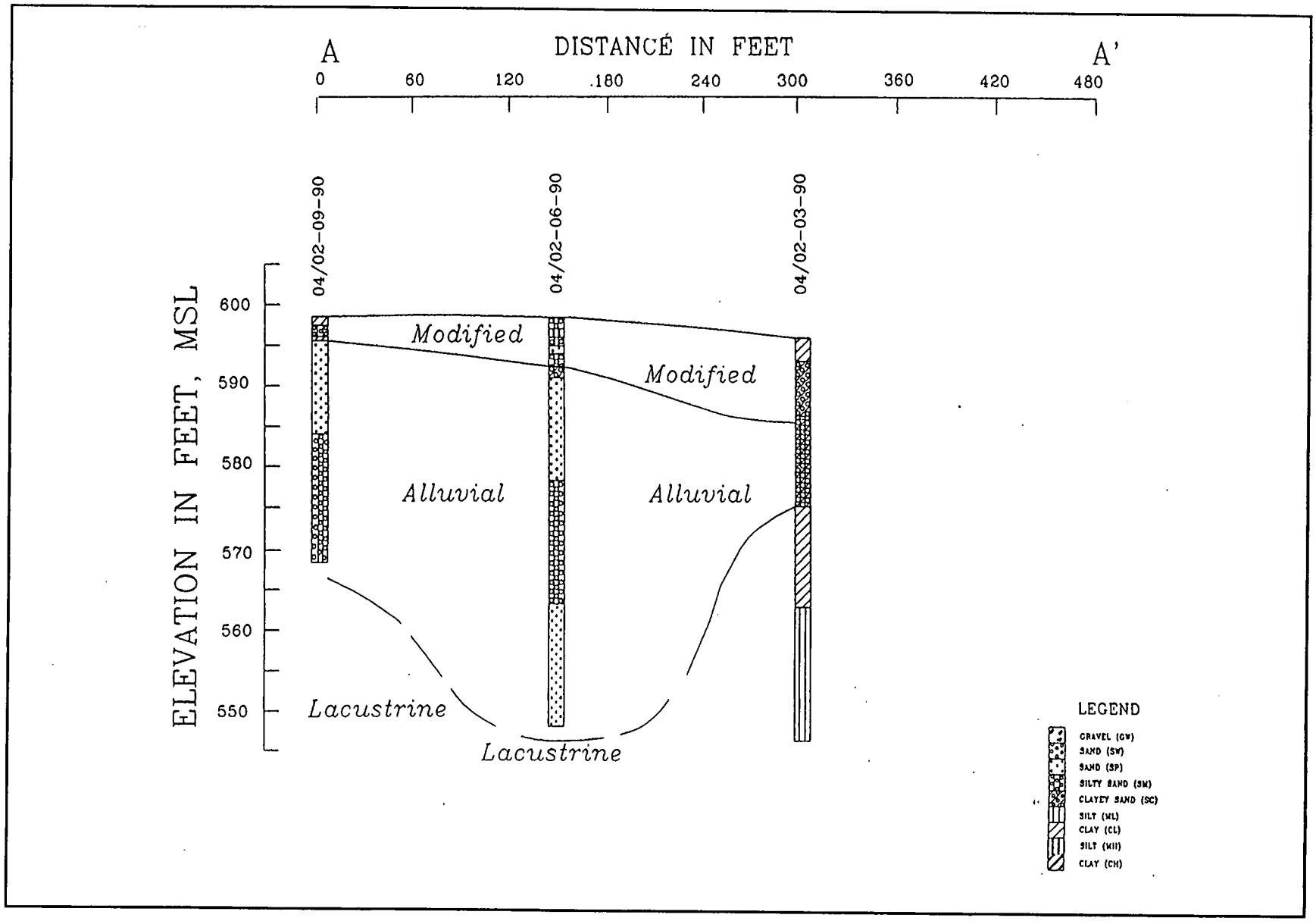


Figure 10. Crane NSWC, McComish Gorge site geologic cross section A-A'

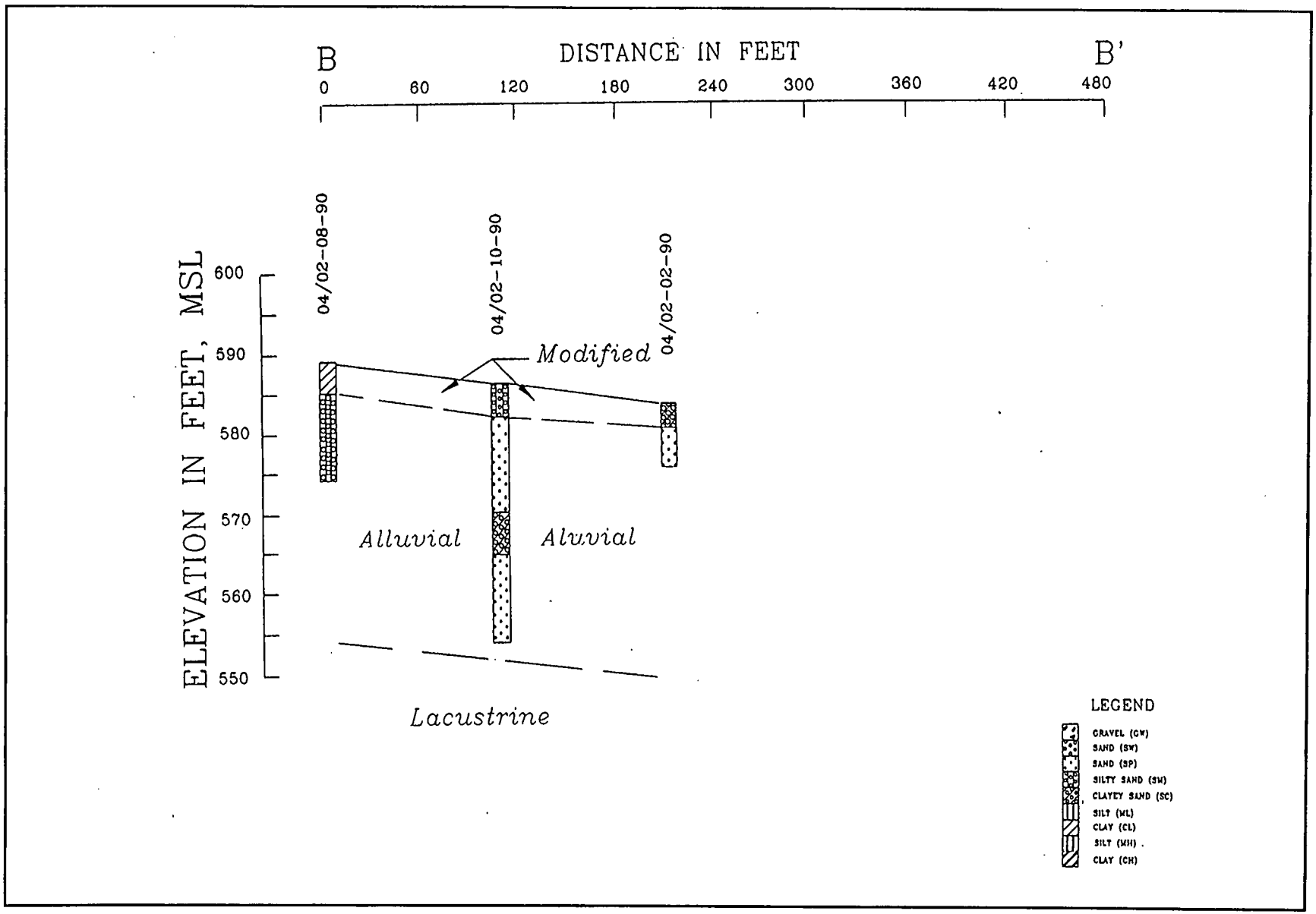


Figure 11. Crane NSWC, McComish Gorge site geologic cross section B-B'

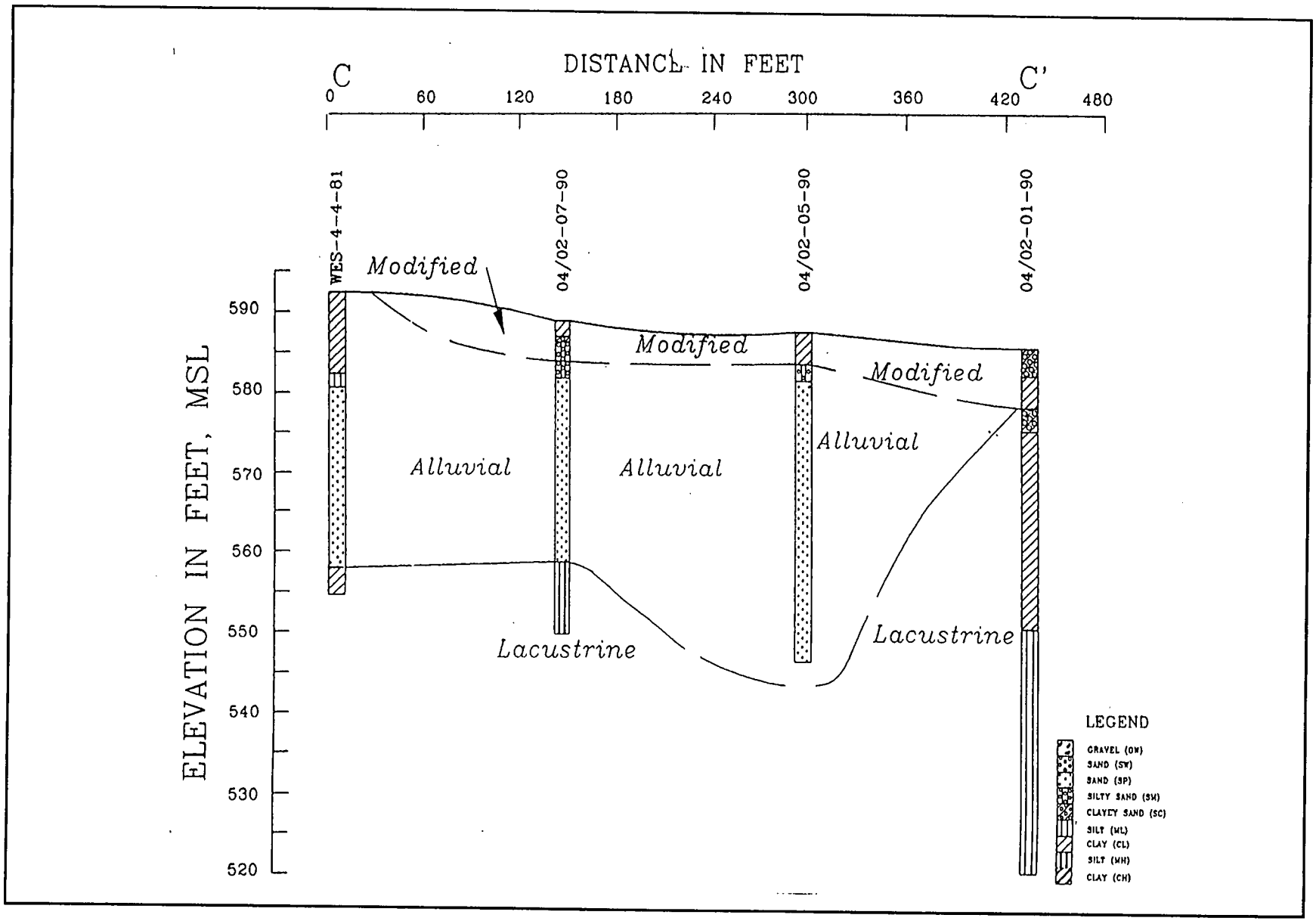


Figure 12. Crane NSWC, McComish Gorge site geologic cross section C-C'

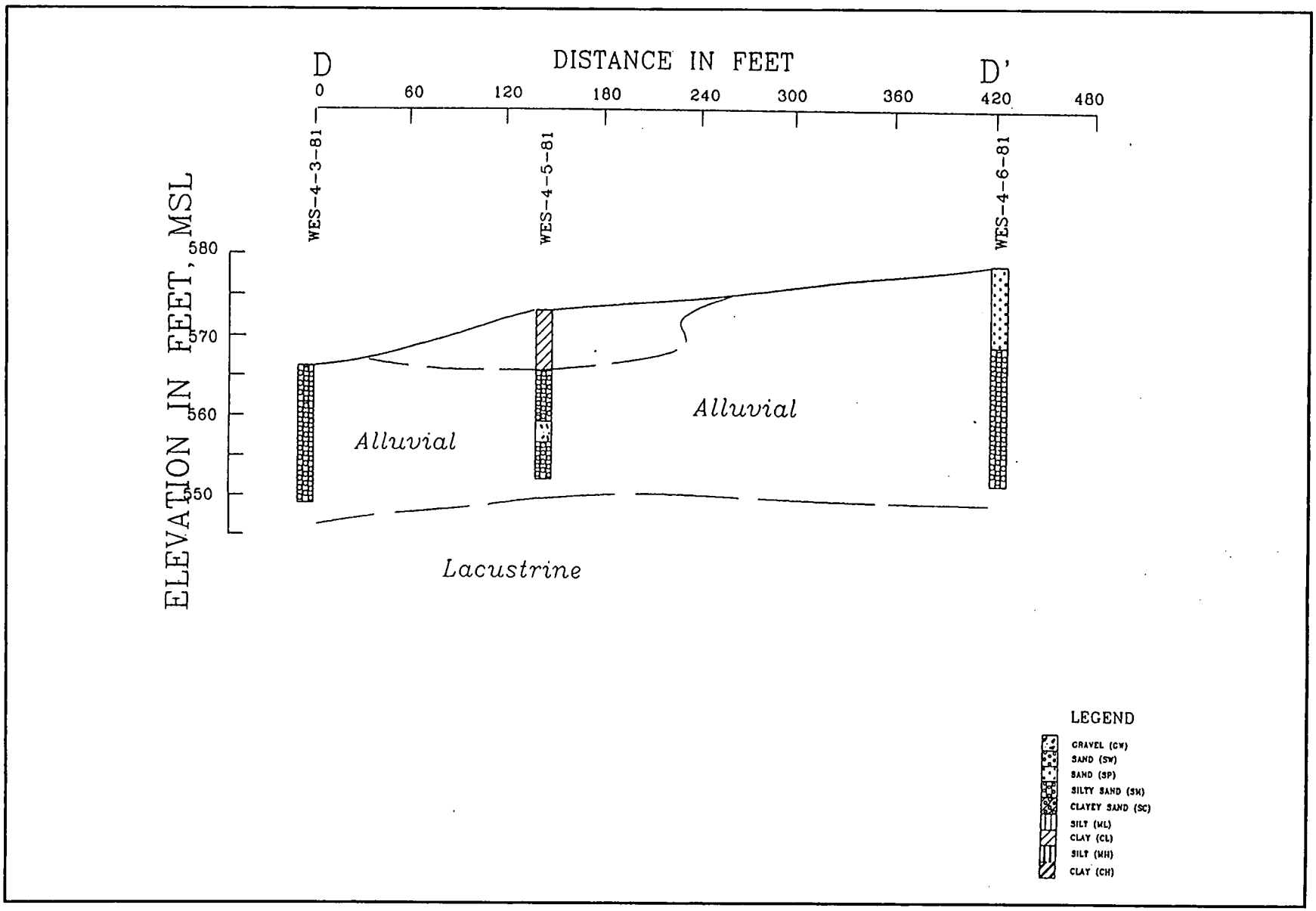


Figure 13. Crane NSWC, McComish Gorge site geologic cross section D-D'

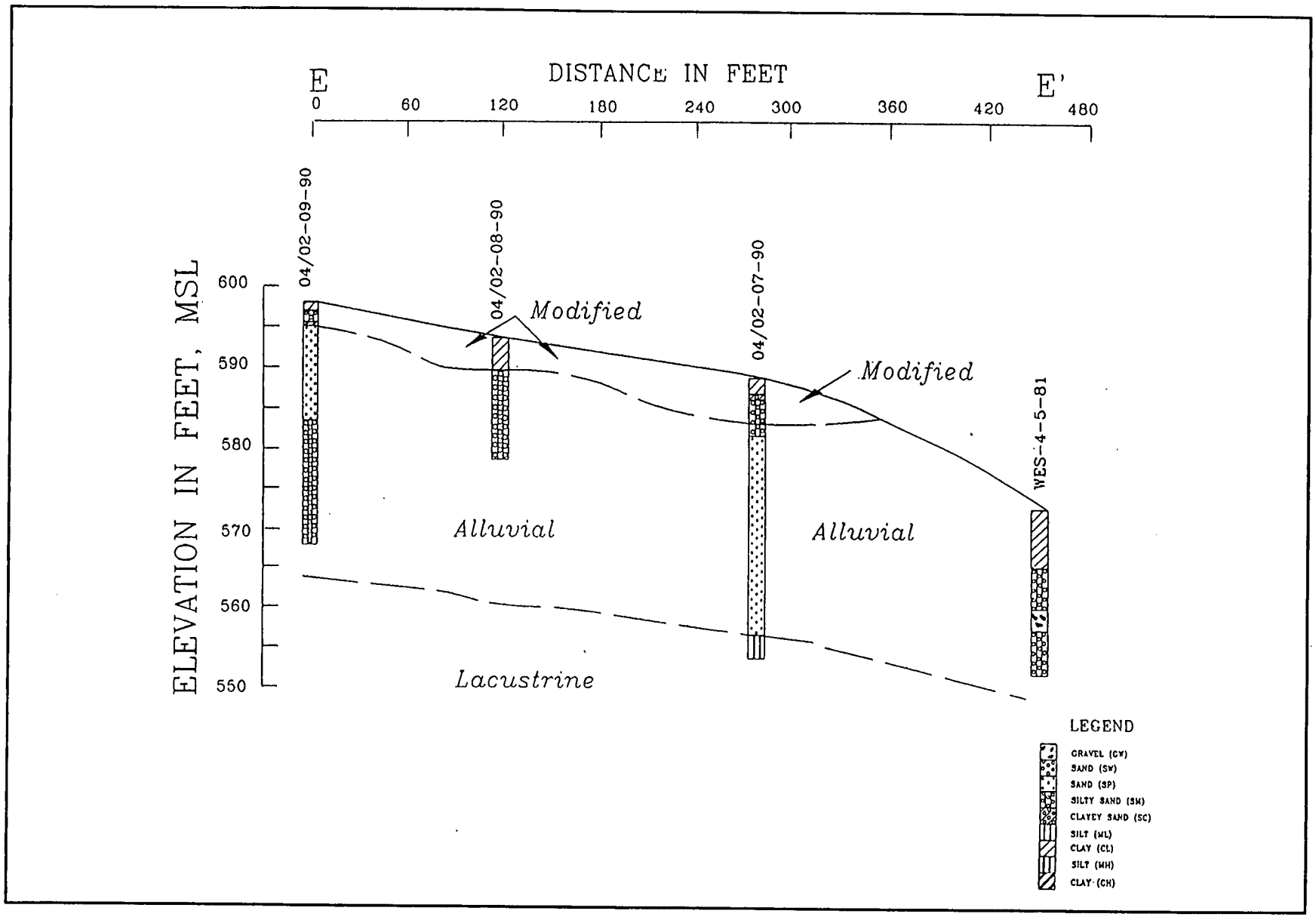


Figure 14. Crane NSWC, McComish Gorge site geologic cross section E-E'

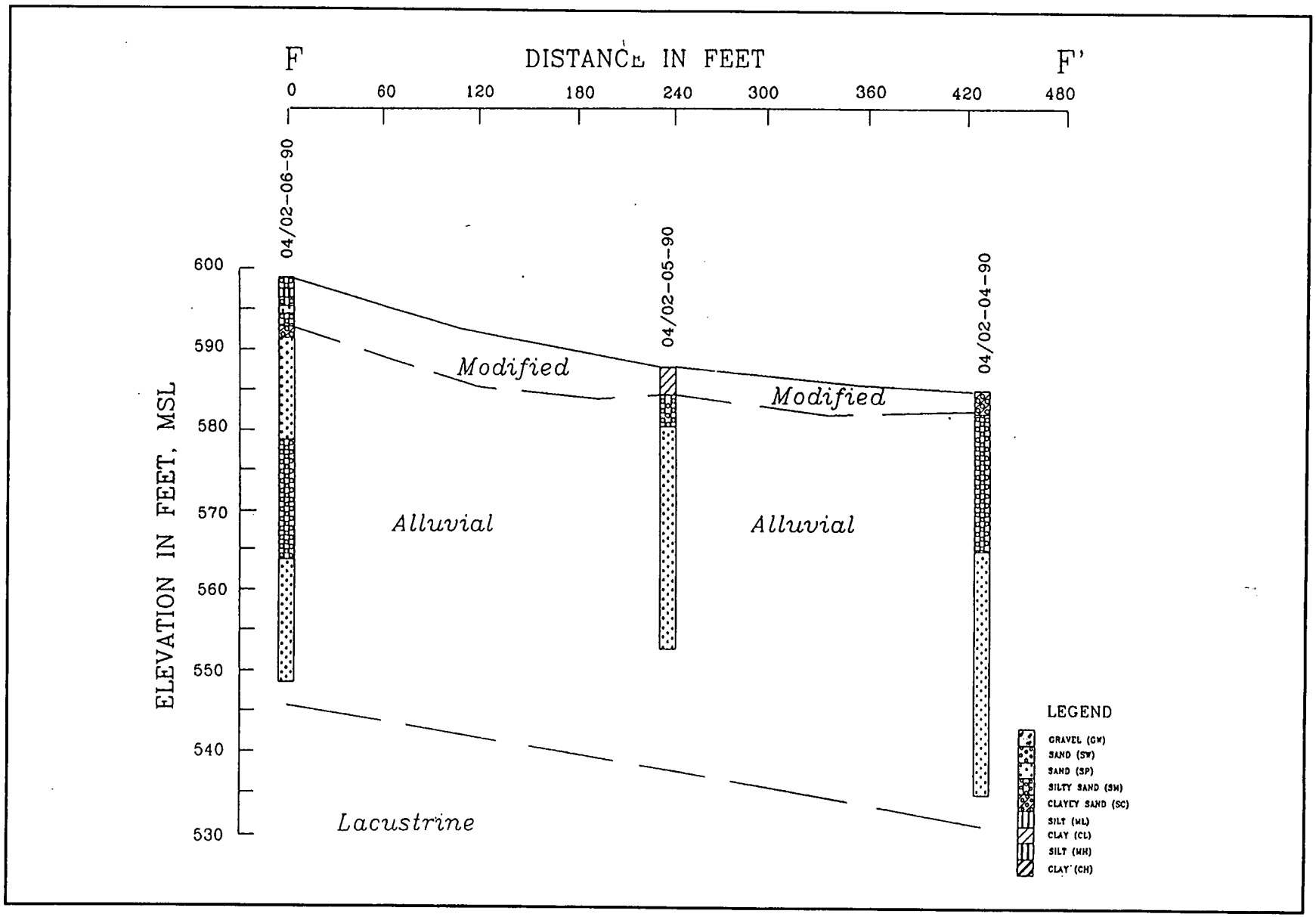


Figure 15. Crane NSWC, McComish Gorge site geologic cross section F-F'

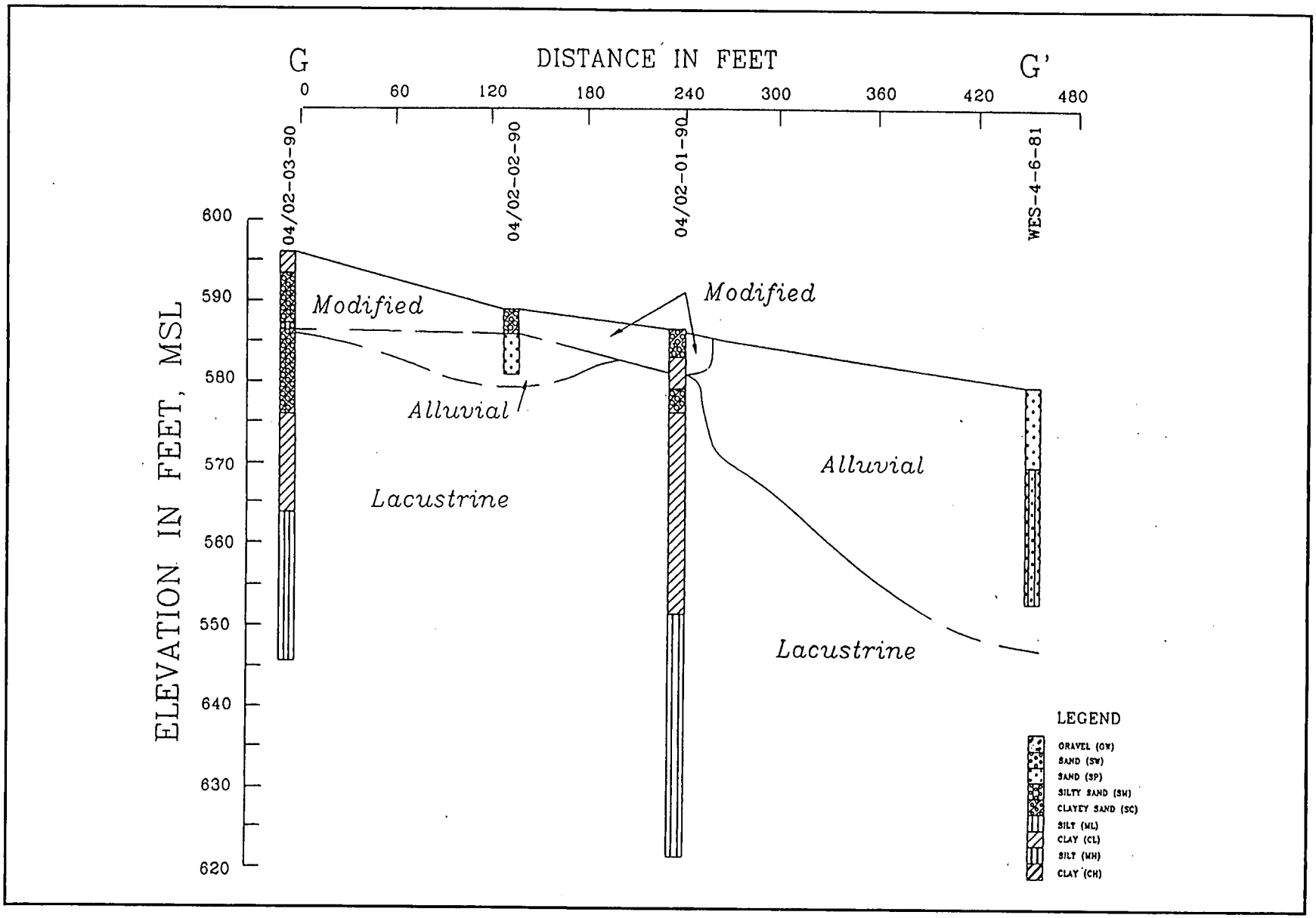


Figure 16. Crane NSWC, McComish Gorge site geologic cross section G-G'

Site Soil Characterization

The soil samples from the auger borings were classified in the field according to the USCS. Selected soil samples were analyzed later in the laboratory. Soil is defined as unconsolidated material. The soil types which compose the MG site are clay (CL), silt (ML and MH), and sand (SC, SM, and SP).

The soil thickness of the MG site ranges from 0 to 65 ft. The total soil thickness was not characterized because none of the borings penetrated the total soil sequence. Therefore, an undifferentiated soil thickness map was not constructed for this report. The soil data did not generate isochore (equal soil-type thickness) maps based on soil sample thickness penetrated by borings samples. The contouring utilized a minimum curvature algorithm which produced a linear trend reflecting the alluvial deposition. A surface clay and silt map was prepared by contouring known clay and silt thickness determined by the borings. The clay and silt map was used for preliminary comparison and is not presented in this report. A net sand map (Figure 17) was prepared to display the thickness of total known sand encountered by the borings. Each isochore map is limited by incomplete soil data. Nevertheless, the predominant soil type and depositional environment are suggested. For example, the thinner sands (thicker clay and silt) reflect areas where the lacustrine deposits were penetrated by the borings. The predominant portion of the clays and silts was formed as lacustrine deposits. The thickest sand shown in Figure 18 corresponds to an interpreted alluvial outwash channel. These sands (SM, SC, and SP) are interpreted as alluvial (outwash) sands on geologic sections (Figures 10, 11, 12, 13, 14, 15, and 16).

An anthropogenic soil unit is depicted on the geologic cross sections as "modified." Anthropogenic refers to soils which have been modified by human activity associated with, in this case, disposal activity. The modified soil consists of lacustrine deposits and alluvium containing cultural debris. Examination of Boring Logs 04/02-1, -2, -5, -6, -7, -8, -9, and -10 (Appendix B) shows soil containing debris such as plastic, rubber, metal, and wood. In addition, the above mentioned boring logs make note of black seams, white seams and rust stains. A preliminary examination shown in Figure 18 presents a depth of modified soil containing debris and/or stains. The contouring utilizes the inverse distance algorithm which tends to cluster and close the data contours. The closure of data realistically represents the deposition of debris in episodes of dumping. The above physical evidence should be correlated with the chemical analysis to describe the area of potential contamination. An initial review of the chemical data reveals high concentrations of barium in samples from Borings 04/02-1A-90 and 04/02-02-90. Boring 04/02-1A-90 also contained 133 ppm lead and 71 ppm 24DNT. Correlation of the modified soil (Figure 18) with high concentrations of barium (Ba), lead (Pb), and 24DNT is restricted to only one pocket of thick (4 ft) modified soil. The 1990 physical and chemical data expand the limits of debris disposal estimated by Dunbar (1982). Review of the site's history indicates that the modified soil is reworked to a depth of 3 to 4 ft. The modified soil is shown on the cross sections as a continuous unit with dashed lines denoting uncertain limits. The area

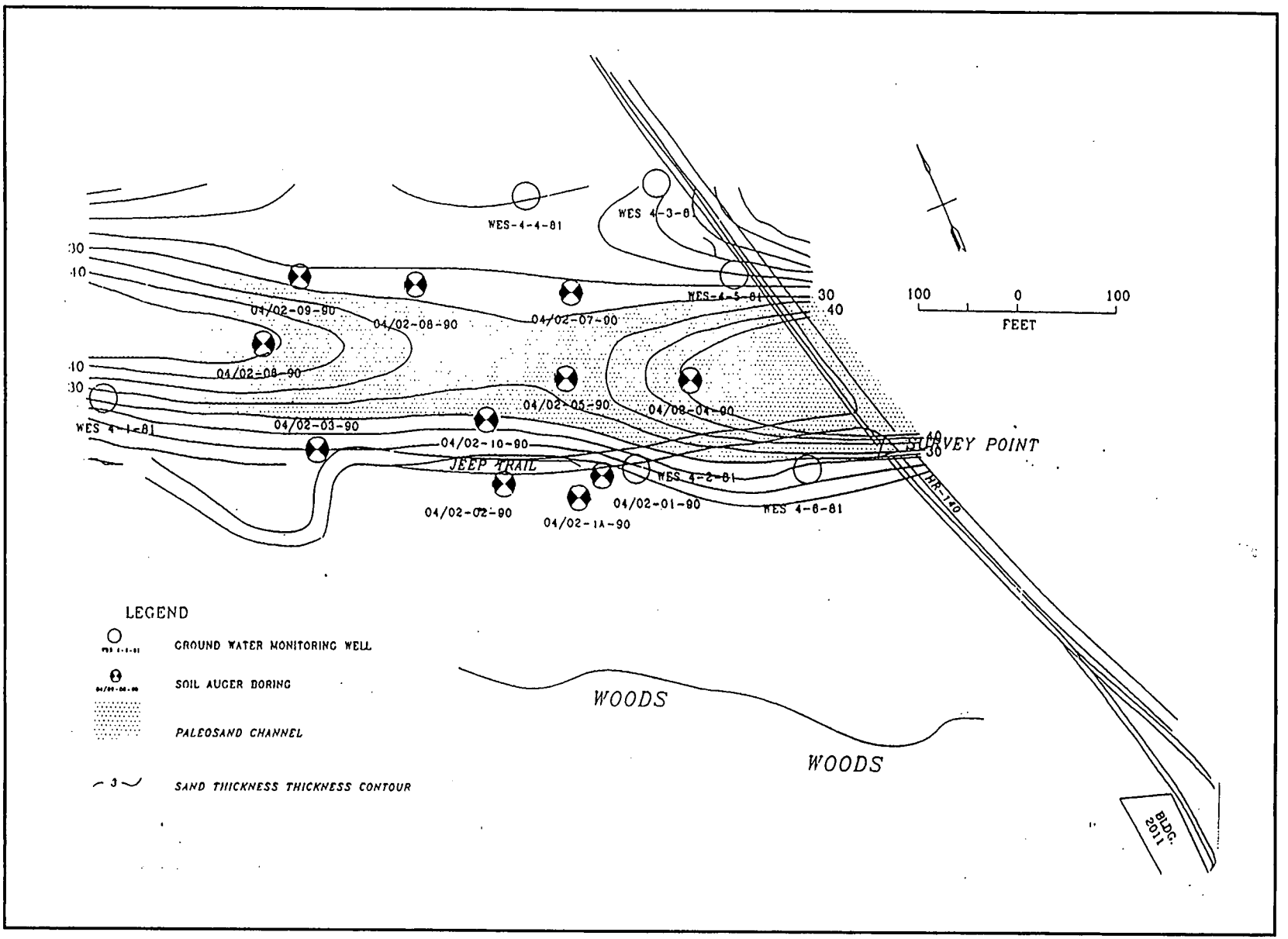


Figure 17. Sand thickness map of Crane NSWC, McComish Gorge site

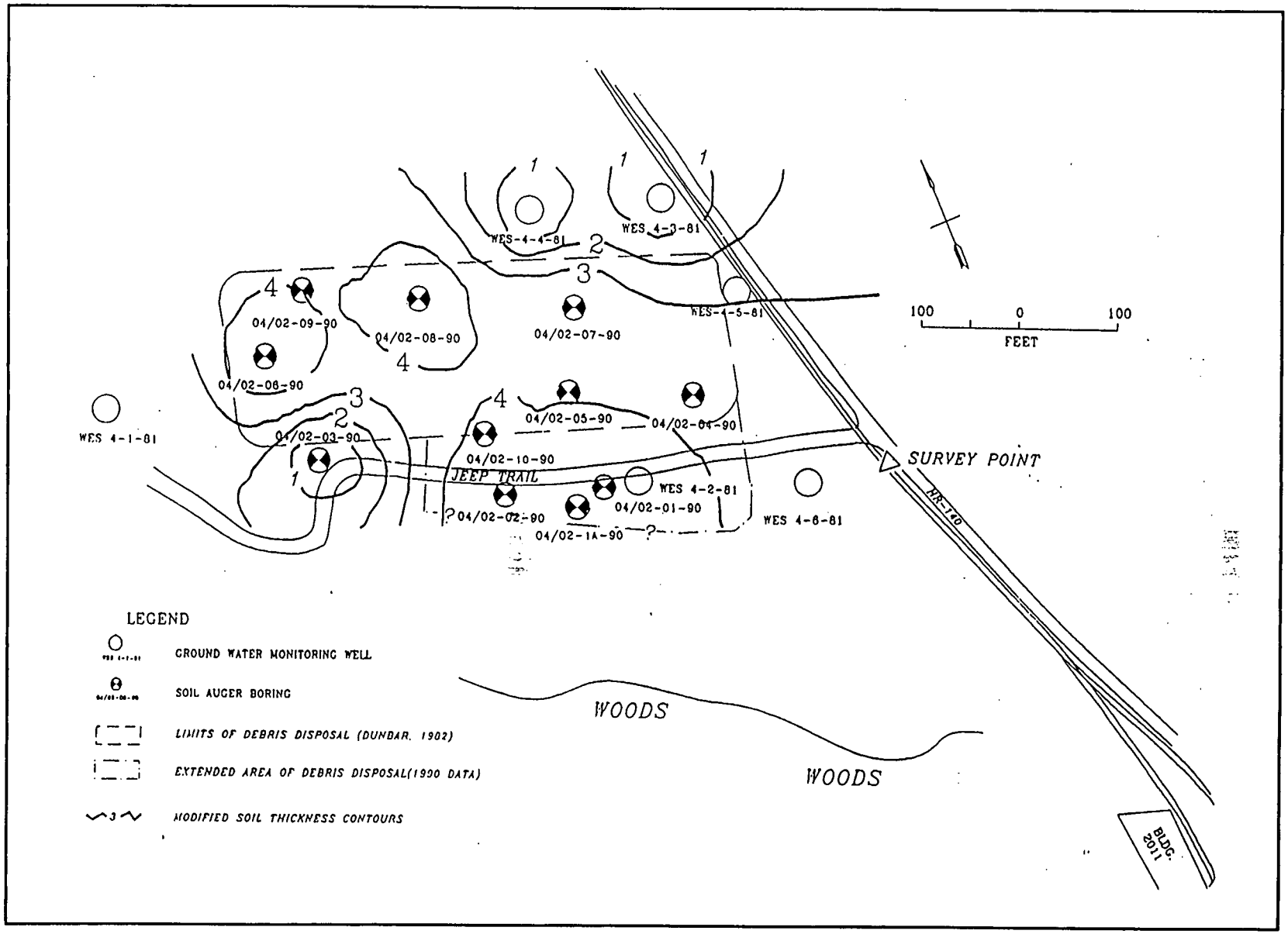


Figure 18. Modified soil thickness map of Crane NSWC, McComish Gorge site

and depth of actual contamination will require additional borings for accurate delineation.

Soil Hydrology

The soil auger borings were left open prior to grouting to measure water levels. Groundwater was encountered at shallow depths (3 to 10 ft) during drilling. The groundwater during the drilling in October 1990 ranged from elevation 592 to 577 ft, msl. Previous investigations (Dunbar 1982) found the groundwater elevations ranged from 573 to 563 ft, msl. Dunbar 1982 presents laboratory permeabilities of the order of 4×10^{-5} cm/sec for a silty sand (SM) sample. During periods of infiltration, the soil acts as a slow conduit for groundwater and any contaminants. Figure 17 indicates the areas of thin sand (thick clay and silts) which would tend to prevent contamination seeping into the groundwater regime. Inversely, the area of thickest sands shown on Figure 17 would act as a conduit for groundwater flow. The SP and SW sands which form the paleochannel (Figure 13) probably have permeabilities of the order of 2×10^{-2} to 5×10^{-3} cm/sec (Freeze and Cherry 1979).

Therefore, based on the available evidence, groundwater moves through the clays and silts very slowly by downward vertical infiltration, then laterally along the soil/rock interface until it reaches fractured rock and enters the rock aquifer system. However, in the paleochannel sand area groundwater moves laterally through the sand body. Understanding the presence and orientation of this sand body is important in monitoring the MG site.

5 Chemical Analytical Results

Introduction

The objective of the soils sampling program was to determine if contaminants associated with waste disposal activities were released to soils within the boundaries of the MG. A release is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (definition set forth in 40 CFR 302.3).

Soil samples were taken at the MG site between 22 October and 6 November 1990. Figure 6 shows the location of the borings. The depth from which each soil sample was taken is indicated in Figure 7. Soil sample locations were selected on the basis of site features and the results of previous investigations (See paragraph "Previous Investigations"). Soil sample locations were selected with a bias toward areas having the greatest probability of contamination resulting from waste disposal activities at the MG site. Borings 1, 1A, 2, and 3 were selected to be "background" borings. These borings were located several hundred feet to the south of the debris disposal area and up-slope from the waste disposal facilities. Soils from Borings 1, 1A, 2, and 3 were sampled to identify characteristics of soils in the vicinity of the disposal area as if no waste disposal activities had occurred at those facilities, but all other influences on soil characteristics had taken place. Borings 4 through 10 were taken from within the debris disposal area. These samples were taken to provide characteristics of the residues left by the waste disposal. Statistical analysis of the two areas (background and dump) showed that the area thought to be the background area was in fact a dump area also. Therefore, another background area was selected. The area selected was the Old Burn Pit (OBP) (SWMU 05/03) Borings 1, 2, and 3. The OBP background was then used to test against all borings at MG. Groundwater data from monitoring wells (Figure 6) located around the perimeter of the disposal area should show if contaminants are being released from the solid waste management unit.

To assist in data interpretation and determine sources of error, the results of the analyses of method blanks and equipment rinses are given. Method blanks are determined by following the analytical procedure step by step including all of the reagents and solvents, in the quantity required by the analytical method. Method blanks are a measure of cumulative interferences from the laboratory or the analytical method. Equipment rinses are samples obtained by running analyte-free water over/through sample equipment after it has been cleaned.

Analyses of equipment rinses are used to evaluate equipment cleaning procedures and determine if sampling equipment contributed to cross contamination of field samples.

To ensure validity of the chemical data obtained, a chemical data quality control program was followed during the MG soil sampling and subsequent laboratory analyses. Quality Control Level "C" as explained in the Naval Energy Environmental Support Activity (NEESA) guidance 20.2-047b "Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program" was followed. In summary, the NEESA Quality Control Level C Plan requires the use of U.S. Environmental Protection Agency (EPA) approved methods when available, a duplication of at least 10 percent of the samples, the collection and analysis of equipment rinse blanks (samples of final equipment rinses) on a daily basis, the collection and analysis of field blanks (samples of water used in decontamination and steam cleaning), and the use of trip blanks with all samples specified for volatile organic analyses. The intent of the plan is to ensure that sources of extraneous contamination can be determined and that decisions made using the data are meaningful and supported. The Chemical Analytical Data Validation Report, which summarizes the chemical data quality control program results, is included in Appendix D.

Because inorganic analytes are naturally occurring crustal elements, the identification of soil contaminants which are also naturally occurring soil constituents required statistical comparisons between background or "uncontaminated" soil concentrations and those of the test soil. The use of whole boring or soil column mean constituent concentrations provided a method, using available data, to identify constituent concentrations which may represent possible soil contamination. The statistical comparisons required the computation of a mean and variance. In order to have a sufficient number of samples for these computations ($n > 3$), all samples from a particular boring were used. As only one sample was taken from each specified elevation within the boring, statistical comparisons of mean constituent concentrations between specific soil boring sample elevations were not possible. Mean concentrations of inorganic constituents from test borings were compared to those of background borings using a one tailed t-test with $p = 0.05$. Means were computed from all samples from a specific boring; however, background means were computed using all samples taken from the Old Burn Pit (OBP), Borings 1, 2, and 3. Assumptions were made that both means were obtained from random samples and that both means were obtained from normal populations. The first hypothesis tested with an F test was if the variance of the two means being compared were equal or alternately not equal. Based on the results of the first tests of hypotheses, a common population variance was or was not computed and appropriate degrees of freedom computed. Subsequently, a second hypothesis tested with a t test, was if the test and background mean constituent concentrations were equal or alternately if the test mean was greater than the background mean.

The specific information obtained from each sample is presented and qualitative observations are made from that data. Statistical comparisons of constituent concentrations between specific soil boring elevations or between samples in the same boring were not possible because only one sample was taken from

each specified elevation. While the specific soil samples were taken from the same elevation in the boring, that elevation may not correspond to the same soil strata from one boring location to the next. Thus comparison of a specific sample from boring to boring may not be relevant.

Discussion

Metals

The results of selected metals analyses of MG soils sampled by boring are given in F1 and F2 (Appendix F). Analyte concentrations in the soils are given as mg/kg (ppm) on a dry weight basis. The contract required detection limit is provided (following the < symbol) where specific metals in the soils were not detected. These results are used to derive the statistical parameters shown on F3 through F5 (Appendix F).

The results for specific inorganic constituents are also given graphically in G1 through G8 (Appendix G). These bar charts provide constituent concentrations for each sample taken from a boring. The bars are oriented from shallowest sample in the boring, on the left, to deepest sample in the boring, on the right. Graphs are not provided for those analytes whose concentrations were below the Analytical Detection Limit.

Statistical analysis was used to determine three separate situations: can the MG data be divided into two populations of results; is the OBP background data a distinct data set; what inorganic parameters constitute soil contamination resulting from the MG operations. To assist in determining the characteristics of the MG data, the borings were divided into two sets 1, 1A, 2, and 3, the background set, and Borings 4 through 10, the dump area set. The resultant statistical parameters (mean, standard deviation, maximum, minimum, and population size) are shown in F3 and F4 (Appendix F). In F5 (Appendix F), those previously described sets of statistical parameters simplified by deriving the averaged analyte concentrations by considering all soil samples from all borings in that set as one population. Comparisons of the resultant less restricted data with comparable data from the OBP area is shown in F6 and F7 Appendix F.

As stated previously, surface soil samples from an area to the south of the MG dump site were selected to be "background" samples. They were located along a jeep trail approximately 150 ft outside of the dump site. The area was perceived to be outside of the operational area of the dump, and the topography of the background site indicated that these boring locations likely did not receive surface water discharges from the MG dump area. This presumption proved to be incorrect. As indicated in F3 throuh F5 (Appendix F), the mean analyte concentrations for soil boring samples from the areas selected as background areas exhibited metal concentration determined to be the maximum concentration levels tested at the site. It was determined that the sites selected as background sites were affected by the dumping operations and not good candidates for consideration as background samples.

All statistical comparative studies completed using the MG inorganic analytical data used the background data from the OBP (SWMU 05/03) as the comparative data baseline concentrations. The OBP site data were used as a substitute background data set for the following reasons: the site is located near the MG site; the soil materials at both sites were derived from common source materials; the sites have a comparable geologic history; and because both sites are located in the same vicinity it is proper to assume that the natural forces affecting the soils at one site have affected the soils at the other site in a relatively similar way. The inorganic concentration means for the OBP background borings were, with the exception of aluminum, cobalt, lead, and magnesium means, less than any of the mean concentrations found at the MG site. All of the concentration means determined for the OBP background samples were less than the concentrations determined for the MG background soils. The assumption was made that OBP background area soils are characteristic of soils in the vicinity of MG as if no waste disposal activities had occurred at this facility, but all other influences on soil characteristics had taken place.

Comparison of the metals analyses from MG subsurface soils indicate that with the exception of aluminum, antimony, arsenic, and barium (4 of a possible 13) the maximum metals concentrations were found in the deeper interval soil samples. Additionally, with the exceptions of antimony, arsenic, beryllium, chromium, lead, sodium, selenium, and thallium, the maximum metals concentrations were found in soil samples from Borings 1 through 3. Specifically for Borings 1 through 3, the mean concentrations for the analytes arsenic, copper, and iron were significantly greater than the mean concentrations for the corresponding analytes at the OBP. The same was true for Borings 4 through 10 for the analytes arsenic, beryllium, and chromium. At the MG site, assumptions concerning the dump area as the only source for metal contamination and the area to the south of the dump site, the jeep trail, being free of wastes were not supported by the inorganic analytical data.

As stated above, the results of the chemical analysis would seem to indicate the possibility that the area selected to be the "background" area may at some time in past years have been a disposal area also.

G8 through G19 (Appendix G) illustrate bar graph comparisons of metals for the Background Data Set mean (Borings 1, 2, and 3 OBP) and all borings at MG showing both samples. G20 through G35 (Appendix G) show the background data set mean and the mean of the MG individual borings with the average of Samples 1 and 2.

In summary, comparisons of metal constituent concentrations in background soils and sampled subsurface soils (test borings) indicated that releases of arsenic, beryllium, chromium, copper, and iron may have occurred.

All the tested metal analytes occur naturally in soils. Another possible explanation of the differences in inorganic chemical characteristics between background and test soils could be due to natural variability in the soils and not a function of anthropogenic activities. Additional data are required to determine the validity of the background site data and assess the natural variability of the MG soils.

Method blanks. The results of analysis of method blanks used in association with the metals analyses of MG soils are provided in F8 (Appendix F). The concentration of constituents in the method blanks were always more than 100 times less than the concentrations determined for the soil samples. These method blank analyses do not change the interpretation of inorganic constituent data previously presented.

Equipment rinses. Metal analytes were found in all equipment rinses analyzed (F9, Appendix F). However, the concentrations of inorganic constituents in the rinses were not great enough to change the interpretation of data as previously discussed.

Volatile organics (EPA Method 8240)

The results of analyses of MG soils for volatile organic compounds (EPA Method 8240 in *Test Methods for Evaluating Organic and Inorganic Waste, Physical/Chemical Methods SW-846,* Third Edition) are given in F10 and F11 (Appendix F). Methylene chloride and acetone were found in all soil samples and all of the rinse samples taken. These constituents were also found in the associated method blanks F12 (Appendix F). The reported concentrations of Acetone in all but four of the samples, were "J" values detected by the analytical instrumentation but not in sufficient amounts to statistically quantify. These concentrations are estimated. The only volatile organic compounds detected in the soil samples from the MG were determined to be laboratory contaminants.

Method blanks. Acetone and methylene chloride were reported in the method blanks for the volatile organic analyses F12 (Appendix F) and indicate a laboratory contamination source for these constituents. The volatile organic compounds 1,1,2,2-tetrachloroethane was also found in some method blanks. 1,1,2,2-tetrachloroethane was not found in any of the soil samples. These method blank analysis results were considered in the interpretation of the volatile organic soils analyses.

Equipment rinses. Acetone and methylene chloride were reported in most of the sampling equipment rinses F13 (Appendix F). As acetone and methylene chloride were detected in the method blank associated with the analyses of these rinses, these constituents are believed to be laboratory contaminants. Chloroform was detected in a few equipment rinses. This volatile organic compound may have been derived from the initial washing with potable water. Chloroform was not detected in any of the MG soil samples. In addition to chloroform, 2-butanone and 2 hexanone were found in equipment rinses but at concentrations which were below quantitation limits ("J" values). With the exception of methylene chloride and acetone, the organic volatile compounds detected in the rinse samples were not found in the soil samples. The results of analyses of equipment rinses for volatile organic compounds indicate that cross contamination of samples or equipment contamination did not occur and was not a factor in the results obtained from the analyses of MG soils for semivolatile organic compounds.

Semivolatile organics (EPA Method 8270)

The results of analyses of MG soils for semivolatile organic compounds (EPA Method 8270 in *Test Methods for Evaluating Organic and Inorganic Waste, Physical/Chemical Methods SW-846*, Third Edition) are given in F14 through F17 (Appendix F) and summarized in F18 (Appendix F). Dibutyphthalate, diethyl phthalate and bis(2-ethylhexyl)phthalate were found in most of the soil samples taken. The results also indicate that these constituents were frequently found in the associated method blanks as well as the sample F19 and F20 (Appendix F). Thus, dibutyphthalate, diethyl phthalate and bis(2-ethylhexyl)phthalate are likely sample contaminants from the laboratory environment rather than contaminants associated with the waste disposal activities.

Di-n-octylphthalate was detected in soil samples from several borings (Borings 3, 6, 7, and 9), a method blank, and two rinse samples (rinse samples (6, 7, 9, 10) and (5,7)). The concentrations detected in the soil samples were higher than the concentrations of the same compound found in the method blanks and rinse samples. The evidence is not conclusive but it indicates that a release of di-n-octylphthalate to the soils has occurred.

In addition to the phthalates, soil sample 1A contained semivolitile compounds 2,6-dinitrotoluene, 2,4-dinitrotoluene, and n-nitrosodiphenylamine. The concentrations of 2,6-dinitrotoluene and n-nitrosodiphenylamine were estimated values below the instrument detection limits. ("J" values). A significant amount 2,4-DNT was found.

In summary, a release of semivolatile organic compounds produced by waste disposal activities at the MG site is evident (2,4-dinitrotoluene, 2,6-dinitrotoluene, n-nitrosodiphenylamine, and di-n-octylphthalate was detected in soils from the MG site and they may represent a release of semivolatile organic compounds). With the exception of concentrations of 2,4-dinitrotoluene in soils from Boring 1A, all other semivolatile organic compounds were found in concentrations that were detected by the analytical instrumentation but not in sufficient amounts to statistically quantify.

F18 provides a list of tentatively identified semivolatile organic compounds detected in MG soil samples. A release of tentatively identified semivolatile organic compounds may have occurred at the MG site.

Method blanks. As discussed previously, method blanks analyzed for semivolatile organic compounds contained dibutylphthalate and bis(2-ethylhexyl) phthalate at estimated concentrations below the instrument detection limits ("J" Values) F19 and F20 (Appendix F). Other phthalates were found in method blanks associated with analyses of soils from Borings 1A, 2, and 3. These method blank analysis results were considered in the interpretation of the semivolatile organic soils analyses.

Equipment rinses. Analyses of equipment rinses for semivolatile organics detected several phathalates including dibutylphthalate, bis(2-ethylhexyl) phthalate, and di-n-octylphthalate F21 and F22 (Appendix F). Also, 1,4-dichlorobenzene was found in rinses for Borings 1 and 2. The concentrations

of these analytes found were in amounts that were detected by the analytical instrumentation but not in sufficient amounts to statistically quantify.

The results of analyses of equipment rinses for semivolatile organic compounds indicate that cross contamination of samples or equipment contamination did not occur and was not a factor in the results obtained from the analyses of MG soils for semivolatile organic compounds.

Explosives

The results of High Pressure Liquid Chromatography (HPLC) analyses of MG soils for selected explosive compounds are given in F23 (Appendix F). The only detectable amount of explosive compound found in soil samples from the MG site were from Boring 1A. An amount of 2,4-dinitrotoluene that was below the quantitation limit was detected. Soil samples taken from borings in the test area were free from detectable amounts of explosive compounds.

The results of the HPLC method analysis for explosive compounds conflicted with analytical results derived from the EPA 8270 GC method analysis. The GC results are reported on F14 through F18 and discussed in paragraph "Semivolatile Organics" (EPA Method 8270). This discrepancy is fully examined and explained in the corrective actions report (Figure 19) which is associated with the sample 04/02-1A-90-2. The discrepancy occurred when the sample taken for the GC analysis was taken from a separate soil sample than was the soil sample used for the HPLC analysis. The soil samples were taken from the same stratigraphic horizon and represent the same soil zone, however, these soils are not completely homogeneous. The variation in the soil's homogeneity resulted in the analytical discrepancy. The corrective action required that the analysis be repeated. The sample from which the semivolatile soil sample was taken contained a metal fragment. The soil sample used in the analysis was preferentially selected from soil in contact with that fragment. The soil analysis confirmed the presence of explosive compound residues. 2,4-DNT, and 2,6-DNT were found in the soils taken from the boring 04/02-1A-90.

Method blanks. No explosive compounds tested were detected in the method blanks analyzed in association with the MG soils analyses F24 (Appendix F). These method blanks analyses do not change the interpretation of explosive compound data previously presented.

Equipment rinses. No explosive compounds tested were detected in equipment rinses F24 (Appendix F). Therefore contamination of field samples by the sample equipment is not evident.

ALG QUALITY ASSURANCE CORRECTIVE ACTION FORM

ANALYSIS: Explosives DATE: 11/10/90

ANALYST: Karen Myers INSTRUMENT: HPLC #96

PROBLEM: Discrepancy between results for 2,4-DNT from HPLC Analysis & GC/MS analysis. HPLC < 1 ppm, GC/MS ~65 ppm prior to conversion to mg/kg.

SAMPLE NUMBER(S) AFFECTED: 7983 & 7991

RECOMMENDED CORRECTIVE ACTION: Recheck & rerun 7983 on HPLC. Reextract 7983 from soil; extract 7991 for HPLC Analysis

CORRECTIVE ACTION TAKEN BY ANALYST: all of above.

COMMENTS: Field sample 04/02-1A-90 #2 10/25/90 was delivered to ALG in 2 jars. They were not combined. Metals & explosives were assigned 1 jar (7983); BNA's the other. A large fragment of metal was removed from the BNA jar (7991). The BNA sample appeared to have been taken from soil in direct contact with this fragment. (over)

DATE CORRECTIVE ACTION TAKEN: 11/10/90

REVIEWED BY: [signature]

Figure 19. Corrective action report

In sampling 7991 for HPLC, soil in close proximity to the metal fragment was taken (A). And soil deeper in the jar (B) was taken. The fragment itself was soaked in acetunitrile. (C)
Two additional samplings of 7983 (D+E) were taken.

Results for HPLC:

A 7991 = 11.1 mg/kg

B 7991 = .810

C 7991 metal = .040 ppm

D 7983 = .204

E 7983 D = .129

Figure 19. (Concluded)

Pesticides, herbicides, and PCB (EPA Methods 8080, 8140, and 8150)

The results of analyses of the MG soils for selected pesticide, herbicide, and PCB compounds are given in F25 and F26 (Appendix F). Some pesticides and herbicides were found in all soils, but were found in concentrations that were detected by the analytical instrumentation but not in sufficient amounts to statistically quantify. Diazinon was the only pesticide found in the soil samples but not detected in the blank or rinse samples. 2,4-D was the only herbicide found in the soil samples but not detected in the blank or rinse samples. Diazinon and 2,4-D were found in only one boring, Boring 5 Sample 2 and Boring 6 Sample 2 respectively. No PCBs were detected in any of the MG soils.

Method blanks. Method blanks analyzed for pesticides, herbicides and PCBs contained heptachlor, endosulfan sulfate, B-BHC, D-BHC, methoxychlor, PPDDT, PPDDD, PPDDE, a-chlordane, g-chlordane, endrin aldehyde and endrin at estimated concentrations below the instrument detection limits (below quantitation limits- "J" values) F27 (Appendix F). These method blank analysis results were considered in the interpretation of the soils analyses for pesticides, herbicides, and PCB.

Equipment rinses. Equipment rinses made after sampling at borings were analyzed for pesticides, herbicides, and PCB and the results are given in F28 through 29 (Appendix F). Dieldrin, a-Chlordane, Heptachlor, A-Endosulfan and PPDDT were detected in low concentrations (below quantitation limits - "J" values) in the rinses. However, these analytes were also found in associated method blanks. Therefore, they are believed to be laboratory artifacts and not rinse contaminants.

Summary

Metals and inorganics. The soils analyses conducted indicate that waste disposal activities at McComish Gorge have released residues of arsenic, beryllium, chromium, copper and iron to soils at MG. However further study is needed due the situation with the MG "background" borings showing that in fact, this area may at one time have been a dump area also.

Volatile organics. Several volatile organic compounds (as determined by EPA Method 8240) were found in the MG soils sampled. The concentrations found were generally just above detection limits or estimated concentrations that were below the quantitation limits for the analyses. A clear pattern of contamination (release) of MG soils with volatile organic compounds, which can be attributed to waste disposal activities in that area, is not evident.

Semivolatile organics. Soil samples from borings taken at the site contained semivolatile organic compounds. Therefore, a release of semivolatile organic compounds at the MG is evident. With the exception of concentrations of 2,4,-dinitrotoluene in soils from Boring 1A No. 2, all other semivolatile

organic compounds were found in concentrations that were detected by the analytical instrumentation but not in sufficient amounts to statistically quantify.

Explosive compounds. A release of explosive residue compounds has occurred as a result of the waste disposal activities. The full extent of the contamination can not be determined from the data. One soil sample taken from Boring 1A contained detectable amounts of explosive reside compounds. This soil sample was taken from an interval of modified soil which was described as having layers of black sand seams. No concentrations of explosive residue compounds was determined in any other soil sample.

Pesticides, herbicides, and PCB. Pesticides and herbicides were found in concentrations that were detected by the analytical instrumentation but not in sufficient amounts to statistically quantify. No PCB were detected in any of the MG soils. Based on the soil analyses performed, no releases of pesticides and herbicides have occurred in the MG area.

6 Conclusions

The MG dump site was used for an unknown period of time between 1942 to 1972. Records of its use are indefinite. Undefined amounts and types of garbage and trash were buried at the site. This rubbish may include wood, paper, construction material, plaster filled warheads, metal shavings, and industrial wastes. Reportedly small arms ammunition was buried here. Today the site is not used and it has revegetated.

The objectives of this study were to (a) describe the soil conditions around the site, and (b) to identify and characterize the operation residuals. To accomplish those goals, 11 auger borings were drilled in 1990. Soil samples were collected at discrete intervals. The physical character of the soils was described. Soils were classified according to the USCS. Particle size gradation and natural water content were determined. To determine the chemical character of the soils and to test for the presence of chemical waste residues, soil samples were taken at defined intervals from the borings. The soil samples were analyzed for the presence of volatiles, semivolatiles, pesticides, herbicides, PCBs, and inorganic compounds. All analytical methods used were EPA SW-846 analytical methods, with the exception of explosive analysis and total phosphorous analysis. Standard U.S. Army analytical methods were used to determine explosive and total phosphorous concentrations in the soils. Soil samples taken from borings located away from the operational areas were used to establish background conditions. The QC level selected for this study was a NEESA QC Level "C."

The site hydrogeologic setting was investigated. Soil descriptions were drawn from 11 auger borings drilled in 1990, 6 groundwater monitoring wells drilled in 1981 and a replacement well in 1986, field observations, and physical soil test data. Differences between soil and unconsolidated earth materials of Tertiary Age were not made. All unconsolidated earth materials were considered soils. Soils across the site ranged from 0 to over 60 in. thickness. Soil types included clays (CL), silts (ML and MH), and sands (SC, SM, and SP). A unit of modified soil, soils containing plastic, rubber, metal and wood wastes, was found in Borings 1, 2, 5, 6, 7, 8, 9, and 10. A linear, sandy zone of soil was interpreted to represent a paleostream channel deposit. Tests to measure permeabilities of the soil material were run on silty sand soil samples from the MG site. Permeabilities on the order of 4×10^{-5} cm/sec were measured. The permeabilities of the sandy zones within the described channel were not tested. It is reasonable to presume that intervals within the

paleochannel may display permeabilities 3 to 5 orders of magnitude greater then those previously measured. In all of the 1990 borings, groundwater was encountered at shallow depths (3 to 10 ft below the ground surface). Available evidence indicates that groundwater moves by downward vertical infiltration through the clays and silts of the site very slowly. When rock is encountered, groundwater would then move laterally along the soil/rock interface until it reaches fractured rock and enters the rock aquifer system. In the paleochannel sand rich zones, groundwater would preferentially move laterally through the sand body. Determining the presence and orientation of this sand body is important to the understanding the MG hydrogeologic environment.

The chemical character of the soils was determined using field monitored parameters and laboratory analysis. All HNU readings, taken in the field and used to detect volatile organics emanating from the soil boring holes, were zero. The area presumed to be contaminant free, the background area, was found to have been affected by the dumping operations at the site. For statistical comparative purposes, the background data derived from the OBP (SWMU No. 05/03) area were used as background data at this site. Analysis of inorganic compounds indicated that releases of arsenic, beryllium, chromium, copper, and iron may have occurred. The only volatile organic compounds detected in the soil samples were determined to be laboratory contaminants. The semivolatile organic compounds 2,4-dinitrotoluene, 2,6-dinitrotoluene, n-nitrosodiphenylamine, and di-n-octylphthalate were detected in soils from the MG. They may represent a release of semivolatile organic compounds. With the exception of concentrations of 2,4,-dinitrotoluene in soils from Boring 1A, all other semivolatile organic compounds were found in "J" level concentrations. Explosive compounds 2,4-DNT and 2,6-DNT were detected in Boring 1A. Some pesticides and herbicides were found in all soils, but were found in "J" level concentrations. Diazinon was the only pesticide found in the soil samples but not detected in the blank or rinse samples. The only herbicide found in the soil samples but not detected in the blank or rinse samples was 2,4-D. No PCB were detected in any of the MG soils.

In summary, McComish Gorge is not considered to be contaminated with volatile organics, pesticide, herbicide, or PCB. A release of inorganics, semivolatile organics, and explosive wastes to the soils of the MG area is likely to have occurred.

7 Recommendations

Based upon the results of the RFI Phase II soils study, a Phase III soils study is recommended.

a. Site specific background data are needed to determine the natural variability of the MG soils.

b. The boundaries of the MG site should be determined. Additional borings will be required to accurately delineate the area and depth of actual contamination.

c. Contamination detected in soil Boring 04/02-1A-90 and 04/02-02-90 should be delimited.

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Appendix A
Compound Names and Abbreviations

Table A-1. EPA method 8240, Volatile compounds, (Test Methods for Evaluating Organic and Inorganic Wastes, Physical/Chemical Methods, SW846, Third Edition, November 1986, with December 1988 revisions). Abbreviations used in report tables along with full analyte names.

ClMETH - Chloromethane
BrMETH - Bromomethane
VnlCl - Vinyl Chloride
ClETHA - Chloroethane
MeCl - Methylene Chloride
11DClETE - 1,1-Dichloroethene
11DClETA - 1,1-Dichloroethane
t-DClETE - Trans-1,2-Dichloroethene
c-DClETE - cis-1,2-Dichloroethene
CHCl3 - Chloroform
12DClETA - 1,2-Dichloroethane
111TCA - 1,1,1-Trichloroethane
CCl4 - Carbon Tetrachloride
BrDClMe - Bromodichloromethane
12DClPR - 1,2-Dichloropropane
t13ClPRE - Trans-1,3-Dichloropropene
TCE - Trichloroethene
DBrClMe - Dibromochloromethane
c13ClPRE - Cis-1,3-Dichloropropene
112TCA - 1,1,2-Trichloroethane
BENZENE - Benzene
CHBR3 - Bromoform
1122TClA - 1,1,2,2,-Tetrachloroethane
TEClETE - Tetrachloroethene
TOLUENE - Toluene
ClBEN - Chlorobenzene
ETBEN - Ethylbenzene
ACETONE - Acetone
BUTANO - 2-Butanone
CS2 - Carbondisulfide
2HEXANO - 2-Hexanone
4Me2PE - 4-Methyl-2-Pentanone
STYRENE - Styrene
VnACETA - Vinyl Acetate
T-XYLENE - T-Xylene

Table A-2. EPA method 8270 semivolatile compounds, (Test Methods for Evaluating Organic and Inorganic Wastes, Physical/Chemical Methods, SW846, Third Edition, November 1986, with December 1988 revisions). Abbreviations used in report tables along with full analyte names.

PHENOL - Phenol
2ClPHEN - 2-Chlorophenol
2NIPHE - 2-Nitrophenol
24DMePHE - 2,4-Dimethylphenol
24DClPHE - 2,4-Dichlorophenol
4C13MePH - 4-Chloro-3-Methylphenol
246TClPH - 2,4,6-Trichlorophenol
24DNPH - 2,4-Dinitrophenol
4NPHE - 4-Nitrophenol
2M46DNPH - 2-Methyl-4,6-Dinotrophenol
PClPHE - Pentachlorophenol
BENZOAC - Benzoic Acid
2MEPHE - 2-Methylphenol
4MEPHE - 4-Methylphenol
245TClPH - 2,4,5-Trichlorophenol
BZLAL - Benzyl Alcohol
NNDMEAM - N-Nitrosodimethylamine
BCliPrE - Bis(2-Chloroisopropyl)Ether
NNDNPAM - N-Nitroso-Di-N-Propylamine
NITROBEN - Nitrobenzene
ISOPHOR - Isophorone
BClEtoME - Bis(2-Chloroethoxy)Methane
26DNTOL - 2,6-Dinitrotoluene
24DNTOL - 2,4-Dinitrotoluene
12DPHYD - 1,2-Diphenylhydrazine
BENZIDI - Benzidine
33DClBEZ - 3,3'Dichlorobenzidine
BClEtE - Bis(2-Chloroethyl)Ether
13DClB - 1,3-Dichlorobenzene
14DCLB - 1,4-Dichlorobenzene
12DClB - 1,2-Dichlorobenzene
HClETA - Hexachloroethane
124TClB - 1,2,4-Trichlorobenzene
NAPHTH - Naphthalene
HClBU - Hexachlorobutadiene
HClCYPD - Hexachlorocyclopentadiene
2ClNAPH - 2-Chloronaphthalene
ACENAY - Acenaphthylene
DMePHTH - Dimethyl Phthalate
ACENAP - Acenaphthene
FLUORE - Fluorene
DEtPHTH - Diethyl Phthalate
4ClPHPHE - 4-Chlorophenyl Phenyl Ether
NNDPHAM - N-Nitrosodiphenyl Amine
4BrPHET - 4-Bromophenyl Ether
HClBEN - Hexachlorobenzene
PHENAN - Phenanthrene
ANTRAC - Anthracene
DBuPHTH - Dibutylphthalate
FLANTHE - Fluoranthene
PYRENE - Pyrene
BuBePHTH - Butylbenzylphthalate
CHRYSE - Chrysene
BAANTHR - Benzo(a)Anthracene
B2EHPH - Bis(2-Ethylhexyl)Phthalate
DNOcPHT - Di-N-Octylphthalate
BBFLANT - Benzo(b)Fluoranthene
BKFLANT - Benzo(k)Fluoranthene
BAPYRE - Benzo(a)Pyrene
I123PYR - Indeno(1,2,3-C,D)Pyrene
B-GHI-PY - Benzo(G,H,I)Perylene
ANILINE - Aniline
4ClANIL - 4-Chloroaniline
DBENZOFU - Dibenzofuran
2MeNAPH - 2-Methylnaphthalene
2NANIL - 2-Nitroaniline
3NANIL - 3-Nitroaniline
4NANIL - 4-Nitroaniline

Table A-3. EPA method 8330. Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC), (Test methods for Evaluating Organic and Inorganic Wastes. Physical/Chemical Methods, SW846, Third Edition, November 1986, with December 1988 revisions). Abbreviations used in report tables along with full analyte names.

Abbrev	Compound
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
TNB	1,3,5-Trinitrobenzene
DNB	1,3-Dinitrobenzene
Tetryl	Methyl-2,4,6-trinitrophenylnitramine
NB	Nitrobenzene
TNT	2,4,6,-Trinitrotoluene
24DNT	2,4-Dinitrotoluene
26DNT	2,6-Dinitrotoluene
2NT	o-Nitrotoluene
3NT	m-Nitrotoluene
4NT	p-Nitrotoluene

Appendix B
Boring Logs

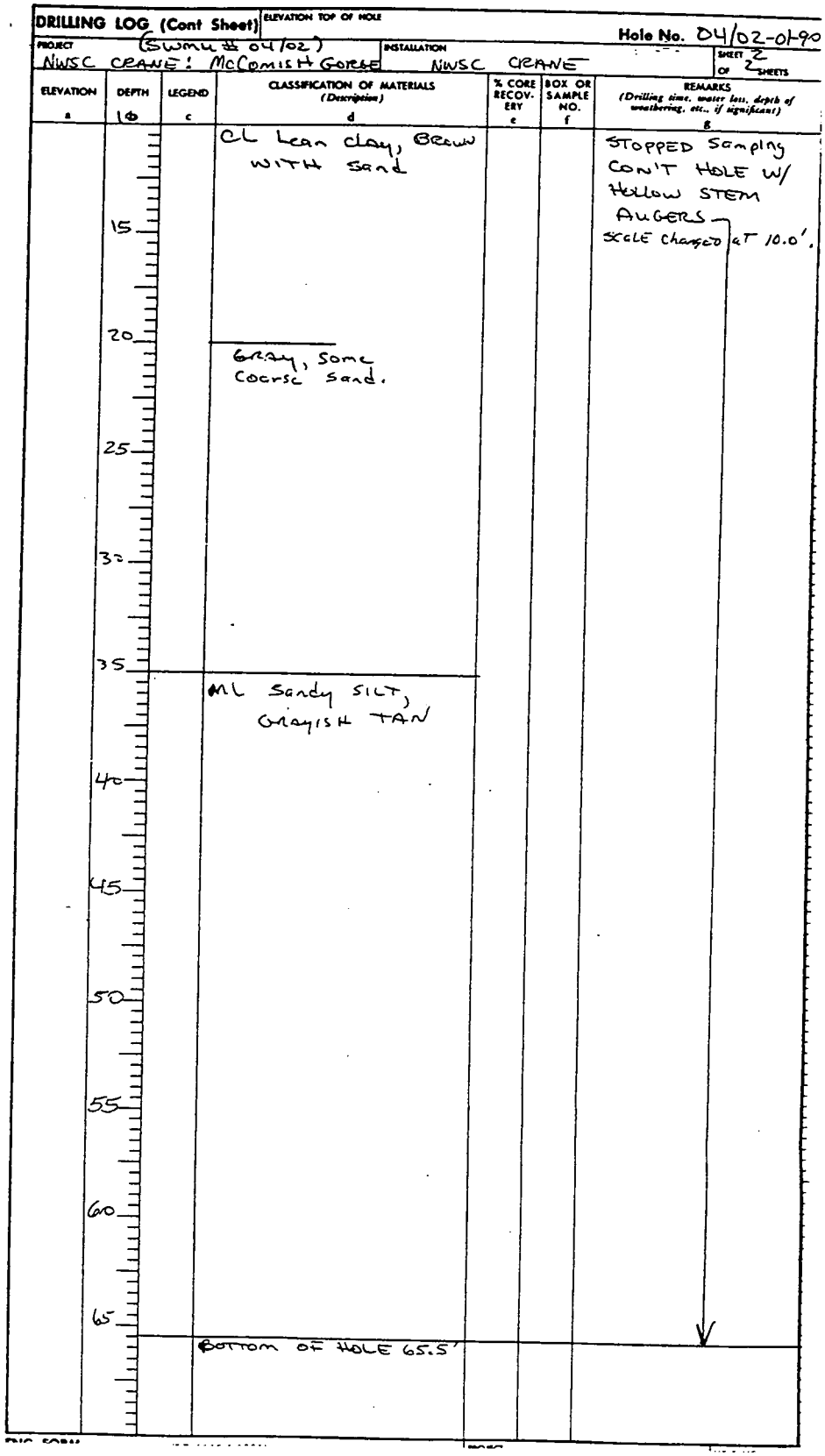
Hole No. 04/02-01-C

DRILLING LOG

DIVISION: NOR DIV (SWMU # 04/02)
INSTALLATION: NWSC CRANE
SHEET 1 OF 2 SHEETS

1. PROJECT: NWSC CRANE : McCOMISH GORGE
2. LOCATION (Coordinates or Station): SEE MAP
3. DRILLING AGENCY: USA COE WES
4. HOLE NO. (As shown on drawing title and file number): 04/02-01-90
5. NAME OF DRILLER: ELASTIC BROWN
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: N/A
9. TOTAL DEPTH OF HOLE: 65.5'
10. SIZE AND TYPE OF BIT: 3" SHELBY TUBE
11. DATUM FOR ELEVATION SHOWN (USGS or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ATL 2; UNDISTURBED SOIL 1
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 10-22-90; COMPLETED 10-23-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Larry Benjamin

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SC Clayey Sand, FINE TO MEDIUM, BROWN, TRACE OF Chert gravel WITH CL Layers.			SAMPLED W/ 3" SHELBY TUBE PUSHED W/ KELLY
					1 / 1V	EXTRUDED SOIL. Skinned samples W/STAINLESS STEEL knifes.
						H-NU Reading @ 1515 = 0
						W.L. During Drilling 8.0'
					1A	24 hrs. 8.7'
			CL Lean Clay WITH some medium grain SIZES, 4.5' TO 5.0' white Seams.			Well WES-01-81 40' EAST FROM 04/02-01-90
						H-NU Reading @ 1530 = 0
					2 / 2V	H-NU Reading @ 1545 = 0
			SC CLAYEY SAND, MEDIUM TO COARSE, BROWN.			CLEAN OUT W/3" HOLLOW STEM AUGERS STARTED AT 8.0', STOPPED Sampling.



DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. D4/02-01-90

PROJECT: NWSC CRANE! McComish Gorge (SWMU # 04/02) | INSTALLATION: NWSC CRANE | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 1Φ	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	15		CL Lean clay, Brown with sand			STOPPED Sampling CON'T HOLE W/ Hollow STEM AUGERS — SCALE Changed at 10.0'.
	20		Gray, Some Coarse Sand.			
	25					
	30					
	35		ML Sandy SILT, Grayish TAN			
	40					
	45					
	50					
	55					
	60					
	65		BOTTOM OF HOLE 65.5'			

Hole No. 04/02-1A-

DRILLING LOG	DIVISION NOR DIV.	INSTALLATION NWSC CRANE	SHEET 1 OF 1 SHEETS
1. PROJECT (SWMU #04/02) NWSC CRANE: McComish GORGE		10. SIZE AND TYPE OF BIT 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station) SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 04/02-1A-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ATU 2; UNDISTURBED SOIL 1	
5. NAME OF DRILLER ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN N/A		16. DATE HOLE STARTED 10/25/90 COMPLETED 10/25/90	
8. DEPTH DRILLED INTO ROCK N/A		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE 8.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR Larry Benjamin	

ELEVATION a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–3		SC CLAYEY SAND, FINE TO MEDIUM, TRACE OF Chert GRAVEL WITH CL LAYERS, LITTLE Black Sand Seams.		1 V	SAMPLED W/3" SHELBY TUBE PUSHED W/Kelly EXHUDED Soil. Skined Samples W/Stainless Steel Knifes. H-NU Reading @ 0945 = 0 W.L. During DRILLING 8.0', 24 hrs. N.E. MOIST 04/02-01-90 IS 10' EAST OF THIS HOLE. (04/02-1A-90)
	3–4		CL Lean Clay with Some medium grain sizes and Some White Colored Seams.		1A	H-NU Reading @ 1000 = 0
	4–6					H-NU Reading @ 1015 = 0
	6–7		WITH Some Metal FLAKES and 1/2" Chert GRAVEL		2 V	
	7–8		BOTTOM OF HOLE 8.0'			HOLE WAS TERMINATED because of having 04/02-01-90 10' away

ENG FORM ... PROJECT HOLE NO.

Hole No. 04/02-02-

DRILLING LOG	DIVISION: NOR DIV (SWMU # 04/02)	INSTALLATION: NWSC CRANE	SHEET 1 OF 1 SHEETS
1. PROJECT: NWSC CRANE: McCOMISH GORGE		10. SIZE AND TYPE OF BIT: 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station): SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
3. DRILLING AGENCY: USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): 04/02-02-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 ATL; UNDISTURBED 2 SOIL	
5. NAME OF DRILLER: ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 10-23-90; COMPLETED 10-23-90	
7. THICKNESS OF OVERBURDEN: N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK: N/A		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 8.0'		19. SIGNATURE OF INSPECTOR: Larry Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SC CLAYEY SAND, FINE TO MEDIUM, BROWN, TRACE OF CHERT GRAVEL.			SAMPLED W/3" SHELBY TUBE PUSHED W/KELLY EXTRUDED SOIL. SKINED SAMPLES W/STAINLESS STEEL KNIFES
	1		0.8' TO 3.0' WHITE COLORED MATERIAL IN SOIL.		1 1V	H-NU Reading @ 1545 = 0
	2					W.L. DURING DRILLING 5.5'
	3				1A	24 hrs. 8.0'
	4		SP TAN, COARSE POORLY GRADED SAND, WITH BLACK SEAMS.			
	5		FINE TO MEDIUM GRAIN SIZES.		2 2V	H-NU Reading @ 1600 = 0
	6					
	7				2A	H-NU Reading @ 1615 = 0
	8		BOTTOM OF HOLE 8.0'			

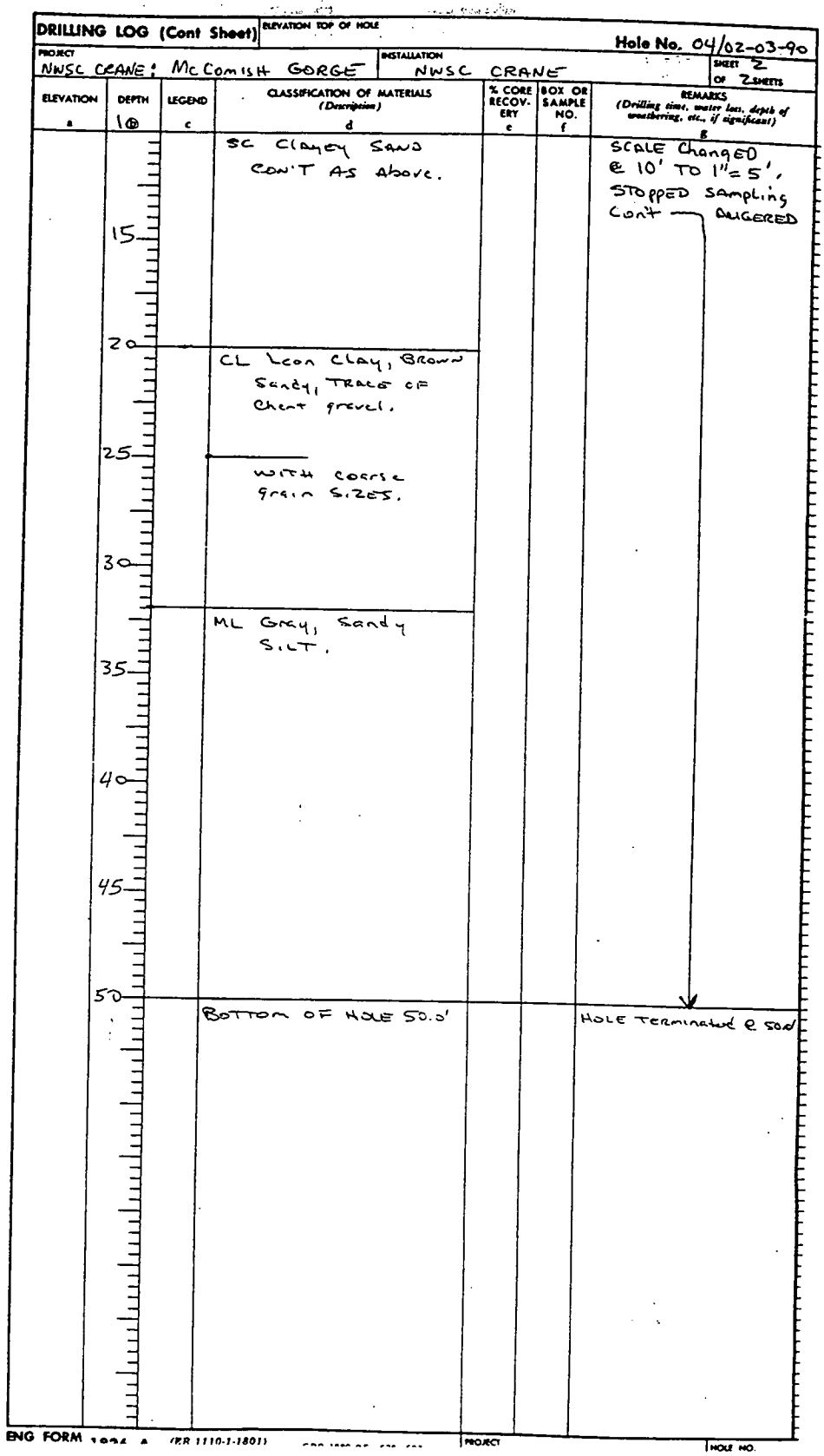
ENG FORM 1836 — PREVIOUS EDITIONS ARE OBSOLETE — PROJECT — HOLE NO.

Hole No. 04/02-03-9

DRILLING LOG	DIVISION NOR DIV.	INSTALLATION NWSC CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT (SWMU # 04/02) NWSC CRANE; McCOMISH GORGE		10. SIZE AND TYPE OF BIT 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station) SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 04/02-03-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ATL 2; UNDISTURBED 2 SOIL	
5. NAME OF DRILLER ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 10/24/90; COMPLETED 10/25/90	
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK N/A		18. TOTAL CORE RECOVERY FOR BORING. N/A %	
9. TOTAL DEPTH OF HOLE 50.0'		19. SIGNATURE OF INSPECTOR Laura Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL Lean clay, BROWN, some sand, TRACE OF ROOTS.		1 1V	SAMPLED W/3" SHELBY TUBE PUSHED W/ Kelly EXTRUDED SOIL. SKined Samples W/STAINLESS steel knifes. H-NU Reading @ 1445 = 0 W.L. During DRILLING 9.0' 24 hrs. 9.8'
	3		SC CLAYEY SAND, medium TO COARSE, BROWN, TRACE OF Chert gravel.		1A	
	5		MOIST			H-NU Reading @ 1510 = 0
	6		WITH Chert GRAVEL.			H-NU Reading @ 1530 = 0
	7				2A	
	8				2 2V	H-NU Readings @ 1600 = 0 STOPPED Sampling, STARTED W/3" HOLLOW STEM AUGERS @ 10.0'
	9		6M - SILTY SAND, FINE TO medium, RUSTY BROWN some black Seams.			
	10		SC CLAYEY SAND, FINE TO medium, BROWN.			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.



DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. 04/02-03-90

PROJECT: NWSC CRANE; McCOMISH GORGE | INSTALLATION: NWSC CRANE | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	15		SC Clayey SAND CON'T AS Above.			SCALE Changed @ 10' TO 1"=5', STOPPED Sampling Cont — AUGERED
	20		CL Lean Clay, Brown Sandy, TRACE OF Chert gravel.			
	25		WITH COARSE grain SIZES.			
	30					
			ML Gray, Sandy SILT.			
	35					
	40					
	45					
	50		BOTTOM OF HOLE 50.0'			HOLE Terminated @ 50'

ENG FORM ... (ER 1110-1-1801) | PROJECT | HOLE NO.

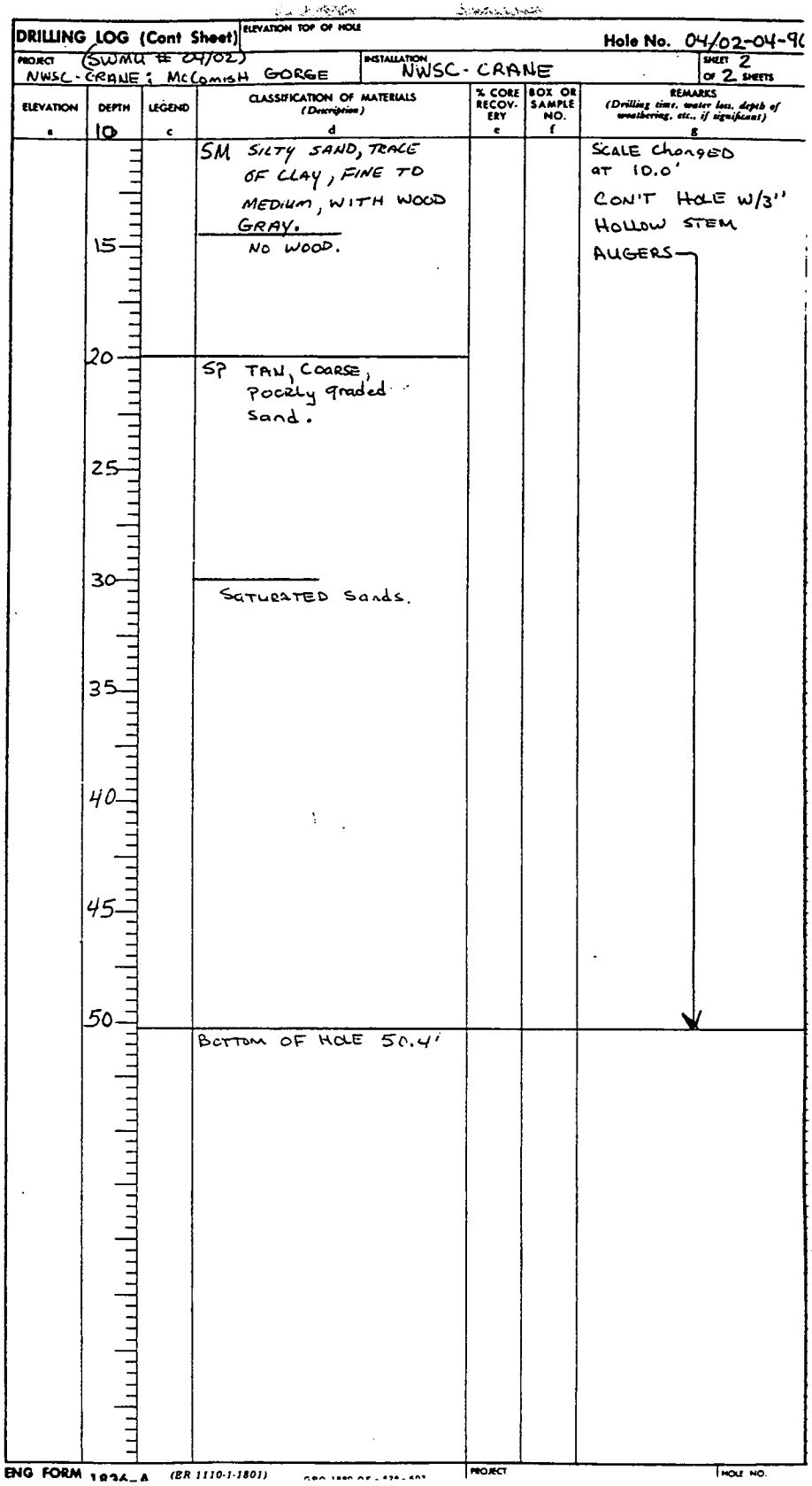
Hole No. 04/02-04-90

DRILLING LOG | DIVISION: NOR DIV. | INSTALLATION: NWSC-CRANE | SHEET 1 OF 2 SHEETS

1. PROJECT: (SWMU # 04/02) NWSC-CRANE ; McCOMISH GORGE
2. LOCATION (Coordinates or Station): SEE MAP
3. DRILLING AGENCY: USA COE WES
4. HOLE NO. (As shown on drawing title and file number): 04/02-04-90
5. NAME OF DRILLER: ELASTIC BROWN
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: 0.0'
9. TOTAL DEPTH OF HOLE: 50.4'
10. SIZE AND TYPE OF BIT: 3" SHELBY TUBE
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: FAIUNG 150C
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED AXL: 2; UNDISTURBED SOIL: 1
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 06/NOV/90; COMPLETED 06/NOV/90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Larry Benjamin

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SC CLAYEY SAND, FINE TO MEDIUM, BROWN, TRACE OF CHERT GRAVEL.			Sampled w/3" SHELBY TUBE PUSHED W/KELLY EXTRUDED SOIL. Shined Samples W/STAINLESS STEEL KNIFES.
	1				1 1V	H-NU Reading at 0830 = 0
			WITH COARSE GRAIN SIZES.			W.L. During, DRILLING 3.0
	2		TRACE OF COARSE GRAIN SIZES			A 4 hr Reading WAS TAKEN 8.2'.
			WITH WOOD and TRACE OF CLAYEY SAND.		2 2V	Backfilled HOLES after cleaning TOOLS.
	3				1A	PUSHED TUBE TO 3.0'.
			SM SILTY SAND, TRACE OF CLAY, FINE TO MEDIUM, WITH WOOD, GRAY.			STOPPED sampling CON'T HOLE w/3" HOLLOW STEM AUGERS
	4					
	5					
	6					
	7					
	8					
	9					
	10					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT | HOLE NO.



DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. 04/02-04-9(

PROJECT (SWMU # 04/02) NWSC - CRANE ; McCOMISH GORGE | INSTALLATION NWSC - CRANE | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 10	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	15		SM SILTY SAND, TRACE OF CLAY, FINE TO MEDIUM, WITH WOOD GRAY. NO WOOD.			SCALE CHANGED AT 10.0' CON'T HOLE W/3" HOLLOW STEM AUGERS
	20		SP TAN, COARSE, POORLY GRADED SAND.			
	25					
	30		SATURATED SANDS.			
	35					
	40					
	45					
	50		BOTTOM OF HOLE 50.4'			

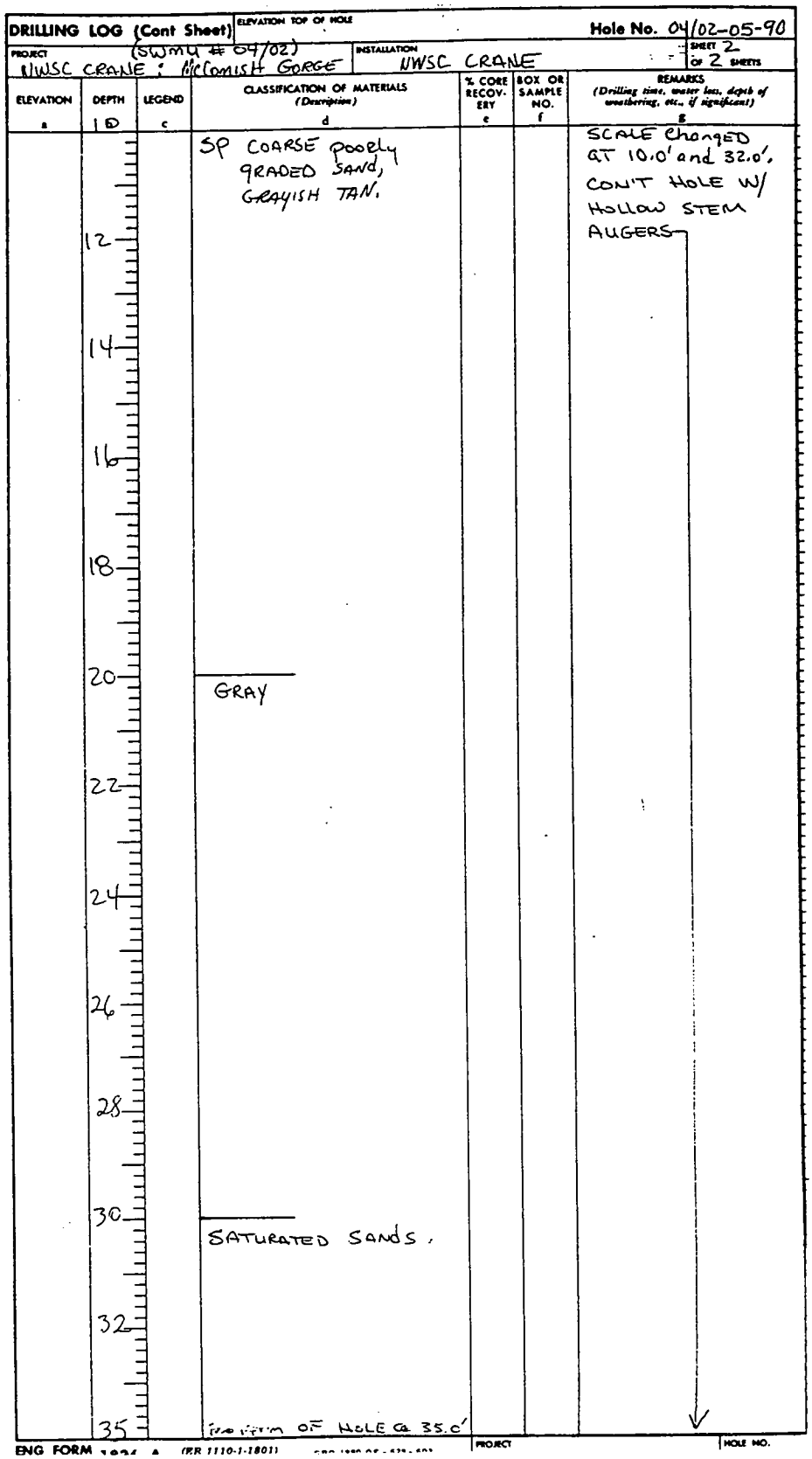
ENG FORM 1836_A (ER 1110-1-1801) | PROJECT | HOLE NO.

Hole No. 04/02-05-9

DRILLING LOG	DIVISION NOR DIV	INSTALLATION NWSC CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT (SWMU # 04/02) NWSC CRANE: McComish Gorge		10. SIZE AND TYPE OF BIT 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station) SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 04/02-05-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 1 SOIL	
5. NAME OF DRILLER ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 02/NOV/90; COMPLETED 02/NOV/90	
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK 0.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 35.0'		19. SIGNATURE OF INSPECTOR Larry Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL LEAN CLAY, BROWN, Sandy, TRACE OF ROOTS.			SAMPLED W/3" SHELBY TUBE PUSHED W/Kelly EXTRUDED SOIL. Skined Samples W/STAINLESS STEEL Knifes. W.L. During DRILLING 4.0', 24 hrs. 5.5' Mostly wood between 2.5'-4.5', SO I TOOK Samples at 4.5'-5.0'. H-NU Reading at 1010 = 0
	1				1 1V	
	2		TRACES OF plastic and metals.			
	3		WITH WOOD LITTLE SOIL.		1A	PUSHED TUBE TO 3.0'.
	4		SM GRAY, FINE SILTY SAND, TRACE OF WOOD and			H-NU Reading at 1035 = 0
	5		NO PEA GRAVEL and WOOD.		2 2V	PUSHED TUBE TO 5.5'
	6		SP TAN COARSE POORLY graded Sand			STOPPED Sampling CON'T HOLE W/ HOLLOW STEM AUGERS
	7					
	8		GRAYISH TAN			
	9					
	10					

ENG FORM 1836 — PROJECT — HOLE NO.

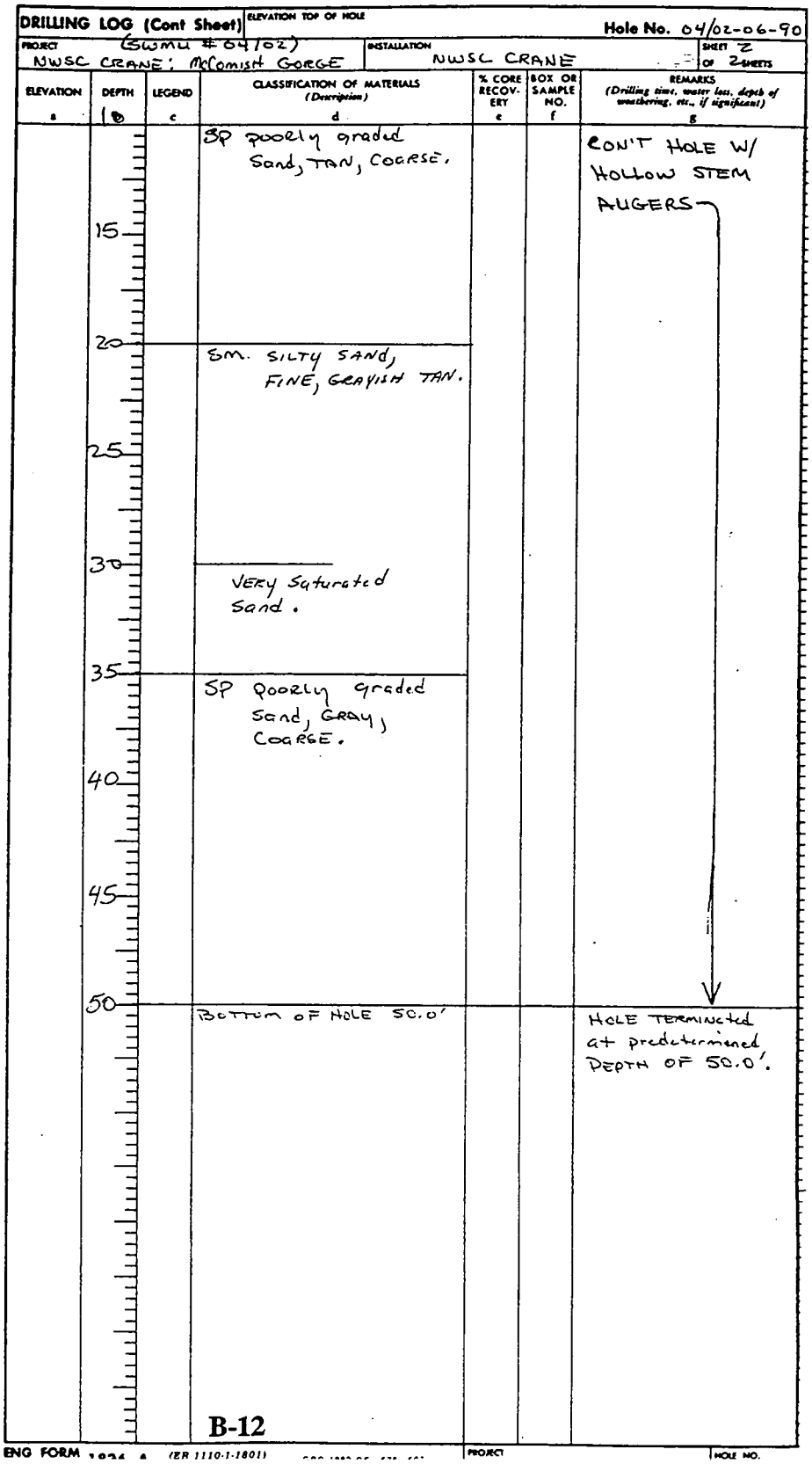

DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE
Hole No. 04/02-05-90
PROJECT
(SWMU # 04/02)
NWSC CRANE ; McCOMISH GORGE
INSTALLATION
NWSC CRANE
SHEET 2 OF 2 SHEETS
ELEVATION
DEPTH
LEGEND
CLASSIFICATION OF MATERIALS (Description)
% CORE RECOV. ERY
BOX OR SAMPLE NO.
REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
SP COARSE poorly GRADED SAND, GRAYISH TAN.
SCALE changED AT 10.0' and 32.0', CON'T HOLE W/ HOLLOW STEM AUGERS
12
14
16
18
20
GRAY
22
24
26
28
30
SATURATED SANDS.
32
35
BOTTOM OF HOLE @ 35.0'
ENG FORM
(ER 1110-1-1801)
PROJECT
HOLE NO.

Hole No. 04/02-06-90

DRILLING LOG	DIVISION: NOR DIV	INSTALLATION: NWSC - CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT: (SWMU # 04/02) NWSC CRANE: McCOMISH GORGE		10. SIZE AND TYPE OF BIT: 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station): SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
3. DRILLING AGENCY: USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): 04/02-06-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ATL 2; UNDISTURBED SOIL 2	
5. NAME OF DRILLER: ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 30/OCT/90; COMPLETED 30/OCT/90	
7. THICKNESS OF OVERBURDEN: N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK: 0.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 50.0'		19. SIGNATURE OF INSPECTOR: Larry Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM SILTY SAND, BROWN, FINE TO MEDIUM WITH ROOTS.			Sampled w/ 3" SHELBY TUBE pushed w/ KELLY EXTRUDED SOIL. SKINED Samples w/ STAINLESS STEEL KNIFES. W.L. During DRILLING 3.0', 24 hrs. 6.0'
	1				1 1V	
					1A	
	2		MH SILTY CLAY, BROWN, WITH SAND.			H-NU Reading at 1330 = 0
					2 2V	
	3		SM SILTY Sand, TAN, FINE, WITH BLACK SEAMS and CLAY LAYERS.		2A	PUSHED TUBE TO 3.0'
	4		SP Poorly graded Sand, TAN, COARSE; TRACE OF black Seams.			H-NU Reading at 1400 = 0
	5		SM SILTY SAND, BROWN, FINE/medium WITH RUST Staining.			PUSHED TUBE TO 5.5'
	6		SC CLAYEY SAND, FINE TO medium, BROWN			STOPPED Sampling CON'T HOLE W/ HOLLOW STEM AUGERS
	7					
	8		SP Poorly graded Sand, TAN, COARSE.			
	9					
	10		B-11			

PROJECT | HOLE NO.

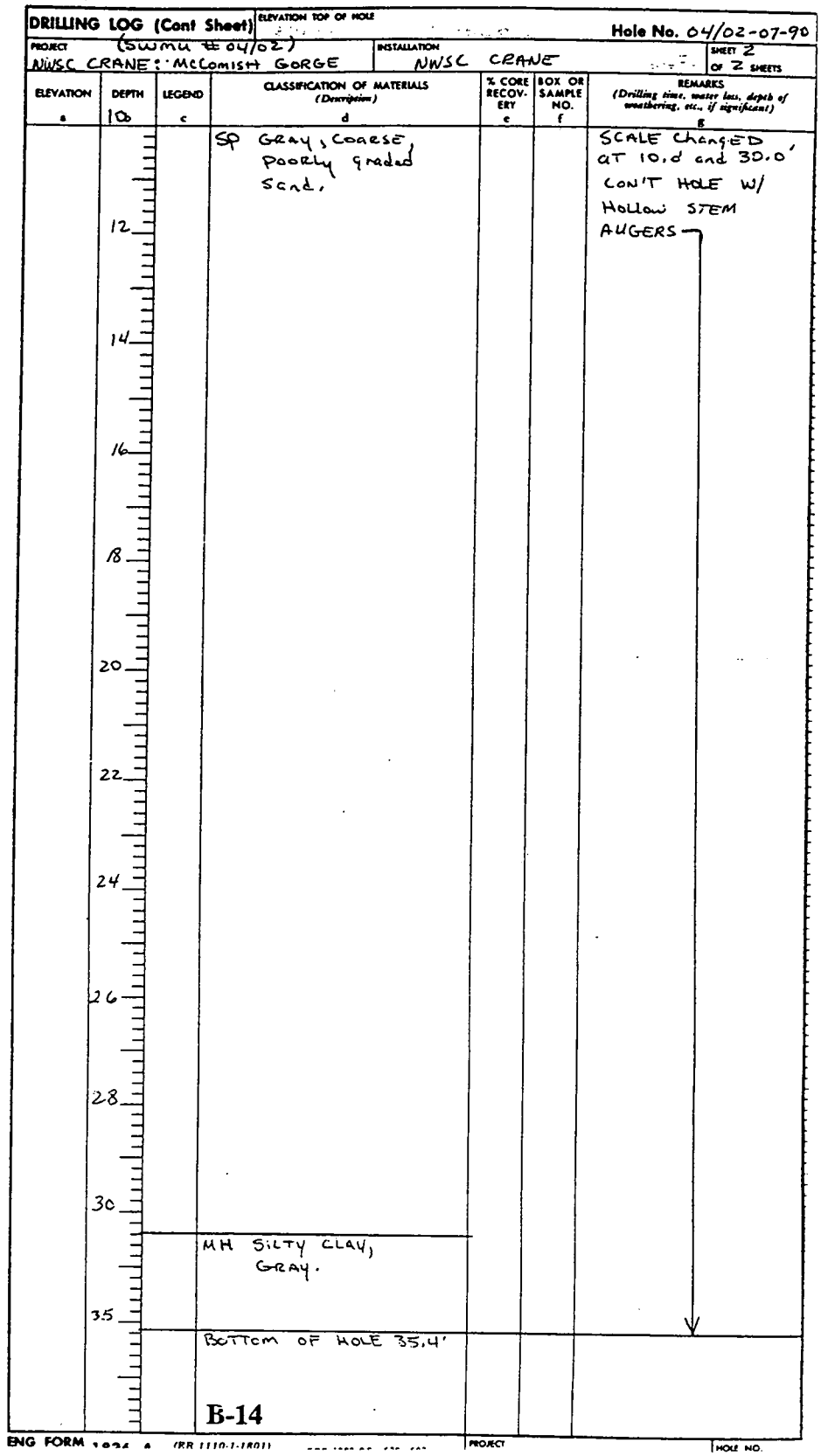

DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE
Hole No. 04/02-06-90
PROJECT (GWMU #04/02) NWSC CRANE: McComish GORGE
INSTALLATION NWSC CRANE
SHEET 2 OF 2 SHEETS
ELEVATION a
DEPTH b
LEGEND c
CLASSIFICATION OF MATERIALS (Description) d
% CORE RECOV. ERY e
BOX OR SAMPLE NO. f
REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
SP poorly graded Sand, TAN, COARSE.
CON'T HOLE W/ HOLLOW STEM AUGERS
15
20
SM. SILTY SAND, FINE, GRAYISH TAN.
25
30
VERY Saturated Sand.
35
SP POORLY graded Sand, GRAY, COARSE.
40
45
50
BOTTOM OF HOLE 50.0'
HOLE TERMINATED at predetermined DEPTH OF 50.0'.
B-12
ENG FORM
(ER 1110-1-1801)
PROJECT
HOLE NO.

Hole No. 04/02-07-9

DRILLING LOG	DIVISION NOR DIV	INSTALLATION NWSC CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT (SWMU # 04/02) NWSC CRANE; McCOMISH GORGE		10. SIZE AND TYPE OF BIT 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station) SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 04/02-07-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED AT/L 2; UNDISTURBED 1 SOIL	
5. NAME OF DRILLER ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE STARTED 02/NOV/90 COMPLETED 02/NOV/90	
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK 0.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 35.4'		19. SIGNATURE OF INSPECTOR Larry Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL Lean CLAY, BROWN, Sandy, TRACE OF Plastic and chert gravel.			Sampled W/3" SHELBY TUBE PUSHED W/ Kelly EXTRUDED SOIL. Skined Samples W/STAINLESS STEEL Knifes. Duplicate Samples TAKEN. W.L. During DRILLING 3.0' 24 hrs. 6.5'
	1				1 1 V	
	2		SC CLAYEY SAND, BROWN, TRACE OF chert GRAVEL WITH FAT CLAY LAYERS, Medium		2 2 V	H-NU Reading at 1300 = 0
	3		SM GRAY, FINE, SILTY SAND WITH WOOD, TRACE OF CLAY and Rubber material.		1A	PUSHED TUBE TO 3.0'.
	4					STOPPED SAMPLING CON'T HOLE W/ HOLLOW STEM AUGERS
	5					
	6					
	7		SP GRAY, COARSE, POORLY graded Sand.			
	8					
	9					
	10					

B-13


DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE
Hole No. 04/02-07-90
PROJECT (SWMU # 04/02) NWSC CRANE: McComish Gorge
INSTALLATION NWSC CRANE
SHEET 2 OF 2 SHEETS
ELEVATION a
DEPTH 10
LEGEND c
CLASSIFICATION OF MATERIALS (Description) d
% CORE RECOV-ERY e
BOX OR SAMPLE NO. f
REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
SP GRAY, COARSE, POORLY GRADED SAND.
SCALE CHANGED AT 10.0 and 30.0'
CON'T HOLE W/ HOLLOW STEM AUGERS
12
14
16
18
20
22
24
26
28
30
MH SILTY CLAY, GRAY.
35
BOTTOM OF HOLE 35.4'
B-14
ENG FORM
(RR 1110-1-1801)
PROJECT
HOLE NO.

Hole No. 04/02-08-

DRILLING LOG	DIVISION NDR DIV	INSTALLATION NWSC CRANE	SHEET 1 OF 2 SHEETS

1. PROJECT (SWMU #04/02) McComish GORGE
2. LOCATION (Coordinates or Station) SEE MAP
3. DRILLING AGENCY USA COE WES
4. HOLE NO. (As shown on drawing title and file number) 04/02-08-90
5. NAME OF DRILLER ELASTIC BROWN
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN N/A
8. DEPTH DRILLED INTO ROCK 0.0'
9. TOTAL DEPTH OF HOLE 15.0'
10. SIZE AND TYPE OF BIT 3" SHELBY TUBE
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED RTL: 1 — UNDISTURBED: 2 SOIL
14. TOTAL NUMBER CORE BOXES N/A
15. ELEVATION GROUND WATER
16. DATE HOLE — STARTED 01/NOV/90 — COMPLETED 01/NOV/90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING N/A
19. SIGNATURE OF INSPECTOR Larry Benjamin

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL LEAN CLAY TRACE OF ROOTS.			SAMPLED W/3" SHELBY TUBE PUSHED W/ KELLY EXTRUDED SOIL. SKINED SAMPLES W/ STAINLESS STEEL KNIFES. W.L. DURING DRILLING 2.5', 24 hrs. 2.0'
	1				1 IV	
	2		WITH WOOD		1A	H-NU Reading at 0850 = 0 PUSHED TO 3.0'
	3		WITH Chert GRAVEL MORE WOOD and SENSOR SCREEN.			H-NU Reading at 0900 = 0 AT 8.0' ONLY water WAS coming out OF HOLE. Possibly A cavity, so we took hole down to 15.0' and terminated hole.
	4		SM GRAY FINE SILTY SAND, TRACE OF WOOD.		2A	
	5		RUSTY COLOR NO WOOD			PUSHED TO 5.5'
	6					STOPPED SAMPLING CON'T HOLE W/ HOLLOW STEM AUGERS
	7					
	8		Possibly Sand			
	9					
	10		B-15			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE PROJECT HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. 04/02-08-90

PROJECT: NWSC CRANE: MrComsit GORGE (SWMU # 04/02) | INSTALLATION: NWSC CRANE | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 10	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	11		SM Possibly Sand.			CON'T HOLE W/ HOLLOW STEM AUGERS
	12					
	13					
	14					
	15		BOTTOM OF HOLE 15.0'			

B-16

ENG FORM 1836-A (ER 1110-1-1801) | PROJECT | HOLE NO.

Hole No. 04/02-09-9

DRILLING LOG	DIVISION NOR DIV	INSTALLATION NWSC CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT (SWMU #04/02) NWSC CRANE; MC COMISH GORGE		10. SIZE AND TYPE OF BIT 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station) SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USA CoE WES		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 04/02-09-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ATL 2; UNDISTURBED SOIL 1	
5. NAME OF DRILLER ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 31/OCT/90; COMPLETED 31/OCT/90	
7. THICKNESS OF OVERBURDEN N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK 0.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 30.0'		19. SIGNATURE OF INSPECTOR Larry Benjamin	

ELEVATION a	DEPTH 0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		CL Lean Clay, BROWN, Sandy.		1 V	Sampled W/ 3" SHELBY TUBE PUSHED W/ KELLY EXTRUDED SOIL. SKINED SAMPLES W/ STAINLESS STEEL KNIFES. W.L. DURING DRILLING 5.5' 24 HRS. CAVE IN 6.5' H-NU Reading at 1040 = 0
	2		SM SILTY SAND, FINE TO medium, BROWN TRACE OF Chert gravel.			
	3		CH FAT CLAY, BROWN		1A	PUSHED TUBE TO 3.0'
	4		SP TAN, COARSE POORLY graded Sand WITH black Seams.			H-NU Reading at 1100 = 0
	5				2 2 V	PUSHED TUBE TO 5.5'
	6		NO black Seams			STOPPED Sampling CON'T HOLE W/ HOLLOW STEM AUGERS ↓
	7					
	8					
	9					
	10					

B-17

ENG FORM [illegible] PROJECT [illegible]

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE — **Hole No.** 04/02-09-90

PROJECT: NWSC CRANE: McComish Gorge (SWMU #04/02) — INSTALLATION: NWSC - CRANE — SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 10	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	12		SP TAN COARSE POORLY graded Sand.			SCALE changed at 10.0'. CONT HOLE W/ HOLLOW STEM AUGERS
	14					
	16		SM SILTY SAND, BROWN FINE TO medium RUST STAINING.			
	18					
	20					
	22		TAN.			
	24					
	26					
	28					
	30		BOTTOM OF HOLE 30.0'			

B-18

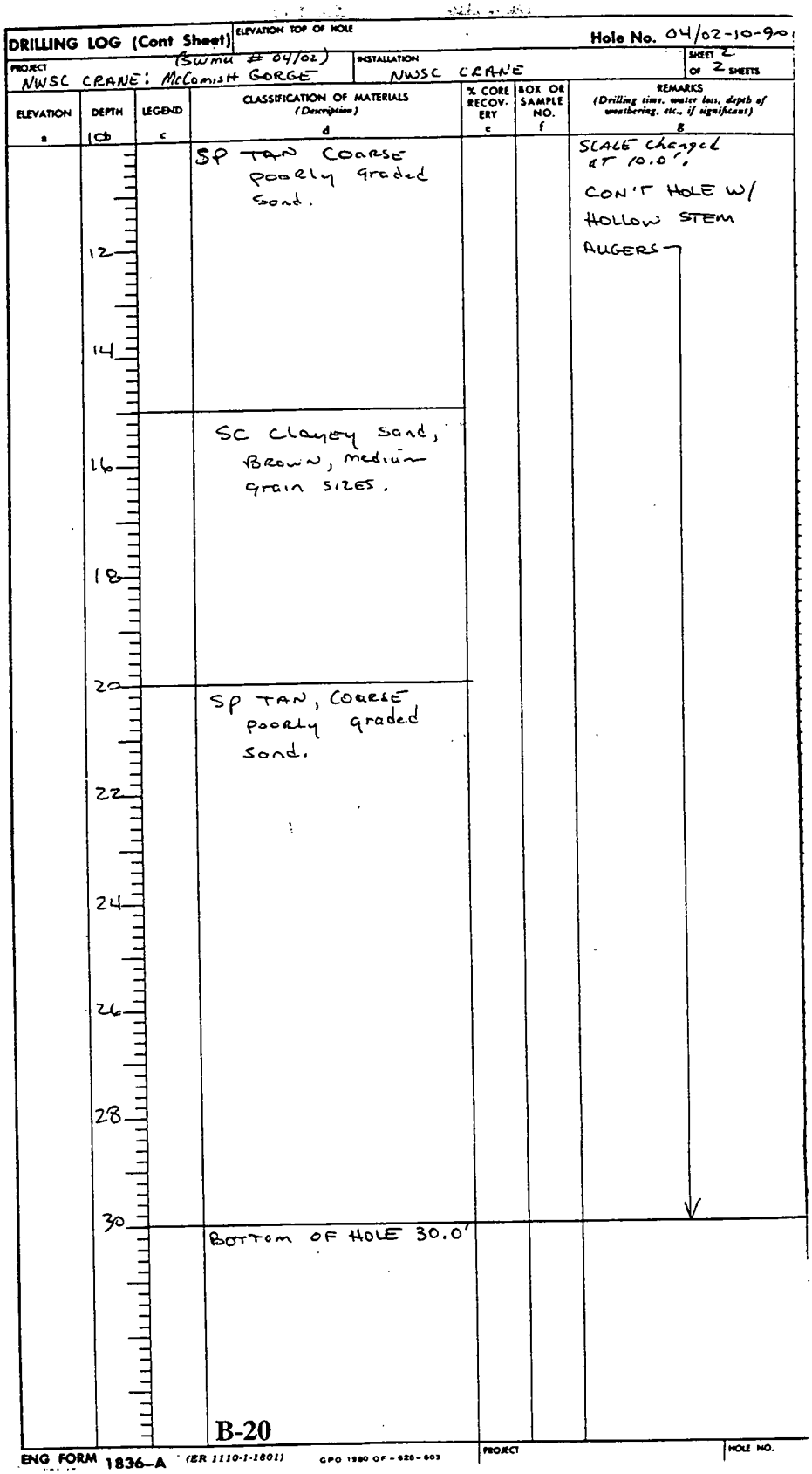
ENG FORM 1836 A (ER 1110-1-1801) — PROJECT — HOLE NO.

Hole No. 04/02-10-1

DRILLING LOG	DIVISION: NOR DIV	INSTALLATION: NWSC-CRANE	SHEET 1 OF 2 SHEETS
1. PROJECT: (GWMU # 04/02) NWSC CRANE; McComish Gorge		10. SIZE AND TYPE OF BIT: 3" SHELBY TUBE	
2. LOCATION (Coordinates or Station): SEE MAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
3. DRILLING AGENCY: USA COE WES		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): 04/02-10-90		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED AUL 1; UNDISTURBED SOIL 1	
5. NAME OF DRILLER: ELASTIC BROWN		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 01/NOV/90; COMPLETED 01/NOV/90	
7. THICKNESS OF OVERBURDEN: N/A		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK: 0.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 30.0'		19. SIGNATURE OF INSPECTOR: Jamey Benjamin	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM silty SAND, BROWN, FINE, TRACE of Chert gravel and clay.			Sampled w/ 3" Shelby tube pushed w/ Kelly extruded soil. Skined samples w/ stainless steel knifes. W.L. during drilling 3.0', 2.4 hrs. 6.5' H-NU Reading at 1000 = 0
	1				1	1 V
	2					
	3		WITH WOOD.		1A	Pushed tube to 3.0'
						H-NU Reading at 1015 = 0
	4		SP TAN COARSE poorly graded SAND.			
	5					Pushed tube to 5.5'
	6					Stopped sampling Con't hole w/ Hollow stem Augers
	7					
	8					
	9					
	10		B-19			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.


DRILLING LOG (Cont Sheet)
ELEVATION TOP OF HOLE
Hole No. 04/02-10-90
(SWMU # 04/02)
PROJECT
NWSC CRANE; McCOMISH GORGE
INSTALLATION
NWSC CRANE
SHEET 2 OF 2 SHEETS
ELEVATION
DEPTH
LEGEND
CLASSIFICATION OF MATERIALS (Description)
% CORE RECOV-ERY
BOX OR SAMPLE NO.
REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
a
b
c
d
e
f
g
SP TAN COARSE POORLY GRADED SAND.
SCALE Changed AT 10.0',
CON'T HOLE W/ HOLLOW STEM AUGERS
12
14
SC CLAYEY SAND, BROWN, MEDIUM GRAIN SIZES.
16
18
20
SP TAN, COARSE POORLY GRADED SAND.
22
24
26
28
30
BOTTOM OF HOLE 30.0'
B-20
ENG FORM 1836-A (ER 1110-1-1801) GPO 1980 OF - 628-603
PROJECT
HOLE NO.

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 9 Sept. 1981
Location McComish Gorge Job No. 441-G150.11GR21/22
Drill Rig Failing Inspector J. Dunbar Operator C. Drake Surface El 603.49 Boring No. WES-4-1-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
1	9 Sept	0.0		0.0	0.5	0.0	2.08	3" Shelby Tube	0	ST	Silt (ML): brown in color, slightly
1A				0.5	1.0	2.08	2.23		0	Jar	moist, little cohesion, slight
				1.0	1.5				0		gritty feal, and contains organic
				1.5	2.0				20		matter.
				2.0	2.5				120		Sample length: 2.23 ft
			5.0	0.0	5.0			7" Folding Auger			Cleanout
2	9 Sept	5.0		5.0	5.5	5.0	6.55	*3"Fixed Piston Sampler	0	ST	Silty sand (SM): reddish brown in
2A				5.5	6.0	6.55	6.75		0	Jar	color, very uniform, fine-grained,
				6.0	6.5				0		little cohesion, and dry.
				6.5	7.0				20		
				7.0	7.4				80		Sample length: 1.75 ft
				5.0	70.0			*7" Hollow-stem Auger			Cleanout

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED *3" Fixed Piston Sampler = 3" F.P.S.
*7" Hollow Stem Auger = 7" H.S. Auger
Sheet 1 of 5 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-1-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
3	9 Sept			10.0	10.5	10.0	10.3	3" F.P.S.	0	ST	Silty sand (SM): reddish brown in
3A				10.5	11.0	10.3	10.6		20	Jar	color, uniform, fine-grained (pre-
				11.0	11.5				40		dominately quartz), little cohesion,
				11.5	12.0				50		and dry.
				12.0	12.5				700		Sample length: 0.6 ft- Sample fell
											back into hole.
			14.0	70.0	15.0			7" H.S. Auger			Cleanout; assumed stratum change.
4	9 Sept	14.0		15.0	15.5	15.0	16.97	3" F.P.S.	0	ST	Gravelly sand (SP): reddish brown
4A				15.5	16.0	16.97	17.20		20	Jar	in color, fine to coarse-grained
				16.0	16.5				80		sand, very fine gravel, slightly
				16.5	17.0				120		moist, and no cohesion.
				17.0	17.5				140		Sample length: 2.2 ft
			19.0	15.0	20.0			7" H.S. Auger			Cleanout; assumed stratum change.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 5 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-1-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
5	9 Sept	19.0		20.0	20.5	20.0	22.05	3" F.P.S	0	ST	Sand (SP): brown in color, fine
5A				20.5	21.0	22.05	22.3		10	Jar	to medium grained, slight moisture,
				21.0	21.5				30		very little cohesion, and 80-90%
				21.5	22.0				60		quartz sand.
				22.0	22.5				90		Sample length: 2.3 ft
			24.0	20.0	25.0			7" H.S. Auger			Cleanout: assumed stratum change
6	9 Sept	24.0		25.0	25.5	25.0	27.08	3" F.P.S.	0	ST	Silty sand (SM): brown in color,
				25.5	26.0	27.08	27.3		50	Jar	fine-grained, slight moisture, little
				26.0	26.5				100		cohesion, and contains 30% silt.
				26.5	27.0				160		
				27.0	27.5				180		Sample length: 2.3 ft
			30.0	25.0	30.0			7" H.S. Auger			Cleanout: assumed stratum change

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-1-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
7A	9 Sept	30.0		30.0	30.5	30.0	30.3	3" F.P.S.	0	Jar	Recovered 0.3 ft of very moist
				30.5	31.0				10		sand/silt; brown in color, very
				31.0	31.5				20		fine-grained, and slight cohesion.
				31.5	32.0				50		Will attempt again at 32.5 ft.
				32.0	32.5				80		
				30.0	32.5			7" H.S. Auger			Cleanout
8	9 Sept			32.5	33.0	32.5	33.3	3" F.P.S.	0	ST	Silt (ML): very moist, brown in
8A				33.0	33.5	33.3	33.6'		20	Jar	color, moderately cohesive, and
				33.5	34.0				30		contains 1-2% very fine gravel.
				34.0	34.5				40		Sample length: 1.1 ft
				34.5	35.0				80		Lost 1.4 ft
			37.5	32.5	37.5			7" H.S. Auger			Cleanout

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 4 of 5 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-1-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
9	9 Sept	37.5		37.5	38.0	37.5	39.55	3" F.P.S.	0		Clay silt: grey in color, moist
9A				38.0	38.5	39.55	39.8		40		and moderately cohesive.
				38.5	39.0				190		
				39.0	39.5				230		Sample length: 2.3 ft
				39.5	39.85				300		
				37.5	40.0			7" H.S. Auger			Cleanout
10	10Sept			40.3	40.8	40.3	42.48	3" F.P.S.	0	ST	Clay silt: same moist
10A				40.8	41.3	42.48	42.63		0	Jar	
				41.3	41.8				0		
				41.8	42.3				10		Sample length: 2.33 ft
			42.7	42.3	42.7				20		
	10Sept										Pulled auger and installed well
											screen.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 5 of 5 Sheets

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 10 Sept. 1981
Location McComish Gorge Job No. 441-G150,11GR21/22
Drill Rig Failing Inspector J. Dunbar Operator C. Drake Surface El 585.69 Boring No. WES-4-2-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
1	10Sept	0.0		0.0	0.5	0.0	1.27	3"Shelby Tube	280	ST	Gravelly sand (SP): brown in
1A				0.5	1.0	1.27	1.47		240	Jar	color, dry, fine to coarse
				1.0	1.5				300		grained with 20% fine to medium
				1.5	2.0				330		gravel, and no cohesion.
				2.0	2.5				350		Sample length: 1.47 ft
				0.0	5.0			7" Folding Auger			Cleanout
2	10Sept			*5.0	5.5	5.0	5.9	*3"Fixed Piston Sampler	0	ST	Gravelly sand (SP): brown in
2A				5.5	6.0	5.9	6.1		20	Jar	color, dry, fine to medium
				6.0	6.5				40		grained with 10% fine gravel and
				6.5	7.0				60		little cohesion.
											Sample length: 1.1 ft- suspect
											loss
			8.0	5.0	10.0			*7"Hollow Stem Auger			Cleanout

WES FORM 819 EDITION OF NOV 1971 MAY BE USED

*3" Fixed Piston Sampler = 3" F.P.S.
*7" Hollow Stem Auger = 7" H.S. Auger

Sheet 1 of 4 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-2-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
3	10Sept	8.0		10.0	10.5	10.0	11.97	3" F.P.S.	12	ST	Silty sand (SM): brown in color
3A				10.5	11.0	11.97	12.23		20	Jar	slight moisture, and slight
				11.0	11.5				30		cohesion.
				11.5	12.0				90		Last foot is fine-grained,
				12.0	12.5				150		Sample length: 2.23 ft
				70.0	15.0			7" H.S. Auger			Cleanout
4	11Sept		15.0	15.0	15.5	15.0	16.60	3" F.P.S.	0	ST	Clay silt (ML): brown in color,
4A		15.0		15.5	16.0	16.60	16.85		20	Jar	moderately cohesive, and slight
				16.0	16.5				40		moisture. Lost last 0.4 ft
				16.5	17.0				100		Sample length: 1.85 ft
				17.0	17.5				180		
				15.0	20.0			7" H.S. Auger			Cleanout

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

BORING LOG
FIELD DATA

Projec _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-2-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
	11Sept			20.0	20.5	See below		3" F.P.S.	20		Lost sample.
				20.5	21.0				20		
				21.0	21.5				50		
1				21.5	22.0				70		
				22.0	22.5				130		
5A	11Sept			20.0	21.5	20.0	21.5	Standard Splitspoon		Jar	Pushed splitspoon-clay silt (ML)
											brown in color, moderately
											cohesive, and moist. Water was
											visible in bottom of hole.
			22.0	20.0	25.0			7" H.S. Auger			Cleanout: stratum change assumed
6	11Sept	22.0		20.0	25.5	25.0	27.05	3" F.P.S.	0	ST	Silty sand (SM): grey in color,
6A				25.5	26.0	27.05	27.35		10	Jar	very fine-grained sand, uniform,
				26.0	26.5				50		moderately cohesive, and moist.
				26.5	27.0				100		Sample length: 2.35 ft

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 4 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-2-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
				27.0	27.4				160		
				25.0	30.0			7" H.S. Auger			Cleanout
7	11Sept			30.0	30.5	30.0	32.05	3" F.P.S.	10	ST	Silty sand (SM); brown in color,
7A				30.5	31.0	32.05	32.35		20	Jar	very fine-grained, moderate
				31.0	31.5				80		cohesion, and moist.
				31.5	32.0				120		Sample length: 2.35 ft
			32.4	32.0	32.4				170		
											Left hole open overnight to
											monitor water level. Water on
											12 Sept. 81, was at 19.9 ft.
											Installed well through auger.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 4 of 4 Sheets

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 12 Sept, 1981
Location McComish Gorge Job No. 441-G150.11GR21/22
Drill Rig Failing Inspector J. Dunbar Operator C. Drake Surface El 566.22 Boring No. WES-4-3-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
1	12Sept	0.0		0.0	0.5	0.0	2.08	3" Shelby	Wt. Kelly	ST	Silty sand (SM): brown in color,
1A				0.5	1.0	2.08	2.28	Tube	0	Jar	damp, fine-grained, and moderate
				1.0	1.5				20		cohesion. Sand equals 60 to 70%
				1.5	2.0				60		and silt equals 30 to 40%.
				2.0	2.5				120		Sample length: 2.28 ft
			4.5	0.0	5.0			7" Folding Auger			Cleanout
2	12Sept	4.5		5.0	5.5	5.0	7.13	*3"Fixed Pis-	0	ST	Silty sand (SM): grey in color,
2A				5.5	6.0	7.13	7.38	ton Sampler	10	Jar	damp to moist, fine-grained, and
				6.0	6.5				20		moderate cohesion. Sand equals
				6.5	7.0				20		60%-70% and silt equals 30%-40%.
				7.0	7.5				20		Believe water starts at 5.5 ft.
											Sample length: 2.38 ft
				5.0	10.0			*7" Hollow Stem			Cleanout
								Auger			

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

*3" Fixed Piston Sampler = 3" F.P.S.
*7" Hollow Stem Auger = 7" H.S. Auger

Sheet 1 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-3-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
3	12Sept			10.0	10.5	10.0	12.3	3" F.P.S	0	ST	Silty sand (SM): same as in no.2
3				10.5	11.0	11.83	12.13		10	Jar	except for more moisture.
				11.0	11.5				50		
				11.5	12.0				120		Sample length: 2.28 ft
				12.0	12.4				160		
			15.0	10.0	15.0	——	——	7" H.S, Auger		——	Cleanout
											When pulling weight out of hollow
											stem auger, acted as piston and
											sucked sand in behind. Cleaned
											out several times with same result.
											Used splitspoon to get sample of
											material and confirm if sample
											was wet.
4A	12Sept	15.00	17.0	15.0	17.0	15.0	17.0	*Splitspoon			Silty sand (SM): grey in color,
											saturated, and fine-grained.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED *Splitspoon = 1-7/8" I.D. x 2 1/2" O.D. Sheet 2 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-3-81

SAMPLE NUMBER	DATE TAKEN	STRATUM		DRIVE		SAMPLE		TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
		FROM	TO	FROM	TO	FROM	TO				
											Installed well through auger.

FORM [illegible] 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 3 Sheets

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 28 Sept. 1981
Location McComish Gorge Job No. 441-G150.11GR21/22
Drill Rig Failing Inspector J. Dunbar Operator C. Drake Surface El 593.14 Boring No. WES-4-4-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
1	28Sept	0.0		0.0	0.5	0.0	2.26	3" Shelby	0	ST	Clay (CL): brown in color, dry,
1A				0.5	1.0	2.26	2.45	Tube	0	Jar	uniform, slightly stiff, with
				1.0	1.5				0		slight to moderate cohesion.
				1.5	2.0				0		Sample length: 2.45 ft
				2.0	2.5				10		
				0.0	5.0			7"Folding Auger			Cleanout
2	28Sept			5.0	5.5	5.0	6.64	*3"Fixed Pis-	0	ST	Clay (CL): same as above.
				5.5	6.0	6.64	6.82	ton Sampler	20	Jar	
				6.0	6.5				90		Sample length: 1.82 ft
				6.5	7.0				130		
				7.0	7.35				200		
			10.0	5.0	10.00			*7"Hollow Stem			Cleanout: stratum change assumed
								Auger			

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

*3" Fixed Piston Sampler = 3" F.P.S.
*7" Hollow Stem Auger = 7" H.S. Auger

Sheet 1 of 4 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-4-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
3	28Sept	10.0		10.0	10.5	10.0	12.19	3" F.P.S	0	ST	Silt (ML): brown, uniform, dry,
3A				10.5	11.0	12.19	12.36		0	Jar	and slight cohesion.
				11.0	11.5				140		Sample length: 2.36 ft
				11.5	12.0				160		
				12.0	12.38				210		
			13.5	10.0	15.0			7" H.S. Auger			Cleanout
4	28Sept	13.5		15.0	15.5	15.0	16.7	3" F.P.S.	0	ST	Sand (SP): reddish brown in
				15.5	16.0	16.7	17.0		10	Jar	color, dry, fine-grained, and
				16.0	16.5				20		no cohesion.
				16.5	17.0				60		Sample length: 2.00 ft
				17.0	17.5				90		
				15.0	20.0			7" H.S. Auger			Cleanout

FORM 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 4 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-4-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
5	28Sept			20.0	20.5	20.0	22.08	3" F.P.S.	0	ST	Sand (SP): brown in color, fine-
5A				20.5	21.0	22.08	22.4		0	Jar	grained, dry, and very uniform
				21.0	20.5				0		quartz sand.
				20.5	22.0				10		Sample length: 2.35 ft
				22.0	22.4				120		
				20.0	25.0			7" H.S. Auger			Cleanout
6				25.0	25.5	25.0	26.50	3" F.P.S.	0	ST	Sand (SP): brown in color, very
6A	28Sept			25.5	26.0	26.50	26.80		0	Jar	fine-grained, wet, and uniform.
				26.0	26.5				10		Water in hollow stem auger at
				26.5	27.0				30		26.89 ft.
				27.0	27.41				70		Sample length: 1.8 ft
				25.0	30.0			7" H.S. Auger			Cleanout: when pulling plug
											from auger, sand came in,

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 4 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-4-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont.	CLASSIFICATION AND REMARKS
7	28Sept			27.8	28.3	27.8	29.90	3" F.P.S.	0	ST	Sand (SP): brown, fine-grained,
				28.3	28.8	29.90	30.40		0	Jar	and wet.
				28.8	29.3				0		Sample length: 2.40 ft
				29.3	29.8				0		
				29.8	30.3				40		
				30.0	35.0			7" H.S. Auger			Cleanout
8	28Sept		36.25	35.0	35.5	35.0	37.05	3" F.P.S.	30	ST	Clay (CL): grey in color, soft,
8A		36.25		35.5	36.0	37.05	37.30		70	Jar	very uniform in texture, and
				36.0	36.5				100		uniform consistency.
				36.5	37.0				120		Sample length: 2.30 ft
			37.4	37.0	37.4				120		
											Installed well through auger.

WES FORM JUN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 4 of 4 Sheets

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 30 Sept. 1981
Location McComish Gorge Job No. 441-G150.11GR21/22
Drill Rig Failing Inspector J. Dunbar Operator C. Drake Surface El 573.39 Boring No. WES-4-5-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
1	30Sept	0.0		0.0	0.5	0.0	1.8	3" Shelby Tube	0	ST	Sandy clay (CL): brown in color,
1A				0.5	1.0	1.8	1.95		0	Jar	moderate cohesion, soft, and
				1.0	1.5				0		contains 20-30% fine-grained sand.
				1.5	2.0				10		Sample length: 1.95 ft
				2.0	2.55				10		
				0.0	5.0			7" Folding Auger			Cleanout
2	30Sept			5.0	5.5	5.0	6.36	*3"Fixed Piston Sampler	0	ST	Sandy clay (CL): brown in color,
				5.5	6.0	6.36	6.56		0	Jar	moderate cohesion, soft, and con-
				6.0	6.5				0		tains 40% fine to coarse-grained
				6.5	7.0				0		sand.
				7.0	7.41				10		Sample length: 1.56 ft
			7.5	5.0	70.0			*7" Hollow Stem Auger			Cleanout

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

*3" Fixed Piston Sampler = 3" F.P.S.
*7" Hollow Stem Auger = 7" H.S. Auger

Sheet 1 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-5-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
3	30Sept	7.5		10.0	10.5	10.0	11.10	3" F.P.S.	0	ST	Silty sand (SM); dark grey to
3A				10.5	11.0	11.10	11.70		0	Jar	black in color, wet, slight cohesion,
				11.0	11.5				0		and trace of odor (organic/oily).
				11.5	12.0				10		Sample length: 2.21 ft
				12.0	12.42				10		Water at 9.5 ft after 30 min
			13.5	10.0	15.0			7" H.S. Auger			Cleanout: material came in when
											pulling plug from auger.
		13.5		14.3	14.8	14.3	16.0	3" F.P.S.	80	ST	Sandy gravel (GW); grey in color,
				14.8	15.3	16.0	16.35		110	Jar	wet, coarse sand (30%) and fine
				15.3	15.8				115		to medium angular to rounded,
				15.8	16.3				130		unsorted gravel.
			15.0	16.3	16.71				130		Sample length: 2.35 ft
				15.0	20.0			7" H.S. Auger			Cleanout: material came in when
											pulling plug from auger.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-5-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
5	30Sept	15.0		18.6	19.1	18.6	20.05	3" F,P.S.	70	ST	Silty sand (SM): grey in color,
5A				19.1	19.6	20.05	20,35		210	Jar	wet, no cohesion, and uniform.
				19.6	20.1				220		Sample length: 1.75 ft
				20.1	20.6				380		
			20.91	20.6	20.91				450		
											Installed well through auger.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 3 Sheets

BORING LOG
FIELD DATA

Project NWSC Groundwater Study Site Crane, IN Date 8 Oct. 1981
Location McComish Gorge Job No. 441-G150.11GR21/22
Drill Rig Failing Inspector, J. Dunbar Operator, C. Drake Surface El 579.54 Boring No., WES-4-6-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
1	8 Oct	0.0		0.0	0.5	0.0	2.14	3" Shelby	0	ST	Sand (SP): reddish brown in color,
1A				0.5	1.0	2.14	2.36	Tube	0	Jar	slight cohesion, dry, uniform, and
				1.0	1.5				0		fine-grained.
				1.5	2.0				50		Sample length: 2.36 ft
				2.0	2.5				140		
				0.0	5.0	—	—	7" Folding Auger	—		Cleanout
2	8 Oct			5.0	5.5	5.0	7.08	*3"Fixed Pis-	0	ST	Sand (SP): brown in color, slight
2A				5.5	6.0	7.08	7.34	ton Sampler	0	Jar	cohesion, dry, uniform, and fine
				6.0	6.5				0		to medium (10-15%) grained.
				6.5	7.0				0		Sample length: 2.34 ft
			10.0	7.0	7.4				0		
				5.0	10.0	—	—	*7" Hollow Stem	—		Cleanout
								Auger			

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED *3" Fixed Piston Sampler = 3" F.P.S. Sheet 1 of 3 Sheets
*7" Hollow Stem Auger = 7" H.S. Auger

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-6-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd. Press	Cont	CLASSIFICATION AND REMARKS
3	8 Oct	10.0		10.0	10.5	10.0	11.71	3" F.P.S.	0	ST	Silty sand (SM): brown in color,
3A				10.5	11.0	11.71	12.31		0	Jar	very fine-grained, uniform, slightly
				11.0	11.5				0		damp, and little cohesion.
				11.5	12.0				0		Sample length: 2.31 ft
				12.0	12.4				0		
				10.0	15.0	—	—	7" H.S. Auger		—	Cleanout
4	8 Oct			15.0	15.5	15.0	17.17	3" F.P.S.	0	ST	Silty sand (SM): brown in color,
4A				15.5	16.0	17.17	17.38		0	Jar	very fine-grained, moist, uniform,
				16.0	16.5		Water	at 17.35	0		and slight cohesion,
				16.5	17.0				0		Sample length: 2.38 ft
				17.0	17.38				0		
				15.0	20.0	—	—	7" H.S. Auger		—	Cleanout: material came in when
											pulling plug from auger.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. WES-4-6-81

SAMPLE NUMBER	DATE TAKEN 1981	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	Hyd Press	Cont	CLASSIFICATION AND REMARKS
5	8 Oct			19.5	20.0	19.5	20.35	3" F.P.S.	0	ST	Silty sand (SM); same as in pre-
5A				20.0	20.5	20.35	20,6		0	Jar	vious sample-moist.
				20.5	21.0				0		Sample length; 1.1 ft
				21.0	21.5				0		
				21.5	21.9				0		
				20.0	25.0			7" H.S. Auger			Cleanout; material came in when
											pulling plug from auger.
6	8 Oct			24.2	24.7	24.2	26.36	3" F.P.S.	0	ST	Silty sand (SM); brown to grey in
6A				24.7	25.2	26.36	26.56		20	Jar	color, fine-grained, slight cohesion,
				25.2	25.7				50		uniform, and damp.
				25.7	26.2				100		Sample length: 2.36 ft
			26.59	26.2	26.59				130		
											Installed well through auger.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 3 Sheets

Appendix C
Physical Data

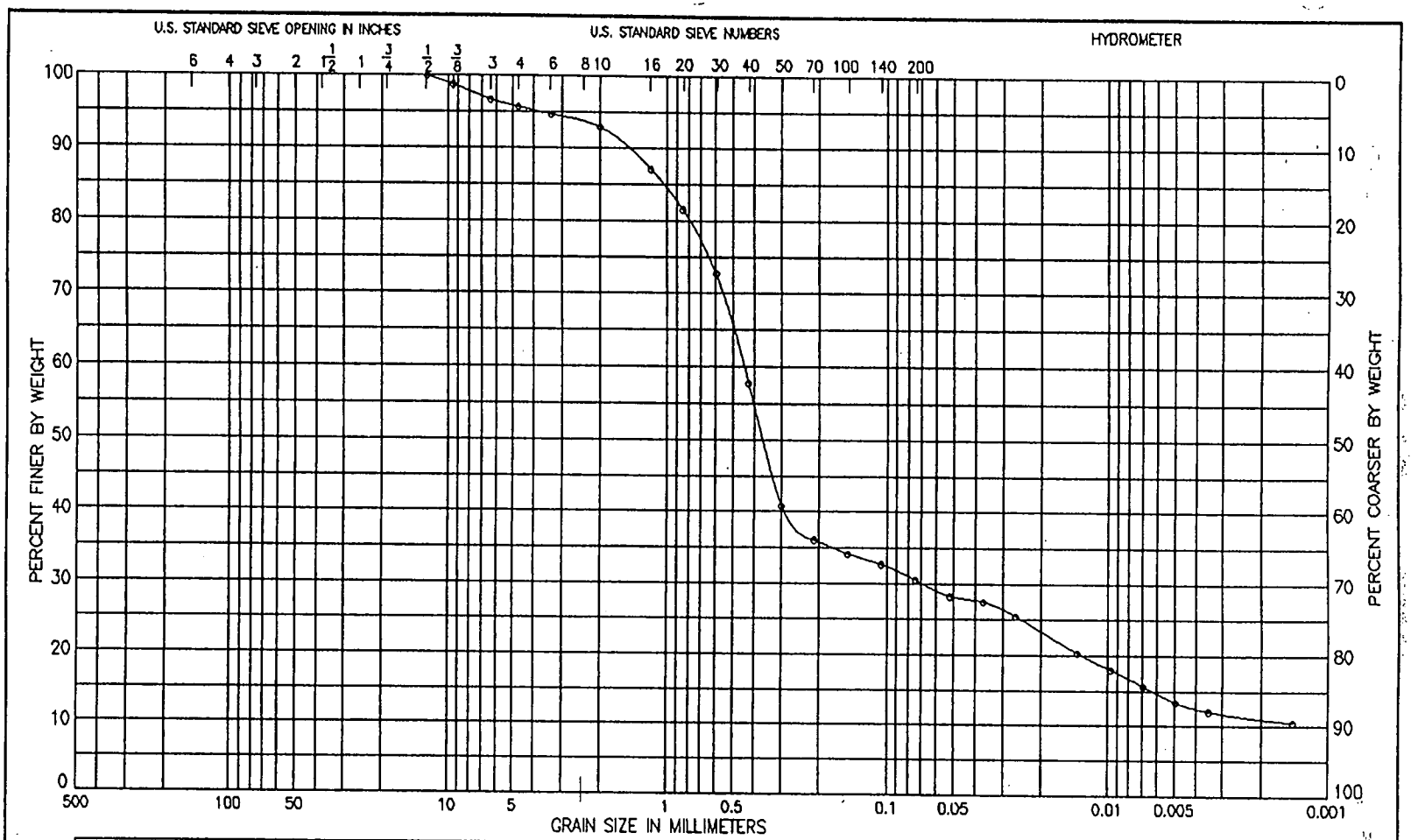
May 23, 1991

To: U.S. Army Corps of Engineers
Wilmington District
Attn. CESAW-EN-GG (Mr. Bob Magee)
P.O. Box 1890
Wilmington,NC 28402-1890

Subject: Performance of Soils Tests on Samples from Crane

1. Inclosed are 30 test report sheets for 15 samples from site McComish Gorge Crane IN. on which particle size distribution, Atterberg limits, natural water content and organic content are presented.

Jessie Oldham



LL	PL	PI	GS	NAT W,%	ORG,%
26	12	14	2.70 EST	12.6	2.2

CLASSIFICATION
CLAYEY SAND (SC), BROWN; TRACE OF GRAVEL

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-01-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-01-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

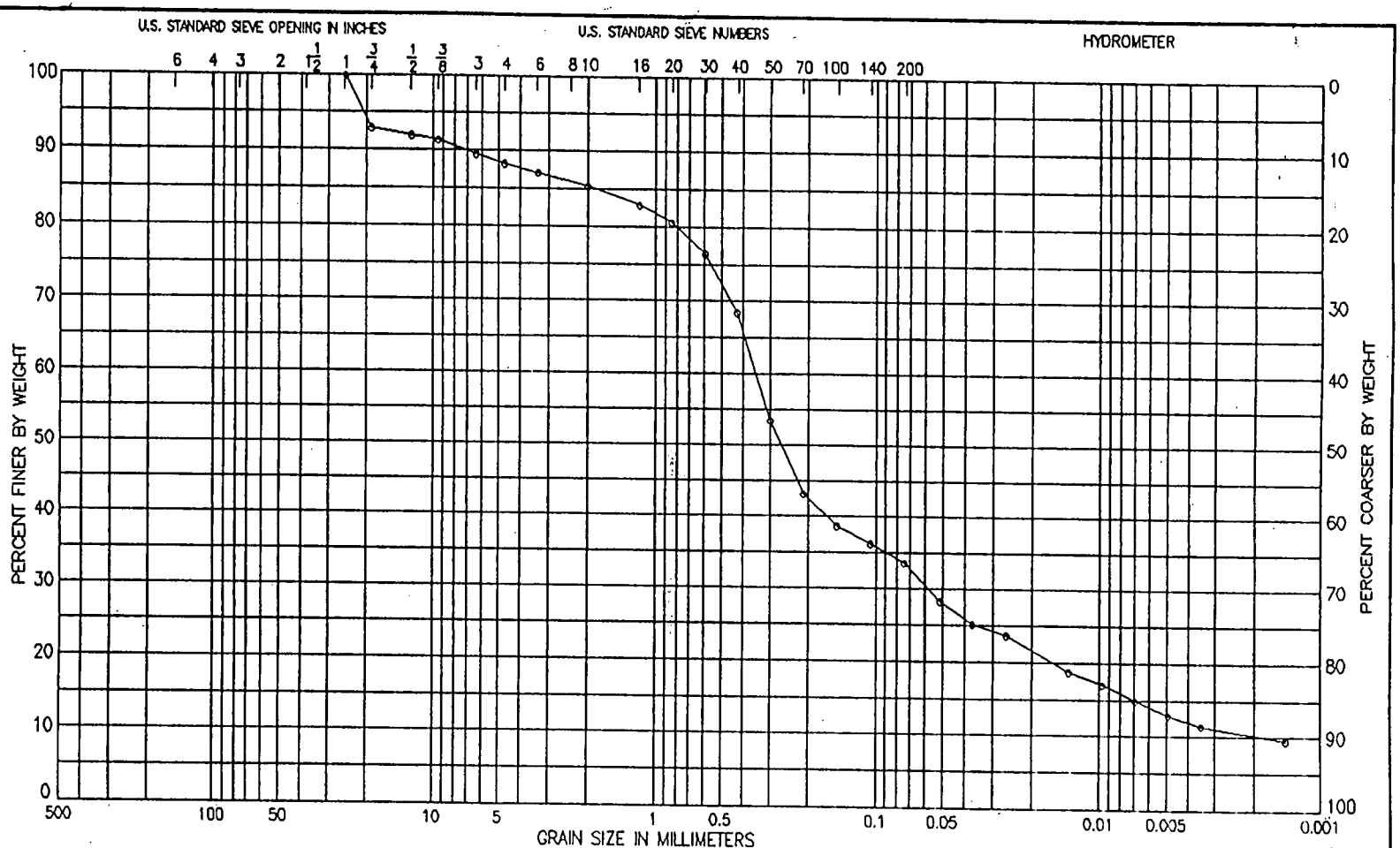
LL: 26 PL: 12 PI: 14 GS: 2.70 est WC: 12.60 OC: 2.20
CLASSIFICATION: 108
CLAYEY SAND (SC), BROWN; TRACE OF GRAVEL

TOTAL WEIGHT OF SAMPLE: 238.8 gms.
PARTIAL WEIGHT AFTER SPLIT: 57.4 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1/2 in	12.500	100.0	.0
2.8	3/8 in	9.500	98.8	1.2
5.0	No 3	6.350	96.7	3.3
2.3	No 4	4.750	95.8	4.2
2.5	No 6	3.350	94.7	5.3
4.3	No 10	2.000	92.9	7.1
3.6	No 16	1.180	87.1	12.9
7.0	No 20	.850	81.6	18.4
12.5	No 30	.600	72.7	27.3
21.7	No 40	.425	57.8	42.2
32.2	No 50	.300	40.8	59.2
35.1	No 70	.212	36.1	63.9
36.3	No 100	.150	34.2	65.8
37.2	No 140	.106	32.7	67.3
38.5	No 200	.075	30.6	69.4
HYDROMETER:				
RDGS	TEMP			
11.2	21.5	.0521	28.3	71.7
10.9	21.5	.0370	27.5	72.5
10.1	21.5	.0263	25.5	74.5
8.1	21.5	.0138	20.3	79.7
7.1	22.0	.0097	18.0	82.0
6.2	22.0	.0069	15.7	84.3
5.3	22.0	.0049	13.4	86.6
4.8	22.0	.0035	12.1	87.9
4.4	21.0	.0015	10.5	89.5

PERCENT GRAVEL = 4.2
PERCENT SAND = 65.2
PERCENT FINES = 30.6

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
25	12	13	2.70 EST	11.8	3.4

CLASSIFICATION

CLAYEY SAND (SC), BROWN; WITH GRAVEL

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE

LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-1A-90 SAMPLE NO. 1A

DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-1A-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 25 PL: 12 PI: 13 GS: 2.70 est WC: 11.80 OC: 3.40
CLASSIFICATION: 126
CLAYEY SAND (SC), BROWN; WITH GRAVEL

TOTAL WEIGHT OF SAMPLE: 382.2 gms.
PARTIAL WEIGHT AFTER SPLIT: 55.6 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

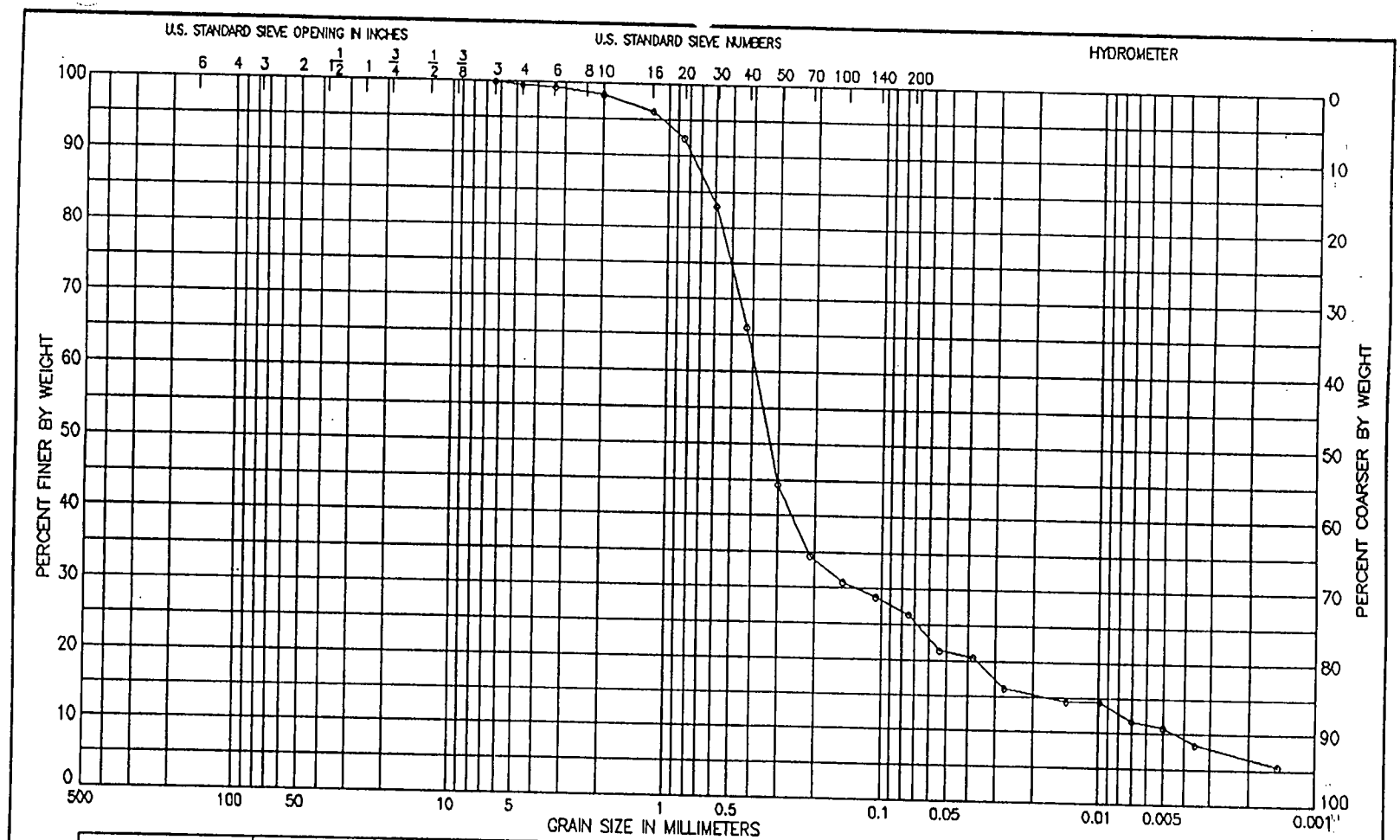
WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1 in	25.000	100.0	.0
27.3	3/4 in	19.100	92.9	7.1
3.7	1/2 in	12.500	91.9	8.1
2.2	3/8 in	9.500	91.3	8.7
6.9	No 3	6.350	89.5	10.5
4.8	No 4	4.750	88.3	11.7
4.5	No 6	3.350	87.1	12.9
6.6	No 10	2.000	85.3	14.7
1.6	No 16	1.180	82.9	17.1
3.1	No 20	.850	80.6	19.4
5.8	No 30	.600	76.4	23.6
11.0	No 40	.425	68.5	31.5
20.8	No 50	.300	53.4	46.6
27.5	No 70	.212	43.1	56.9
30.4	No 100	.150	38.7	61.3
32.0	No 140	.106	36.2	63.8
33.7	No 200	.075	33.6	66.4

HYDROMETER:

RDGS	TEMP			
11.8	21.5	.0518	28.3	71.7
10.5	21.5	.0371	25.1	74.9
9.9	21.5	.0264	23.6	76.4
7.9	21.5	.0138	18.8	81.2
7.1	22.0	.0097	17.1	82.9
6.2	22.0	.0069	14.9	85.1
5.4	22.0	.0049	12.9	87.1
4.8	22.0	.0035	11.5	88.5
4.2	21.0	.0015	9.5	90.5

PERCENT GRAVEL = 11.7
PERCENT SAND = 54.6
PERCENT FINES = 33.6

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
25	16	9	2.70 EST	15.0	2.1

CLASSIFICATION
CLAYEY SAND (SC), BROWN

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-02-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

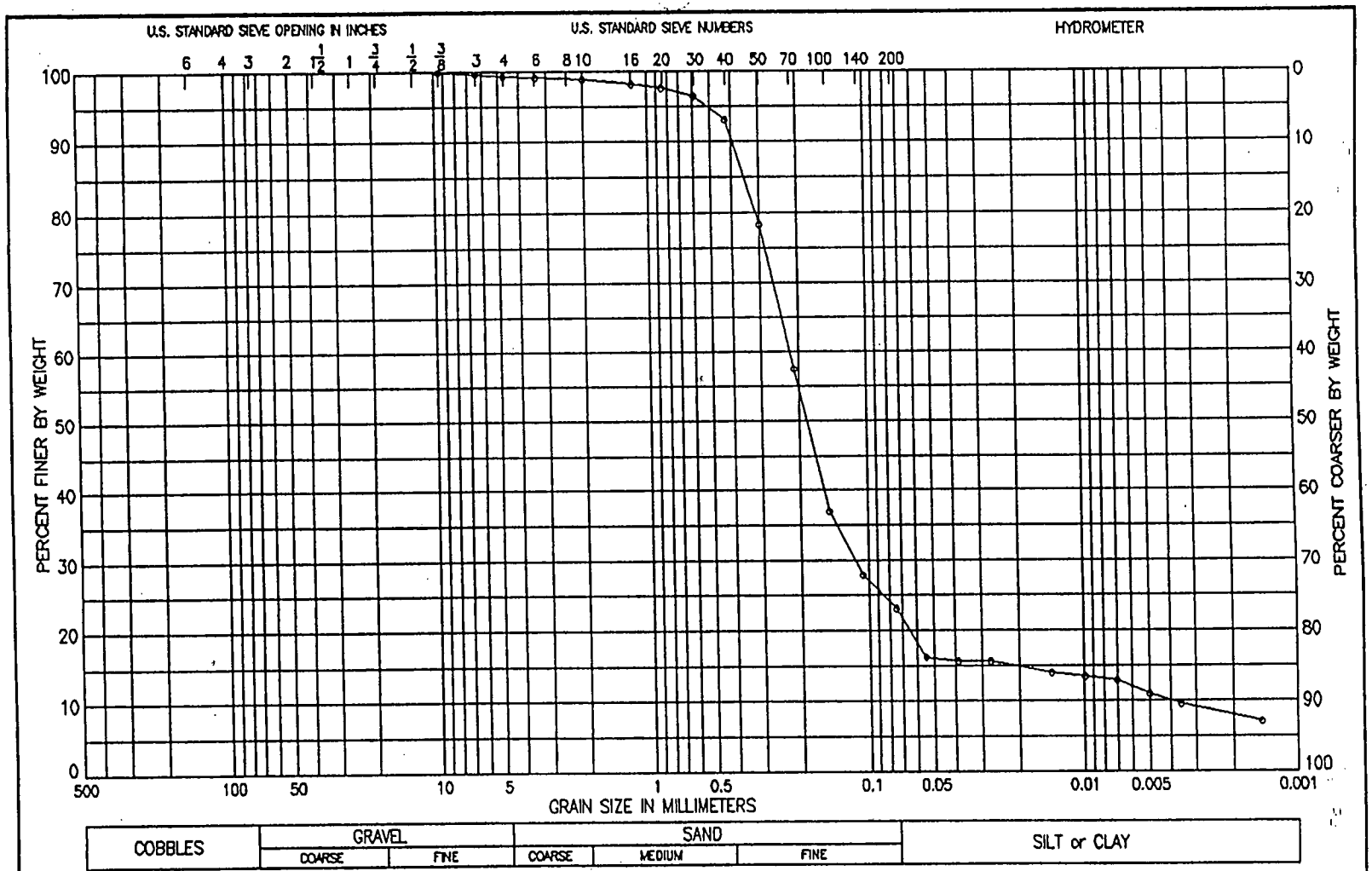
BORING: 04/02-02-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 25 PL: 16 PI: 9 GS: 2.70 est WC: 15.00 OC: 2.10
CLASSIFICATION: 144
CLAYEY SAND (SC), BROWN

TOTAL WEIGHT OF SAMPLE: 156.9 gms.
PARTIAL WEIGHT AFTER SPLIT: 53.3 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	No 3	6.350	100.0	.0
.7	No 4	4.750	99.6	.4
.3	No 6	3.350	99.4	.6
1.5	No 10	2.000	98.4	1.6
1.2	No 16	1.180	96.2	3.8
3.2	No 20	.850	92.5	7.5
8.3	No 30	.600	83.1	16.9
17.5	No 40	.425	66.1	33.9
29.3	No 50	.300	44.3	55.7
34.6	No 70	.212	34.5	65.5
36.6	No 100	.150	30.8	69.2
37.7	No 140	.106	28.8	71.2
39.0	No 200	.075	26.4	73.6
HYDROMETER:				
RDGS	TEMP			
7.5	21.5	.0538	21.4	78.6
7.2	21.5	.0381	20.5	79.5
5.7	21.5	.0273	16.1	83.9
5.1	21.5	.0142	14.4	85.6
5.0	22.0	.0099	14.4	85.6
4.1	22.0	.0071	11.7	88.3
3.8	22.0	.0050	10.8	89.2
3.0	22.0	.0036	8.5	91.5
2.2	21.0	.0015	5.6	94.4

PERCENT GRAVEL = .4
PERCENT SAND = 73.2
PERCENT FINES = 26.4



LL	PL	PI	GS	NAT W,%	ORG,%
21	18	3	2.68 EST	20.9	2.0

CLASSIFICATION
SILTY SAND (SC), BROWN

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-02-90 SAMPLE NO. 2A
DEPTH/ELEV 6.5 – 7.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

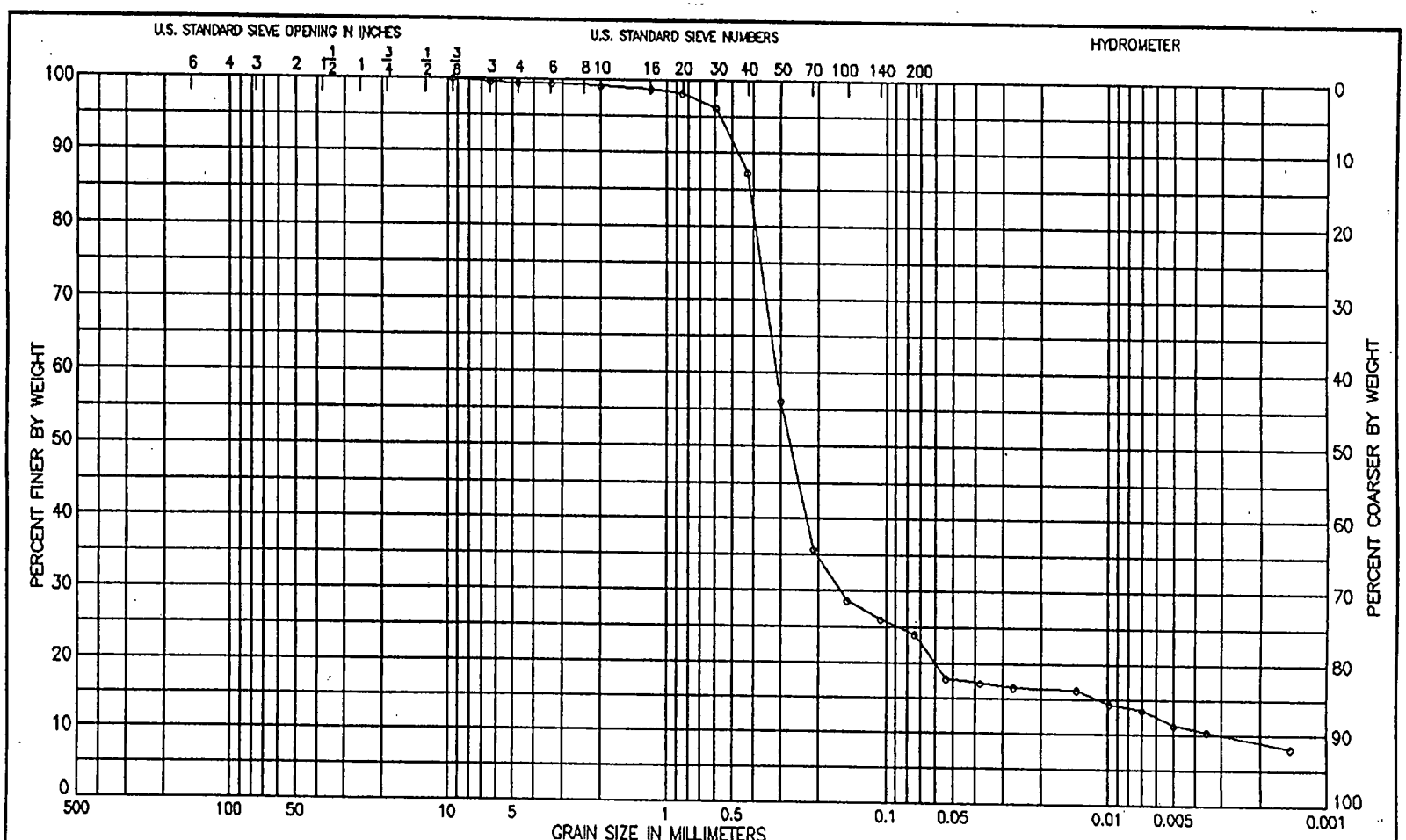
BORING: 04/02-02-90 SAMPLE: 2A DF: MD3091 .DAT
DEPTH: 6.5 - 7.0 DATE: 21 MAY 91

LL: 21 PL: 18 PI: 3 GS: 2.68 est WC: 20.90 OC: 2.00
CLASSIFICATION: 162
SILTY SAND (SC), BROWN

TOTAL WEIGHT OF SAMPLE: 243.1 gms.
PARTIAL WEIGHT AFTER SPLIT: 57.5 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/8 in	9.500	100.0	.0
.7	No 3	6.350	99.7	.3
.7	No 4	4.750	99.4	.6
.4	No 6	3.350	99.3	.7
.7	No 10	2.000	99.0	1.0
.4	No 16	1.180	98.3	1.7
.7	No 20	.850	97.8	2.2
1.4	No 30	.600	96.6	3.4
3.4	No 40	.425	93.1	6.9
12.0	No 50	.300	78.3	21.7
24.1	No 70	.212	57.5	42.5
36.0	No 100	.150	37.0	63.0
41.3	No 140	.106	27.9	72.1
44.1	No 200	.075	23.1	76.9
HYDROMETER:				
RDGS	TEMP			
6.1	21.5	.0547	16.2	83.8
5.9	21.5	.0388	15.7	84.3
5.9	21.5	.0274	15.7	84.3
5.3	21.5	.0142	14.0	86.0
5.0	22.0	.0100	13.5	86.5
4.8	22.0	.0071	12.9	87.1
4.1	22.0	.0050	11.0	89.0
3.6	22.0	.0036	9.6	90.4
2.9	21.0	.0015	7.1	92.9

PERCENT GRAVEL = .6
PERCENT SAND = 76.4
PERCENT FINES = 23.1



LL	PL	PI	GS	NAT W,%	ORG,%
21	14	7	2.70 EST	13.3	1.7

CLASSFICATION
CLAYEY SAND (SC), BROWN

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-03-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

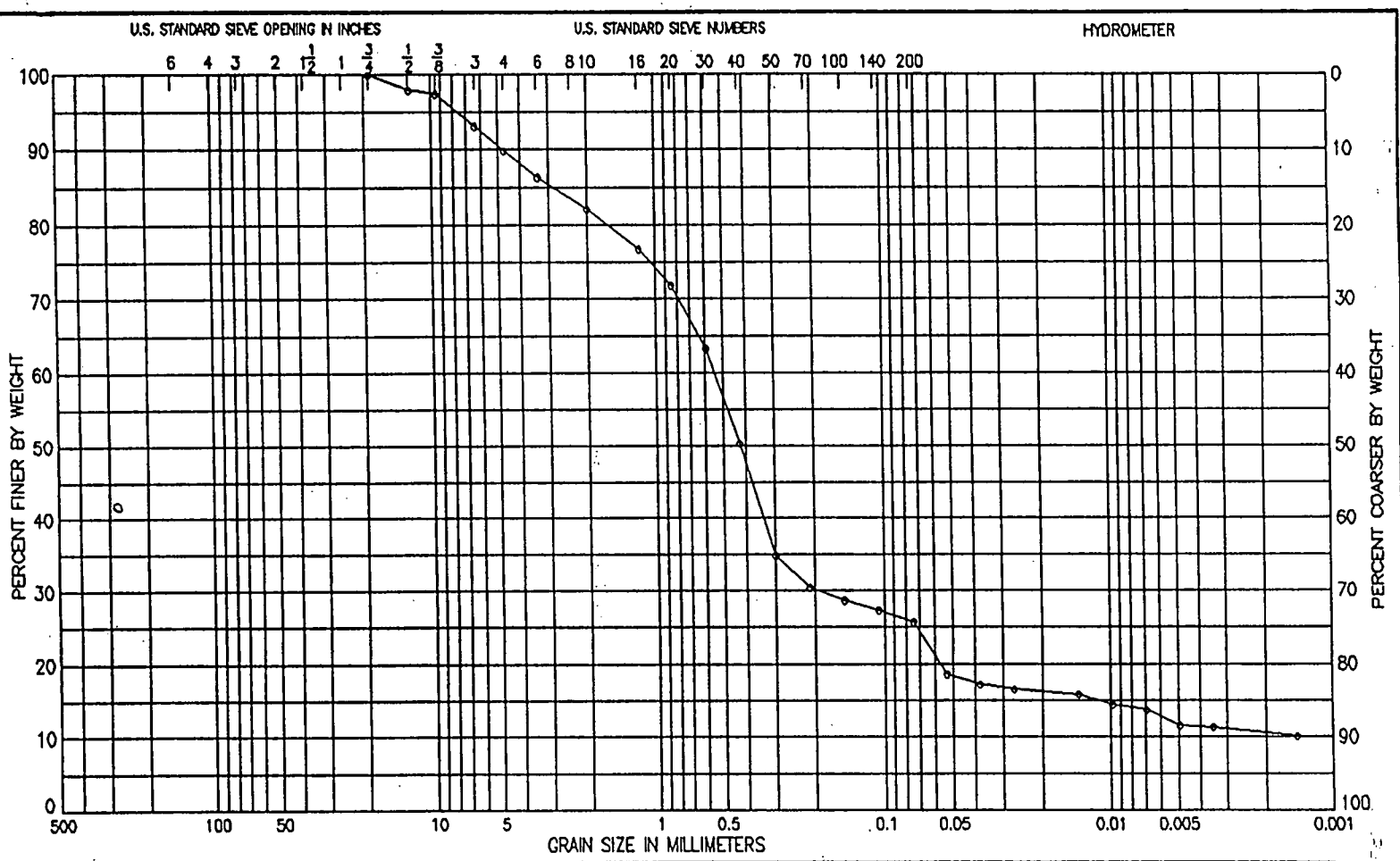
BORING: 04/02-03-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 21 PL: 14 PI: 7 GS: 2.70 est WC: 13.30 OC: 1.70
CLASSIFICATION: 180
CLAYEY SAND (SC), BROWN

TOTAL WEIGHT OF SAMPLE: 299.8 gms.
PARTIAL WEIGHT AFTER SPLIT: 54.1 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/8 in	9.500	100.0	.0
1.0	No 3	6.350	99.7	.3
.4	No 4	4.750	99.5	.5
.2	No 6	3.350	99.5	.5
.8	No 10	2.000	99.2	.8
.2	No 16	1.180	98.8	1.2
.5	No 20	.850	98.3	1.7
1.6	No 30	.600	96.3	3.7
6.5	No 40	.425	87.3	12.7
23.5	No 50	.300	56.1	43.9
34.6	No 70	.212	35.8	64.2
38.5	No 100	.150	28.6	71.4
39.9	No 140	.106	26.0	74.0
41.0	No 200	.075	24.0	76.0
HYDROMETER:				
RDGS	TEMP			
6.2	22.0	.0537	17.8	82.2
6.0	22.0	.0381	17.2	82.8
5.8	22.0	.0270	16.6	83.4
5.7	22.0	.0139	16.3	83.7
5.0	22.0	.0099	14.3	85.7
4.7	22.0	.0070	13.4	86.6
4.0	22.0	.0050	11.4	88.6
3.7	22.0	.0035	10.5	89.5
3.1	21.0	.0015	8.2	91.8

PERCENT GRAVEL = .5
PERCENT SAND = 75.5
PERCENT FINES = 24.0



LL	PL	PI	GS	NAT W,%	ORG,%
46	21	25	2.70 EST	16.5	2.3

CLASSIFICATION
CLAYEY SAND (SC), BROWN; WITH GRAVEL

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-03-90 SAMPLE NO. 2A
DEPTH/ELEV 7.0 – 7.5 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

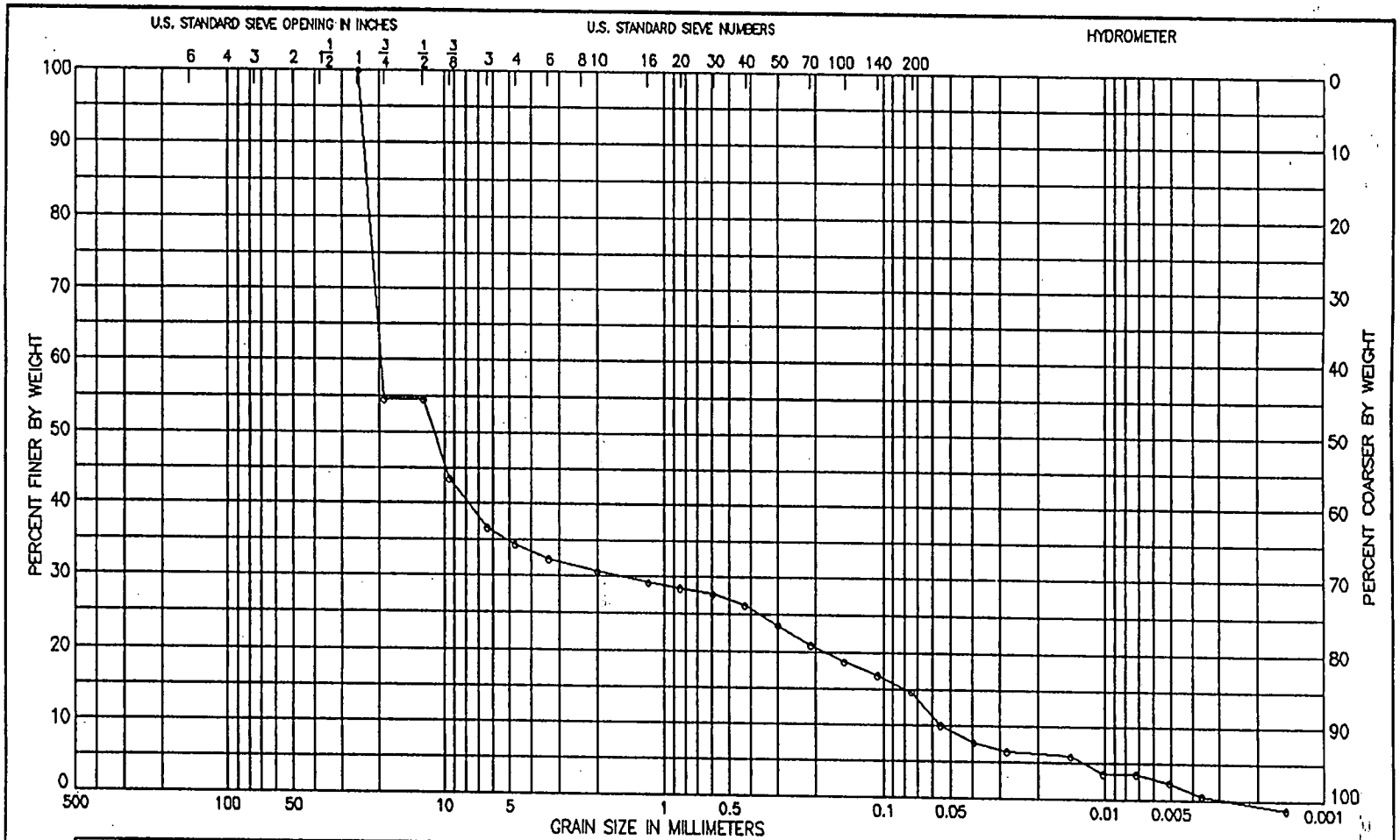
BORING: 04/02-03-90 SAMPLE: 2A DF: MD3091 .DAT
DEPTH: 7.0 - 7.5 DATE: 21 MAY 91

LL: 46 PL: 21 PI: 25 GS: 2.70 est WC: 16.50 OC: 2.30
CLASSIFICATION: 198
CLAYEY SAND (SC), BROWN; WITH GRAVEL

TOTAL WEIGHT OF SAMPLE: 311.0 gms.
PARTIAL WEIGHT AFTER SPLIT: 55.3 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/4 in	19.100	100.0	.0
6.3	1/2 in	12.500	98.0	2.0
1.6	3/8 in	9.500	97.5	2.5
13.5	No 3	6.350	93.1	6.9
10.2	No 4	4.750	89.8	10.2
10.8	No 6	3.350	86.4	13.6
13.3	No 10	2.000	82.1	17.9
3.6	No 16	1.180	76.7	23.3
6.9	No 20	.850	71.8	28.2
12.6	No 30	.600	63.4	36.6
21.4	No 40	.425	50.3	49.7
31.8	No 50	.300	34.9	65.1
34.8	No 70	.212	30.4	69.6
36.0	No 100	.150	28.6	71.4
36.9	No 140	.106	27.3	72.7
38.0	No 200	.075	25.7	74.3
HYDROMETER:				
RDGS	TEMP			
8.1	21.5	.0535	18.6	81.4
7.5	21.5	.0380	17.2	82.8
7.2	21.5	.0270	16.5	83.5
6.9	21.5	.0140	15.8	84.2
6.2	22.0	.0098	14.4	85.6
5.9	22.0	.0070	13.7	86.3
5.0	22.0	.0050	11.6	88.4
4.9	22.0	.0035	11.3	88.7
4.6	21.0	.0015	10.1	89.9

PERCENT GRAVEL = 10.2
PERCENT SAND = 64.2
PERCENT FINES = 25.7



LL	PL	PI	GS	NAT W,%	ORG,%
29	19	10	2.70 EST	29.6	43.2

CLASSIFICATION
SANDY CLAYEY GRAVEL (GC), BROWN

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-04-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-04-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 29 PL: 19 PI: 10 GS: 2.70 est WC: 29.60 OC: 43.20
CLASSIFICATION: 216
SANDY CLAYEY GRAVEL (GC), BROWN

TOTAL WEIGHT OF SAMPLE: 29.7 gms.
PARTIAL WEIGHT AFTER SPLIT: 8.2 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

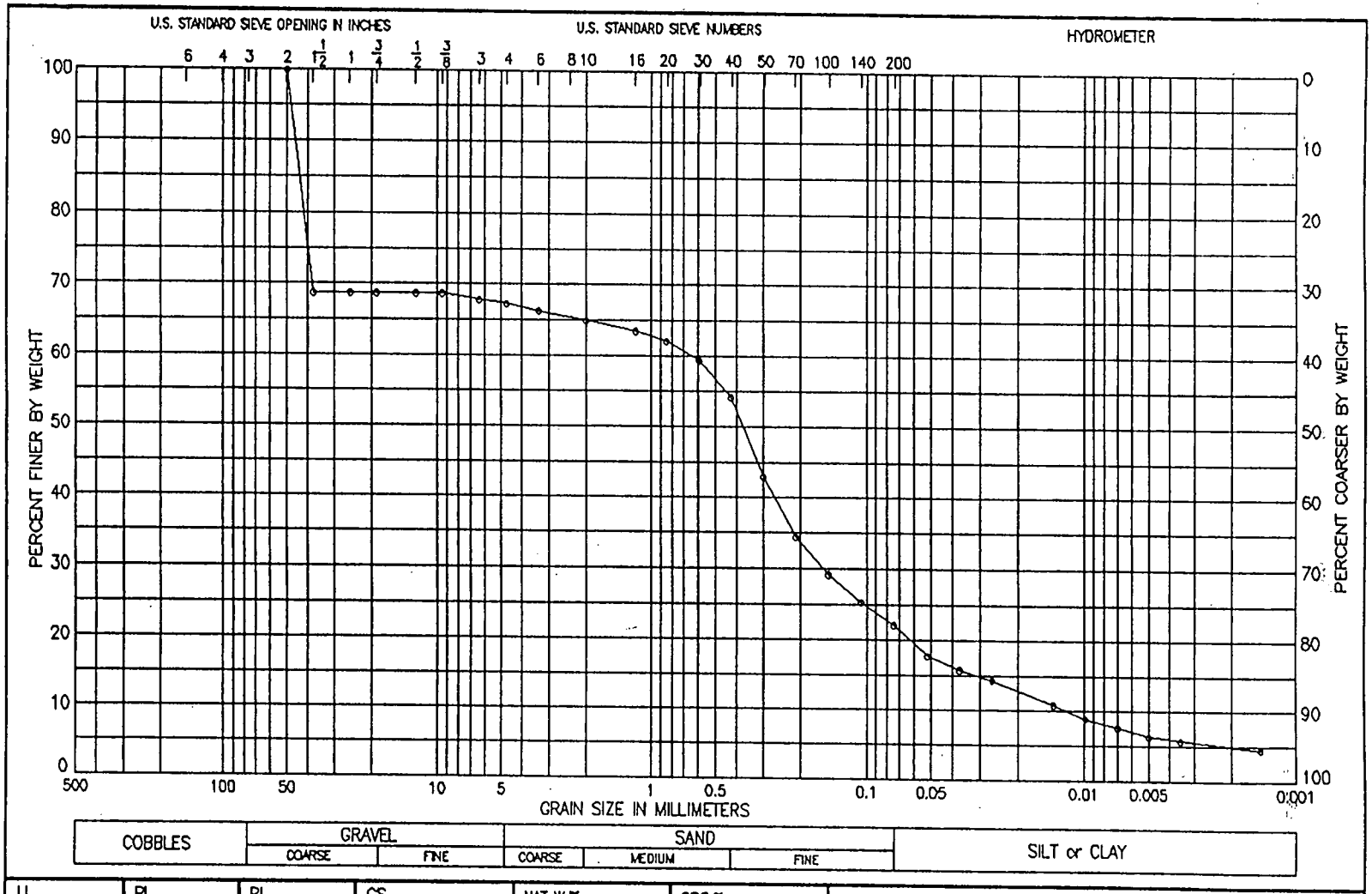
WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1 in	25.000	100.0	.0
13.5	3/4 in	19.100	54.5	45.5
.0	1/2 in	12.500	54.5	45.5
3.3	3/8 in	9.500	43.4	56.6
2.0	No 3	6.350	36.7	63.3
.7	No 4	4.750	34.3	65.7
.6	No 6	3.350	32.3	67.7
.5	No 10	2.000	30.6	69.4
.4	No 16	1.180	29.1	70.9
.6	No 20	.850	28.4	71.6
.8	No 30	.600	27.7	72.3
1.2	No 40	.425	26.2	73.8
1.9	No 50	.300	23.5	76.5
2.6	No 70	.212	20.9	79.1
3.2	No 100	.150	18.7	81.3
3.7	No 140	.106	16.8	83.2
4.3	No 200	.075	14.6	85.4

HYDROMETER:

RDGS	TEMP			
1.8	22.0	.0556	10.1	89.9
1.4	22.0	.0394	7.7	92.3
1.2	22.0	.0279	6.5	93.5
1.1	22.0	.0144	5.9	94.1
.7	22.0	.0102	3.6	96.4
.7	22.0	.0072	3.6	96.4
.5	22.0	.0051	2.4	97.6
.2	22.0	.0036	.6	99.4
.1	21.0	.0015	-1.2	101.2

PERCENT GRAVEL = 65.7
PERCENT SAND = 19.8
PERCENT FINES = 14.6

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
22	14	8	2.70 EST	19.3	3.8

CLASSIFICATION

GRAVELLY CLAYEY SAND (SC), BROWN

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE

LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-05-90 SAMPLE NO. 1A

DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-05-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 22 PL: 14 PI: 8 GS: 2.70 est WC: 19.30 OC: 3.80
CLASSIFICATION: 234
GRAVELLY CLAYEY SAND (SC), BROWN

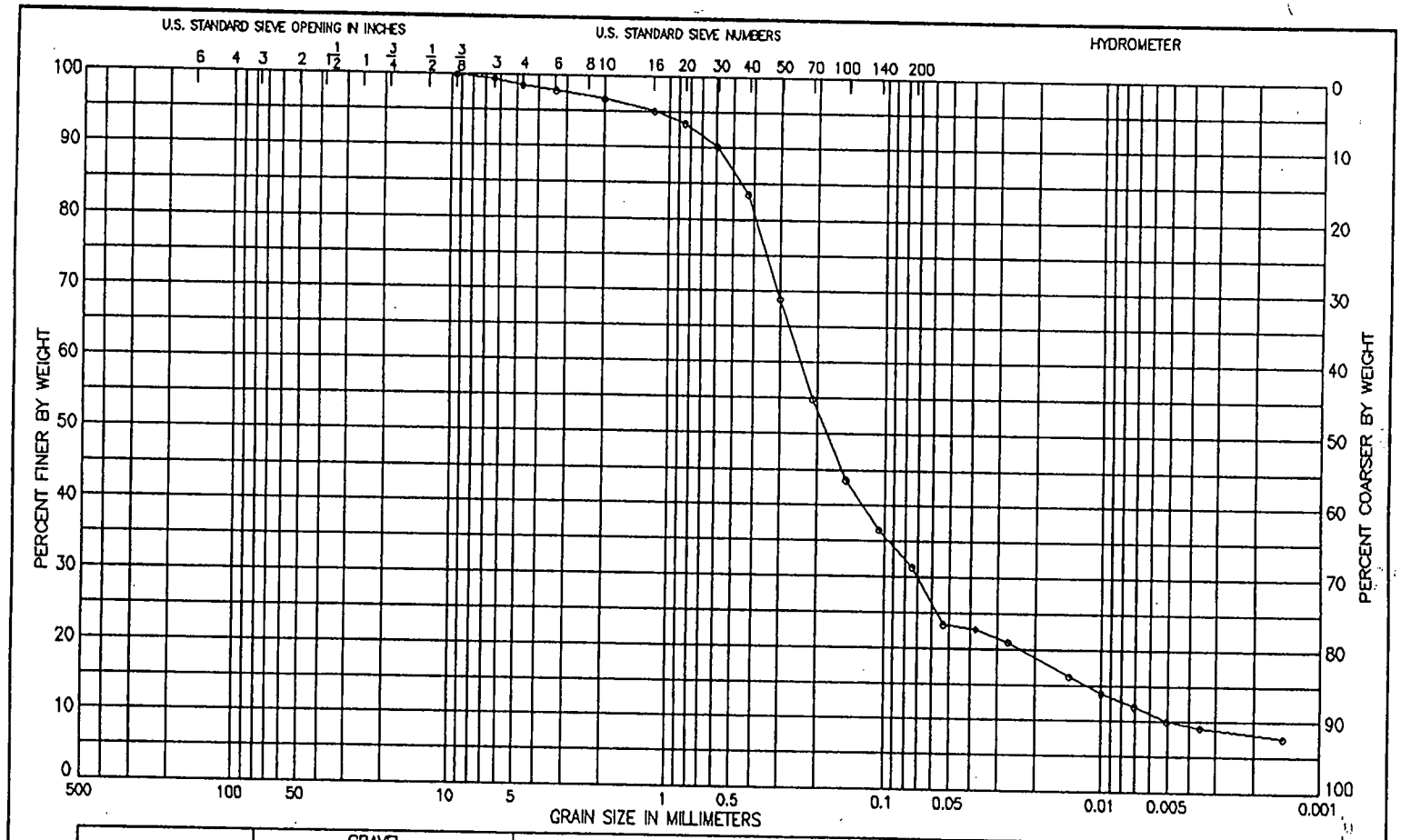
TOTAL WEIGHT OF SAMPLE: 92.0 gms.
PARTIAL WEIGHT AFTER SPLIT: 57.0 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	2 in	50.000	100.0	.0
28.8	1.5 in	37.500	68.7	31.3
.0	1 in	25.000	68.7	31.3
.0	3/4 in	19.100	68.7	31.3
.0	1/2 in	12.500	68.7	31.3
.0	3/8 in	9.500	68.7	31.3
.8	No 3	6.350	67.8	32.2
.5	No 4	4.750	67.3	32.7
.9	No 6	3.350	66.3	33.7
1.2	No 10	2.000	65.0	35.0
1.3	No 16	1.180	63.5	36.5
2.5	No 20	.850	62.1	37.9
4.9	No 30	.600	59.4	40.6
9.5	No 40	.425	54.2	45.8
19.3	No 50	.300	43.0	57.0
26.8	No 70	.212	34.4	65.6
31.4	No 100	.150	29.2	70.8
34.8	No 140	.106	25.3	74.7
37.6	No 200	.075	22.1	77.9

HYDROMETER:

RDGS	TEMP			
9.9	22.0	.0521	17.7	82.3
8.8	22.0	.0372	15.8	84.2
8.0	22.0	.0265	14.3	85.7
6.1	22.0	.0139	10.9	89.1
5.0	22.0	.0099	8.9	91.1
4.3	22.0	.0070	7.6	92.4
3.6	22.0	.0050	6.3	93.7
3.3	22.0	.0035	5.8	94.2
2.8	21.0	.0015	4.5	95.5

PERCENT GRAVEL = 32.7
PERCENT SAND = 45.2
PERCENT FINES = 22.1



LL	PL	PI	GS	NAT W,%	ORG,%
NP			2.67 EST	15.2	2.6

CLASSIFICATION
SILTY SAND (SM), BROWN

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-06-90 SAMPLE NO. 1A
DEPTH/ELEV 1.0 – 1.5 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-06-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 1.0 - 1.5 DATE: 21 MAY 91

NON-PLASTIC GS: 2.67 est WC: 15.20 OC: 2.60
CLASSIFICATION: 252
SILTY SAND (SM), BROWN

TOTAL WEIGHT OF SAMPLE: 244.9 gms.
PARTIAL WEIGHT AFTER SPLIT: 52.4 gms.

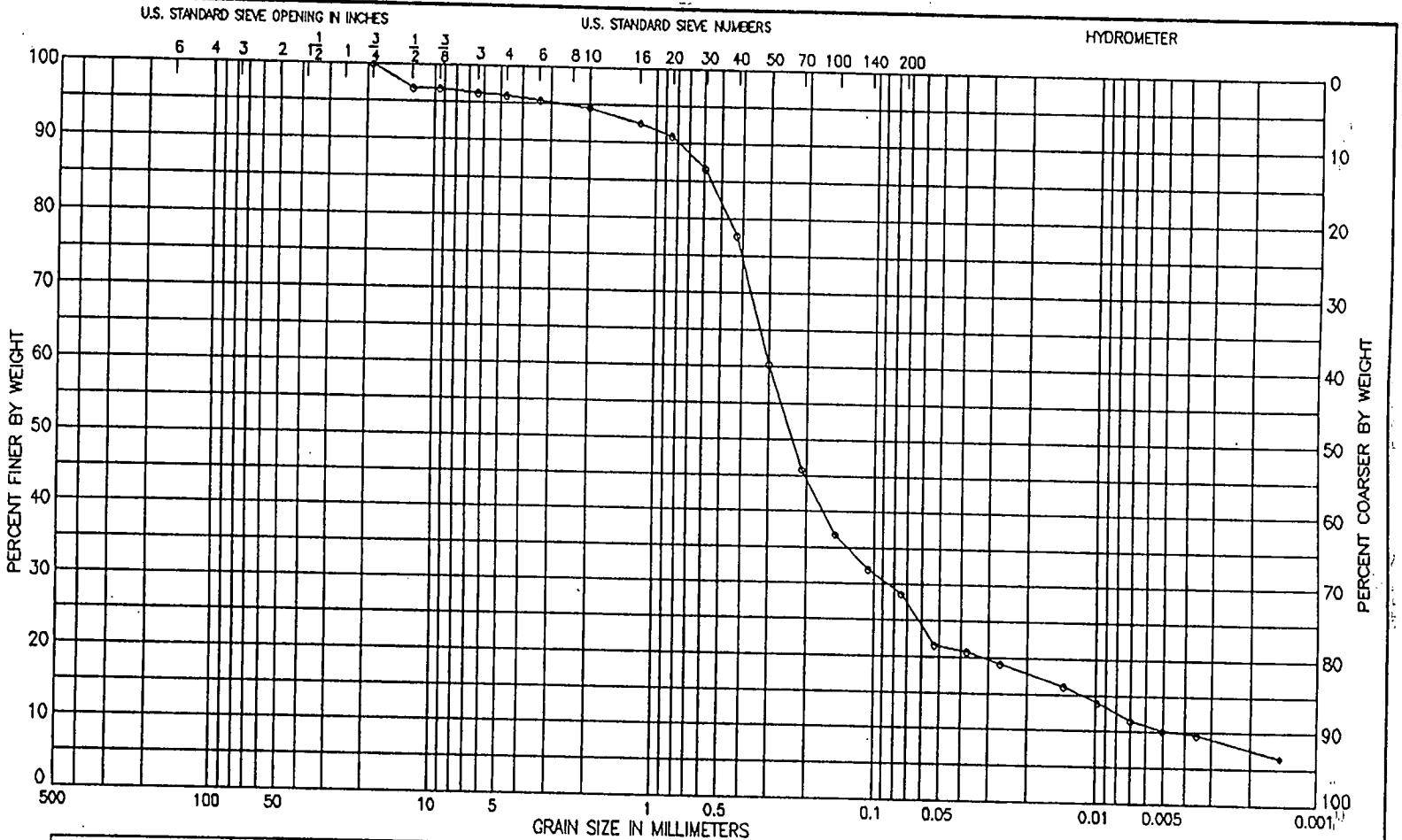
WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/8 in	9.500	100.0	.0
1.4	No 3	6.350	99.4	.6
2.0	No 4	4.750	98.6	1.4
1.8	No 6	3.350	97.9	2.1
2.7	No 10	2.000	96.8	3.2
.9	No 16	1.180	95.1	4.9
1.8	No 20	.850	93.4	6.6
3.6	No 30	.600	90.1	9.9
7.2	No 40	.425	83.5	16.5
15.1	No 50	.300	68.9	31.1
22.7	No 70	.212	54.9	45.1
28.8	No 100	.150	43.6	56.4
32.6	No 140	.106	36.6	63.4
35.4	No 200	.075	31.4	68.6

HYDROMETER:

RDGS	TEMP			
8.0	22.0	.0534	23.3	76.7
7.8	22.0	.0378	22.7	77.3
7.2	22.0	.0269	21.0	79.0
5.6	22.0	.0141	16.2	83.8
4.8	22.0	.0100	13.9	86.1
4.2	22.0	.0071	12.1	87.9
3.5	22.0	.0051	10.0	90.0
3.2	22.0	.0036	9.2	90.8
2.9	21.0	.0015	7.7	92.3

PERCENT GRAVEL = 1.4
PERCENT SAND = 67.2
PERCENT FINES = 31.4

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
28	14	14	2.70 EST	15.2	2.2

CLASSIFICATION

CLAYEY SAND (SC), DARK BROWN; TRACE OF GRAVEL

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE ! LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-06-90 SAMPLE NO. 2A

DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-06-90 SAMPLE: 2A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 28 PL: 14 PI: 14 GS: 2.70 est WC: 15.20 OC: 2.20
CLASSIFICATION: 270
CLAYEY SAND (SC), DARK BROWN; TRACE OF GRAVEL

TOTAL WEIGHT OF SAMPLE: 286.5 gms.
PARTIAL WEIGHT AFTER SPLIT: 54.9 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

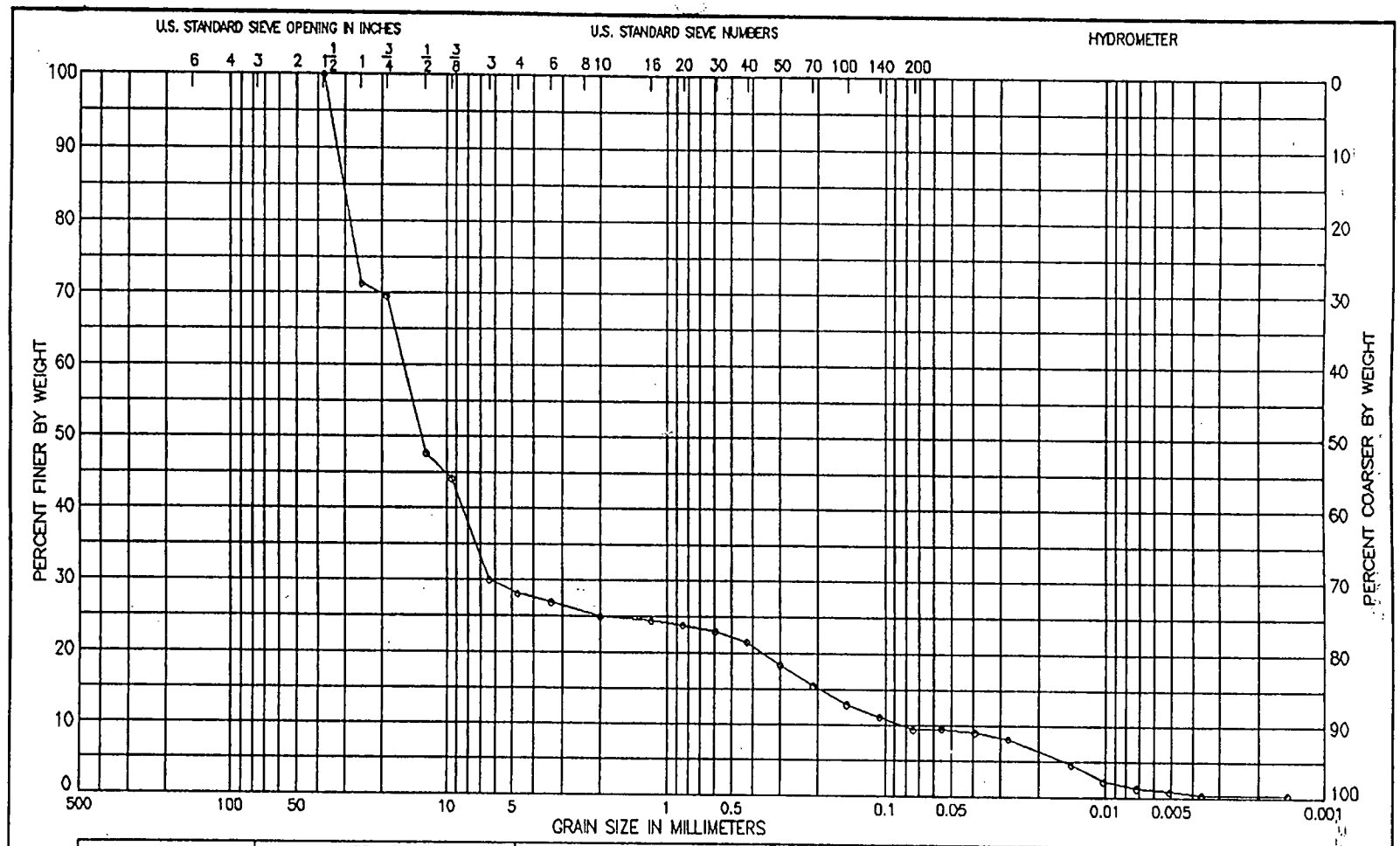
WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/4 in	19.100	100.0	.0
9.2	1/2 in	12.500	96.8	3.2
.0	3/8 in	9.500	96.8	3.2
1.5	No 3	6.350	96.3	3.7
.8	No 4	4.750	96.0	4.0
1.6	No 6	3.350	95.4	4.6
2.5	No 10	2.000	94.6	5.4
1.1	No 16	1.180	92.7	7.3
2.1	No 20	.850	90.9	9.1
4.6	No 30	.600	86.6	13.4
9.8	No 40	.425	77.7	22.3
19.9	No 50	.300	60.3	39.7
28.3	No 70	.212	45.8	54.2
33.5	No 100	.150	36.9	63.1
36.3	No 140	.106	32.0	68.0
38.3	No 200	.075	28.6	71.4

HYDROMETER:

RDGS	TEMP			
8.0	22.0	.0529	21.6	78.4
7.7	22.0	.0375	20.8	79.2
7.1	22.0	.0267	19.1	80.9
6.0	22.0	.0139	16.1	83.9
5.2	22.0	.0099	14.0	86.0
4.3	22.0	.0070	11.5	88.5
3.9	21.5	.0051	10.1	89.9
3.6	22.0	.0035	9.6	90.4
2.7	21.0	.0015	6.6	93.4

PERCENT GRAVEL = 4.0
PERCENT SAND = 67.4
PERCENT FINES = 28.6

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
24	14	10	2.70 EST	16.4	24.9

CLASSIFICATION

SANDY CLAYEY GRAVEL (GP–GC), BROWN

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-07-90 SAMPLE NO. 1A

DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-07-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

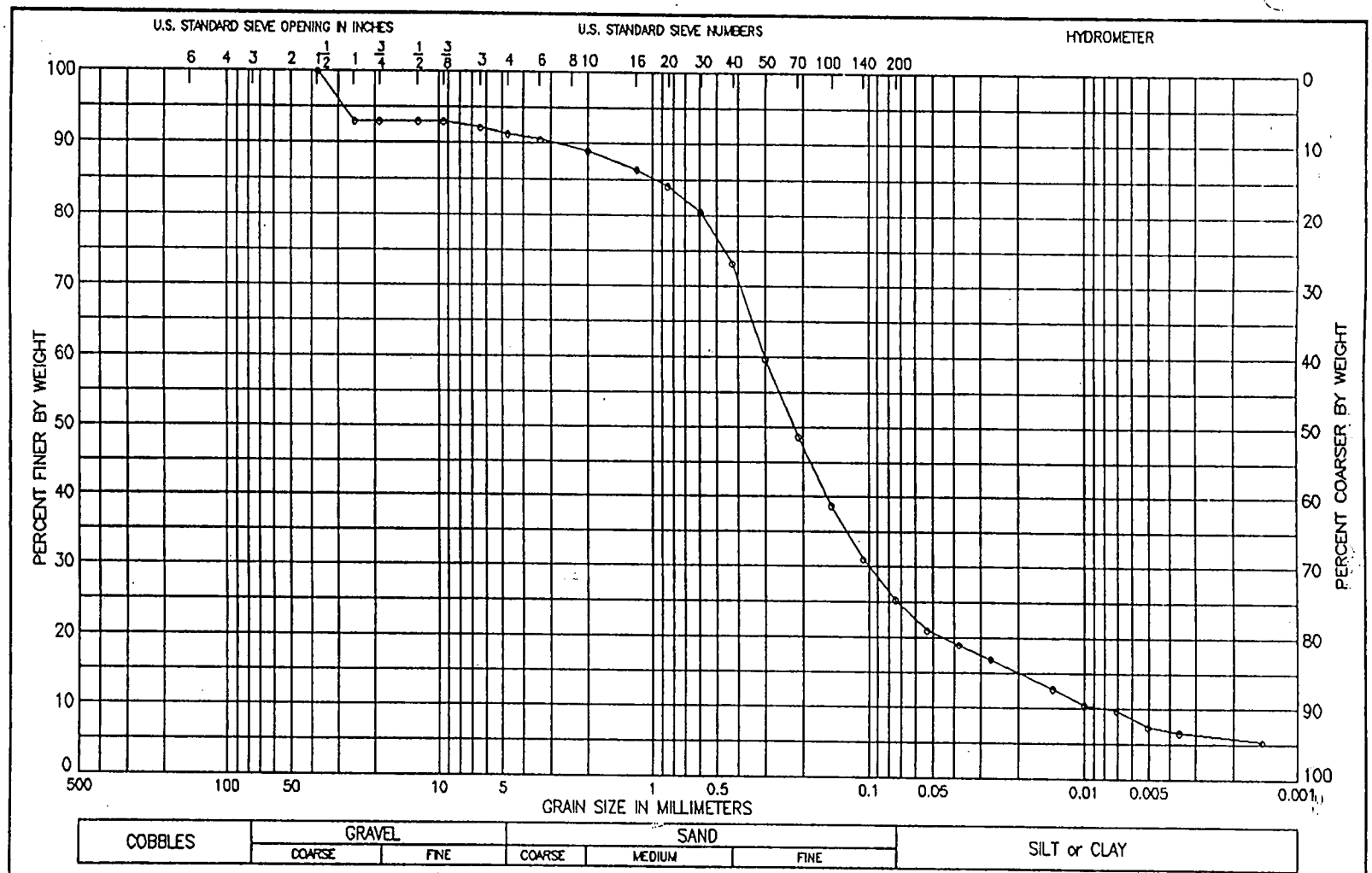
LL: 24 PL: 14 PI: 10 GS: 2.70 est WC: 16.40 OC: 24.90
CLASSIFICATION: 288
SANDY CLAYEY GRAVEL (GP-GC), BROWN

TOTAL WEIGHT OF SAMPLE: 51.7 gms.
PARTIAL WEIGHT AFTER SPLIT: 8.7 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1.5 in	37.500	100.0	.0
14.8	1 in	25.000	71.4	28.6
.9	3/4 in	19.100	69.6	30.4
11.4	1/2 in	12.500	47.6	52.4
1.8	3/8 in	9.500	44.1	55.9
7.3	No 3	6.350	30.0	70.0
1.0	No 4	4.750	28.0	72.0
.6	No 6	3.350	26.9	73.1
1.0	No 10	2.000	25.0	75.0
.2	No 16	1.180	24.4	75.6
.4	No 20	.850	23.8	76.2
.7	No 30	.600	22.9	77.1
1.2	No 40	.425	21.5	78.5
2.3	No 50	.300	18.4	81.6
3.3	No 70	.212	15.5	84.5
4.2	No 100	.150	12.9	87.1
4.8	No 140	.106	11.2	88.8
5.4	No 200	.075	9.5	90.5
HYDROMETER:				
RDGS	TEMP			
2.1	22.5	.0555	9.6	90.4
2.0	22.5	.0393	9.1	90.9
1.8	22.5	.0278	8.2	91.8
1.0	22.5	.0144	4.6	95.4
.6	22.0	.0102	2.3	97.7
.4	22.0	.0073	1.4	98.6
.3	22.0	.0051	.9	99.1
.2	22.0	.0036	.5	99.5
.2	22.0	.0015	.5	99.5

PERCENT GRAVEL = 72.0
PERCENT SAND = 18.6
PERCENT FINES = 9.5

D60 = 16.22
D30 = 6.35
D10 = .08
CU =191.58
CC = 29.41



LL	PL	PI	GS	NAT W,%	ORG,%
20	15	5	2.67 EST	16.8	2.6

CLASSIFICATION

CLAYEY SILTY SAND (SM-SC), BROWN; WITH GRAVEL

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE | LABORATORY USAE WES - STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-08-90 SAMPLE NO. 1A

DEPTH/ELEV 2.5 - 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-08-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 20 PL: 15 PI: 5 GS: 2.67 est WC: 16.80 OC: 2.60
CLASSIFICATION: 306
CLAYEY SILTY SAND (SM-SC), BROWN; WITH GRAVEL

TOTAL WEIGHT OF SAMPLE: 173.1 gms.
PARTIAL WEIGHT AFTER SPLIT: 55.6 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

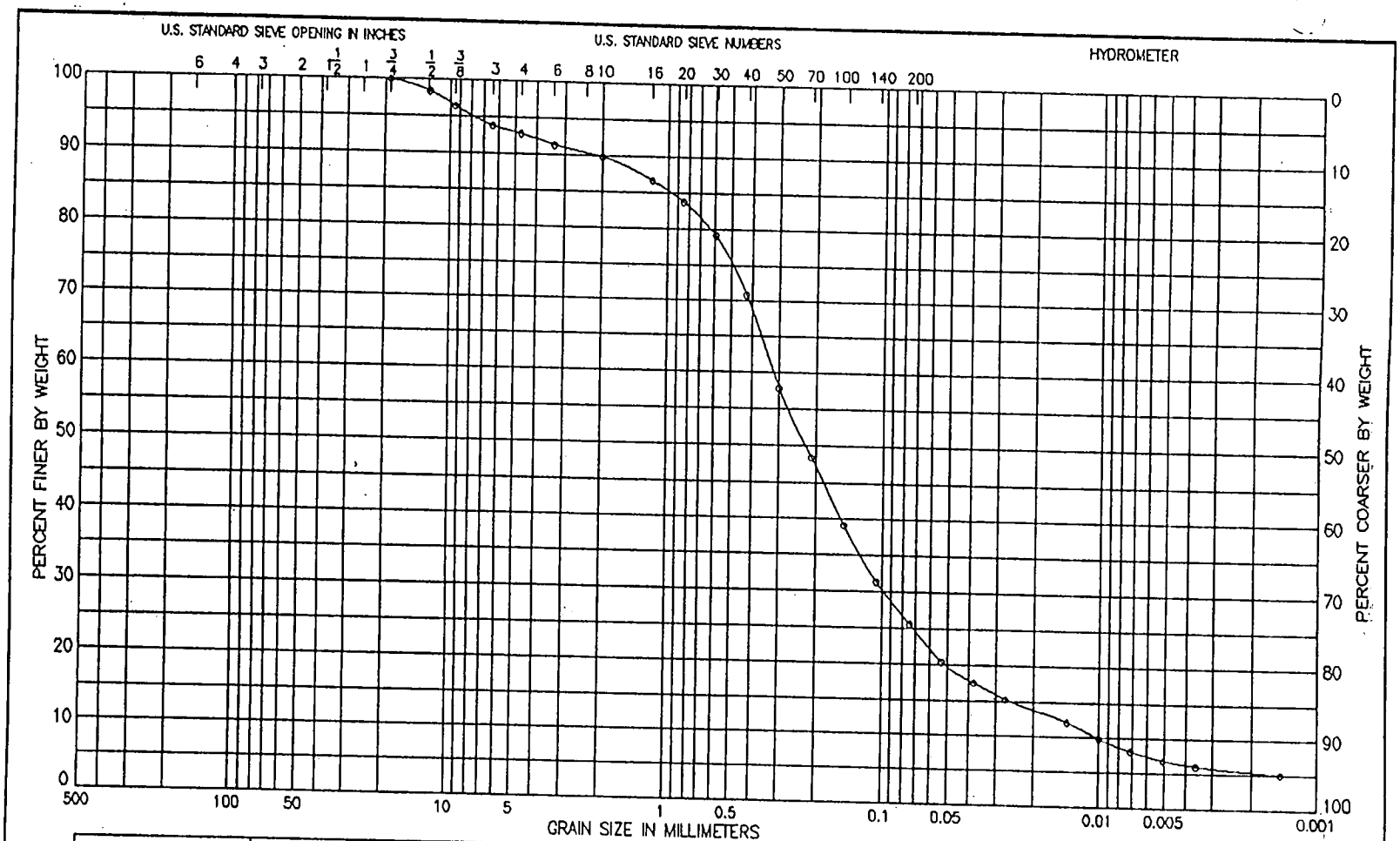
WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1.5 in	37.500	100.0	.0
12.1	1 in	25.000	93.0	7.0
.0	3/4 in	19.100	93.0	7.0
.0	1/2 in	12.500	93.0	7.0
.0	3/8 in	9.500	93.0	7.0
1.5	No 3	6.350	92.1	7.9
1.5	No 4	4.750	91.3	8.7
1.3	No 6	3.350	90.5	9.5
2.7	No 10	2.000	89.0	11.0
1.6	No 16	1.180	86.4	13.6
3.0	No 20	.850	84.2	15.8
5.3	No 30	.600	80.5	19.5
9.8	No 40	.425	73.3	26.7
18.3	No 50	.300	59.7	40.3
25.2	No 70	.212	48.6	51.4
31.4	No 100	.150	38.7	61.3
36.2	No 140	.106	31.0	69.0
39.8	No 200	.075	25.3	74.7

HYDROMETER:

RDGS	TEMP			
8.2	22.5	.0533	21.0	79.0
7.4	22.5	.0380	18.9	81.1
6.6	22.5	.0270	16.9	83.1
5.0	22.5	.0141	12.8	87.2
4.2	22.0	.0101	10.5	89.5
3.9	22.0	.0071	9.7	90.3
3.0	22.0	.0051	7.4	92.6
2.7	22.0	.0036	6.7	93.3
2.2	22.0	.0015	5.4	94.6

PERCENT GRAVEL = 8.7
PERCENT SAND = 66.0
PERCENT FINES = 25.3

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
21	16	5	2.67 EST	13.4	3.6

CLASSIFICATION

CLAYEY SILTY SAND (SM–SC), BROWN; WITH GRAVEL

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE

CRANE, IN

BORING NO. 04/02-08-90 SAMPLE NO. 2A

DEPTH/ELEV 4.0 – 4.5 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-08-90 SAMPLE: 2A DF: MD3091 .DAT
DEPTH: 4.0 - 4.5 DATE: 21 MAY 91

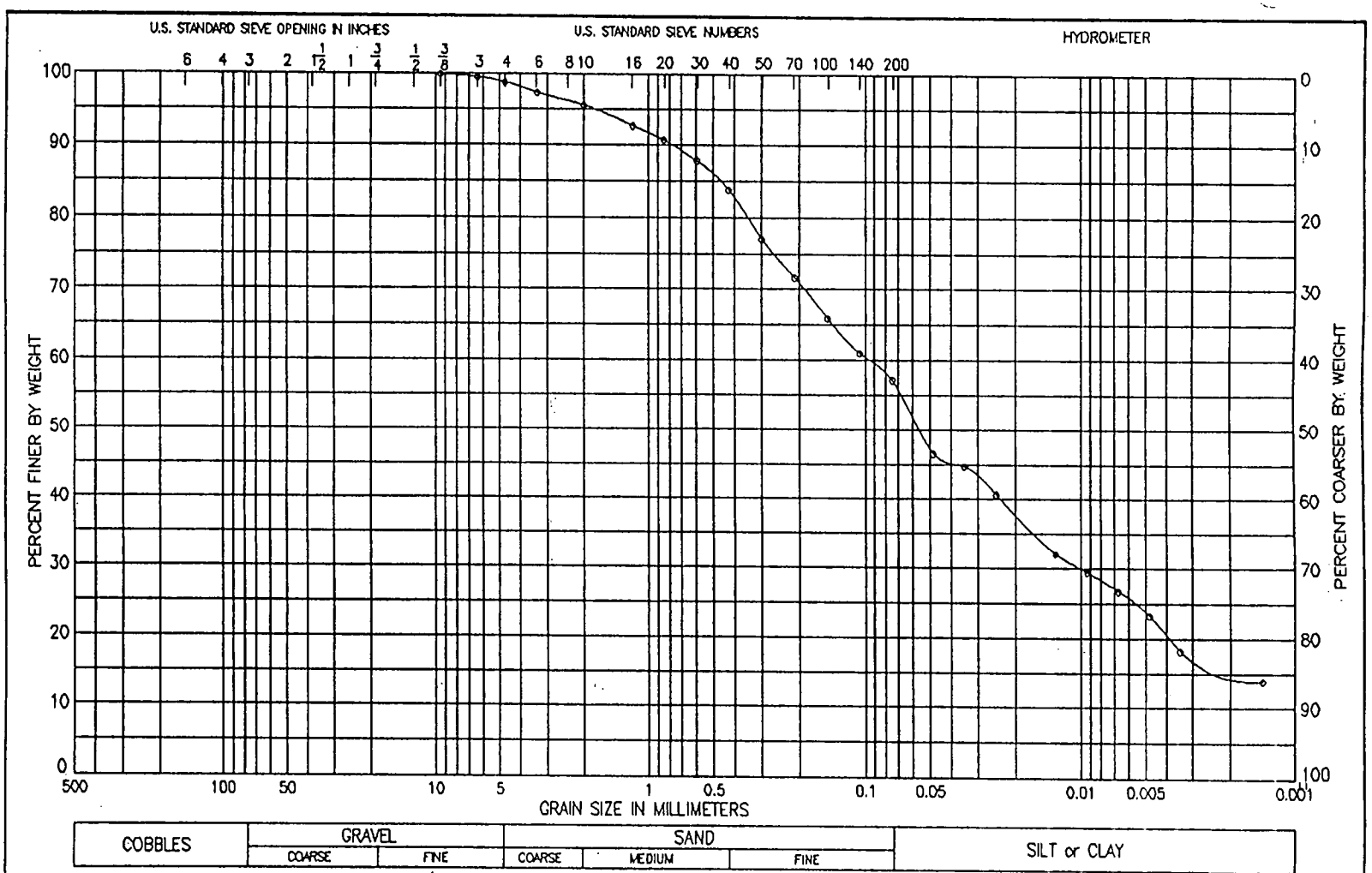
LL: 21 PL: 16 PI: 5 GS: 2.67 est WC: 13.40 OC: 3.60
CLASSIFICATION: 324
CLAYEY SILTY SAND (SM-SC), BROWN; WITH GRAVEL

TOTAL WEIGHT OF SAMPLE: 264.3 gms.
PARTIAL WEIGHT AFTER SPLIT: 56.4 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/4 in	19.100	100.0	.0
4.1	1/2 in	12.500	98.4	1.6
5.2	3/8 in	9.500	96.5	3.5
6.9	No 3	6.350	93.9	6.1
2.6	No 4	4.750	92.9	7.1
3.9	No 6	3.350	91.4	8.6
4.1	No 10	2.000	89.9	10.1
2.0	No 16	1.180	86.7	13.3
3.8	No 20	.850	83.8	16.2
6.7	No 30	.600	79.2	20.8
11.9	No 40	.425	70.9	29.1
20.1	No 50	.300	57.8	42.2
26.0	No 70	.212	48.4	51.6
31.8	No 100	.150	39.2	60.8
36.7	No 140	.106	31.4	68.6
40.3	No 200	.075	25.7	74.3
HYDROMETER:				
RDGS	TEMP			
8.1	22.0	.0534	20.4	79.6
7.0	22.0	.0381	17.6	82.4
6.1	22.0	.0271	15.3	84.7
4.9	22.0	.0141	12.2	87.8
4.0	22.0	.0101	9.9	90.1
3.3	22.0	.0072	8.2	91.8
2.8	22.0	.0051	6.9	93.1
2.4	22.5	.0036	6.1	93.9
2.1	22.0	.0015	5.1	94.9

PERCENT GRAVEL = 7.1
PERCENT SAND = 67.2
PERCENT FINES = 25.7

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
36	18	18	2.70 EST	14.9	2.1

CLASSIFICATION
SANDY CLAY (CL), BROWN

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-09-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

OJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-09-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

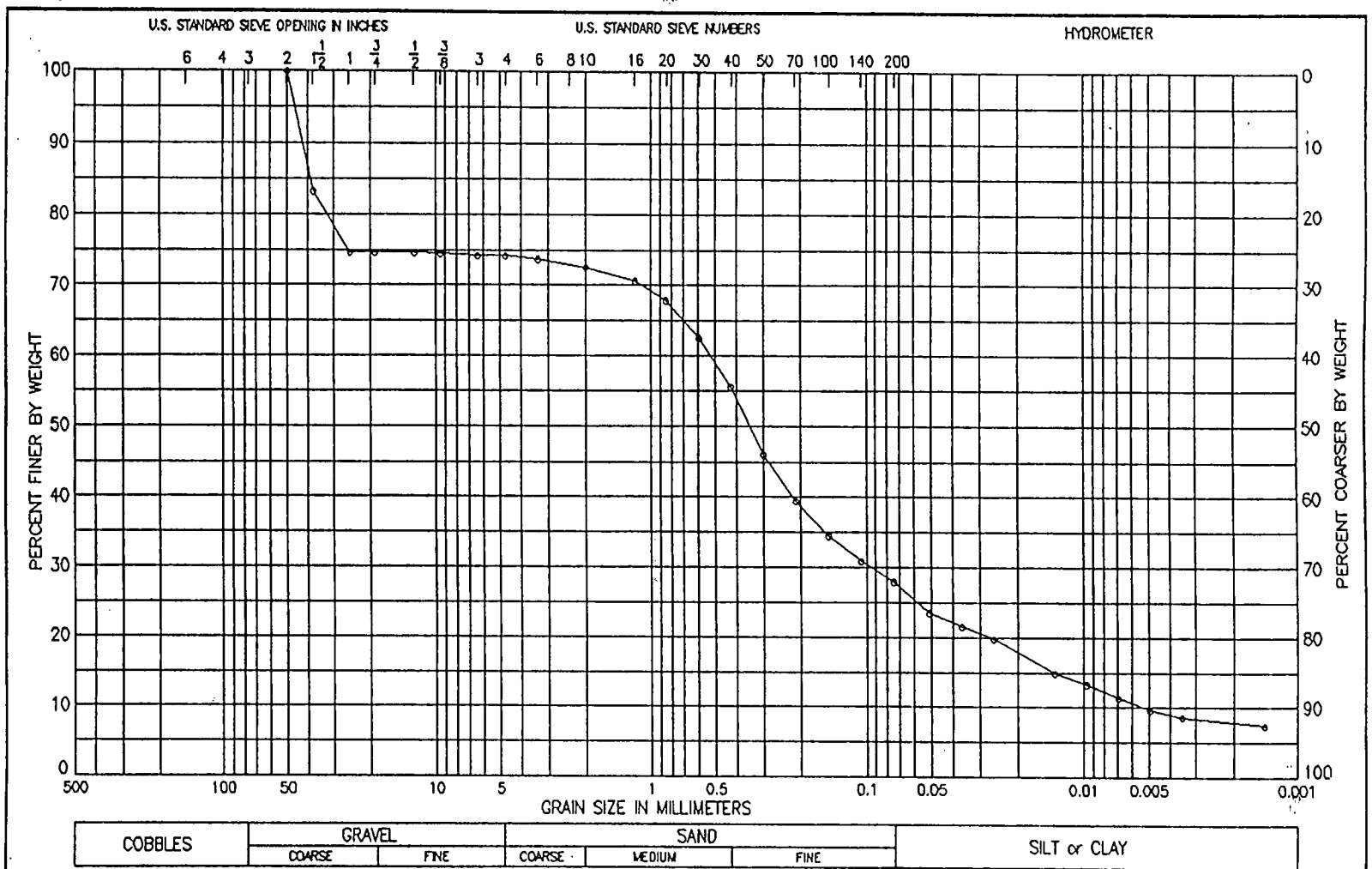
LL: 36 PL: 18 PI: 18 GS: 2.70 est WC: 14.90 OC: 2.10
CLASSIFICATION: 342
SANDY CLAY (CL), BROWN

TOTAL WEIGHT OF SAMPLE: 169.6 gms.
PARTIAL WEIGHT AFTER SPLIT: 56.7 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/8 in	9.500	100.0	.0
.7	No 3	6.350	99.6	.4
1.2	No 4	4.750	98.9	1.1
2.5	No 6	3.350	97.4	2.6
3.0	No 10	2.000	95.6	4.4
1.7	No 16	1.180	92.8	7.2
2.9	No 20	.850	90.7	9.3
4.6	No 30	.600	87.9	12.1
7.0	No 40	.425	83.8	16.2
11.0	No 50	.300	77.1	22.9
14.2	No 70	.212	71.7	28.3
17.6	No 100	.150	66.0	34.0
20.5	No 140	.106	61.1	38.9
22.8	No 200	.075	57.2	42.8
HYDROMETER:				
RDGS	TEMP			
17.5	22.0	.0486	46.6	53.4
16.8	22.0	.0346	44.7	55.3
15.3	22.0	.0248	40.7	59.3
12.1	22.0	.0132	32.1	67.9
11.1	22.0	.0094	29.5	70.5
10.1	22.0	.0067	26.8	73.2
8.8	22.0	.0048	23.3	76.7
6.8	22.5	.0035	18.2	81.8
5.3	22.0	.0014	13.9	86.1

PERCENT GRAVEL = 1.1
PERCENT SAND = 41.7
PERCENT FINES = 57.2

EDE



LL	PL	PI	GS	NAT W,%	ORG,%
23	14	9	2.70 EST	14.3	11.0

CLASSIFICATION
GRAVELLY CLAYEY SAND (SC), BROWN

INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT MCCOMISH GORGE
CRANE, IN
BORING NO. 04/02-10-90 SAMPLE NO. 1A
DEPTH/ELEV 2.5 – 3.0 DATE 21 MAY 91

SIEVE ANALYSIS

PROJECT: MCCOMISH GORGE
CRANE, IN

BORING: 04/02-10-90 SAMPLE: 1A DF: MD3091 .DAT
DEPTH: 2.5 - 3.0 DATE: 21 MAY 91

LL: 23 PL: 14 PI: 9 GS: 2.70 est WC: 14.30 OC: 11.00
CLASSIFICATION: 360
GRAVELLY CLAYEY SAND (SC), BROWN

TOTAL WEIGHT OF SAMPLE: 120.6 gms.
PARTIAL WEIGHT AFTER SPLIT: 58.9 gms.
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	2 in	50.000	100.0	.0
20.2	1.5 in	37.500	83.3	16.7
10.4	1 in	25.000	74.6	25.4
.0	3/4 in	19.100	74.6	25.4
.0	1/2 in	12.500	74.6	25.4
.1	3/8 in	9.500	74.5	25.5
.4	No 3	6.350	74.2	25.8
.0	No 4	4.750	74.2	25.8
.6	No 6	3.350	73.7	26.3
1.4	No 10	2.000	72.6	27.4
1.6	No 16	1.180	70.6	29.4
3.8	No 20	.850	67.9	32.1
8.1	No 30	.600	62.6	37.4
13.8	No 40	.425	55.6	44.4
21.5	No 50	.300	46.1	53.9
26.9	No 70	.212	39.4	60.6
30.9	No 100	.150	34.5	65.5
33.8	No 140	.106	30.9	69.1
36.2	No 200	.075	28.0	72.0
HYDROMETER:				
RDGS	TEMP			
12.1	22.0	.0511	23.5	76.5
11.1	22.0	.0364	21.5	78.5
10.2	22.0	.0260	19.8	80.2
7.7	22.0	.0137	14.9	85.1
6.9	22.0	.0098	13.3	86.7
5.9	22.0	.0070	11.3	88.7
5.0	22.0	.0050	9.6	90.4
4.5	22.0	.0035	8.6	91.4
3.9	22.0	.0014	7.4	92.6

PERCENT GRAVEL = 25.8
PERCENT SAND = 46.3
PERCENT FINES = 28.0

EDE

Laboratory Soil Test Results

McComish Gorge

Boring Number	Sample Number	Depth ft	Dry Density lbs/cu ft	Water Content Percent	Liquid Limit Percent	Plastic Limit Percent	Plasticity Index Percent	USCS**	Permeability cm/sec	Cation Exchange Capacity meq/100 g
4-1-81	1	0.0-2.08	115.1	15.0	29	15	14	CL		4.28
4-1-81	2	5.0-6.55	110.8	17.8	27	16	11	SC		
4-1-81	3	10.0-10.3	86.6	10.3	19	12	7	SP-SC		
4-1-81	4	15.0-16.97	100.0	15.0	28	17	11	SC		
4-1-81	5	20.0-22.05	87.8	11.3	NP+	NP	NP	SP-SM		
4-1-81	6	25.0-27.08	95.6	15.5	NP	NP	NP	SM		
4-1-81	7A*	30.0-30.3	--	21.5	NP	NP	NP	--		
4-1-81	8	32.5-33.3	97.1	19.1	25	18	7	CL		
4-1-81	9	37.5-39.55	102.4	23.1	26	18	8	CL		
4-1-81	10	40.3-42.48	104.4	17.2	NP	NP	NP	ML		
4-2-81	1	0.0-1.27	118.8	10.6	22	13	9	SC		
4-2-81	2	5.0-5.9	116.7	12.6	27	12	15	SC		
4-2-81	3	10.0-11.97	96.9	13.9	24	16	8	SC		
4-2-81	4	15.0-16.60	101.1	22.9	29	24	5	ML		
4-2-81	5A*	20.0-21.5	--	30.0	21	16	5	CL-ML		
4-2-81	6	25.0-27.05	100.5	13.6	NP	NP	NP	SM		2.87
4-2-81	7	30.0-32.05	99.7	14.6	NP	NP	NP	SM		
4-3-81	1	0.0-2.08	105.8	14.1	25	13	12	SC		
4-3-81	2	5.0-7.13	64.3	49.7	NP	NP	NP	ML		2.93
4-3-81	3	10.0-11.83	97.4	4.9	NP	NP	NP	SM		
4-3-81	4A*	15.0-17.0	--	24.3	NP	NP	NP	SP-SM		

(Continued)

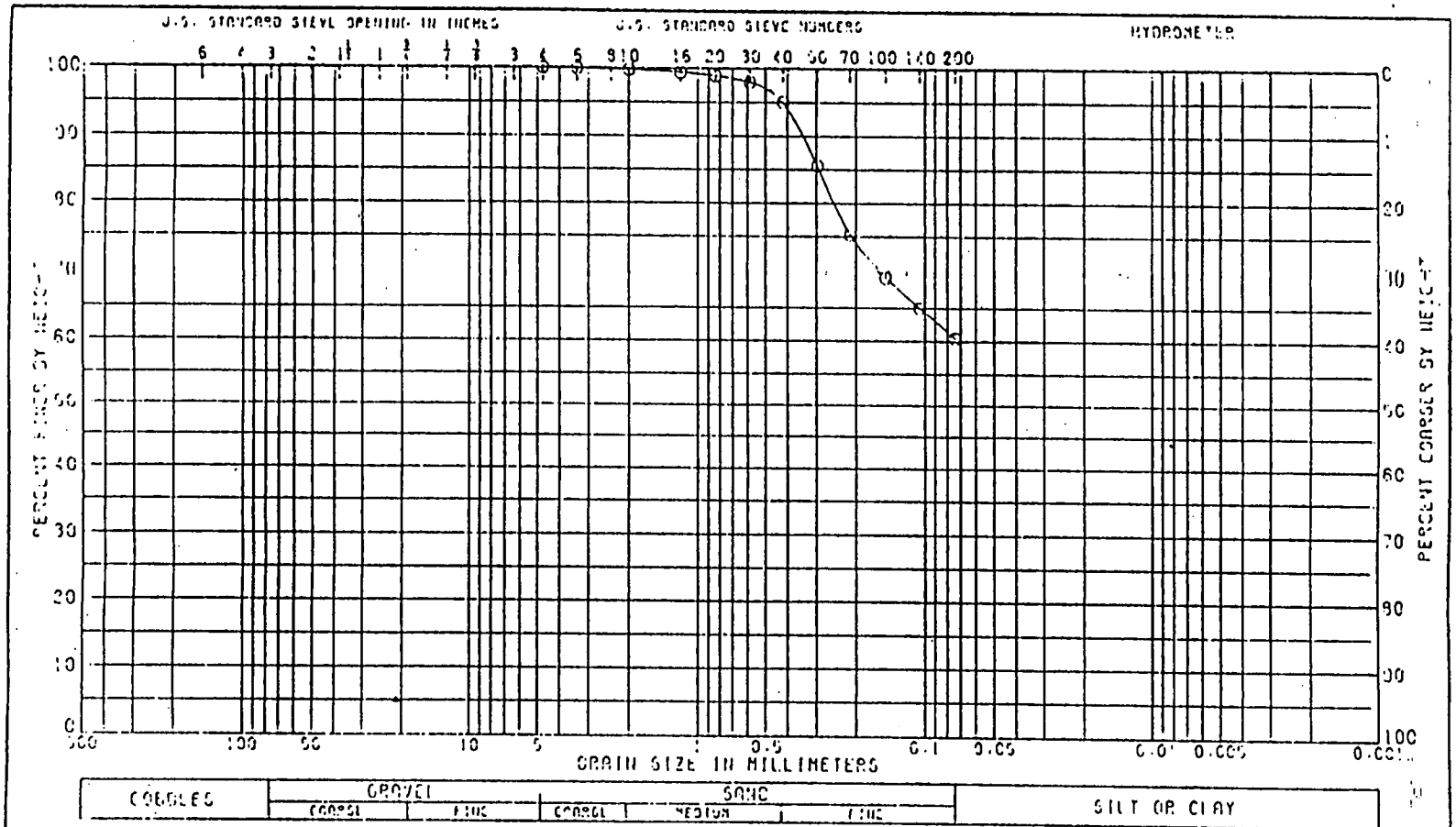
\+ Not plastic
* Jar sample
** See Figure E-1

Laboratory Soil Test Results

McComish Gorge (Concluded)

Boring Number	Sample Number	Depth ft	Dry Density lbs/cu ft	Water Content Percent	Liquid Limit Percent	Plastic Limit Percent	Plasticity Index Percent	USCS**	Permeability cm/sec	
4-4-81	1	0.0-2.26	99.0	20.7	39	18	21	CL		
4-4-81	2	5.0-6.64	103.8	21.8	45	20	25	CL		
4-4-81	3	10.0-12.19	98.8	12.0	35	19	16	CL		
4-4-81	4	15.0-16.7	87.7	9.9	32	14	18	SC		
4-4-81	5	20.0-22.08	91.1	5.8	NP	NP	NP	SP-SM		
4-4-81	6	25.0-26.50	93.7	18.4	NP	NP	NP	SP-SM		
4-4-81	7	27.8-29.90	98.4	23.9	NP	NP	NP	SM	3.99×10^{-5}	
4-4-81	8	35.0-37.05	89.8	33.6	31	16	15	CL		
4-5-81	1	0.0-1.8	100.5	23.6	35	16	19	CL		
4-5-81	2	5.0-6.36	102.5	21.1	38	18	20	CL		
4-5-81	3	10.0-11.10	91.8	22.9	30	17	13	SC		3.36
4-5-81	4	14.3-16.0	96.7	14.7	NP	NP	NP	SP		
4-5-81	5	18.6-20.05	89.8	22.4	NP	NP	NP	SM		
4-6-81	1	0.0-2.14	115.0	12.4	NP	NP	NP	SM		2.7
4-6-81	2	5.0-7.08	93.3	10.2	NP	NP	NP	SM		
4-6-81	3	10.0-11.71	83.4	19.2	NP	NP	NP	ML		
4-6-81	4	15.0-17.17	92.3	27.4	NP	NP	NP	SM		
4-6-81	5	19.5-20.35	103.1	18.4	NP	NP	NP	SM		
4-6-81	6	24.2-26.36	101.9	23.1	20	17	3	SM		

* Jar sample
** See Figure E-1

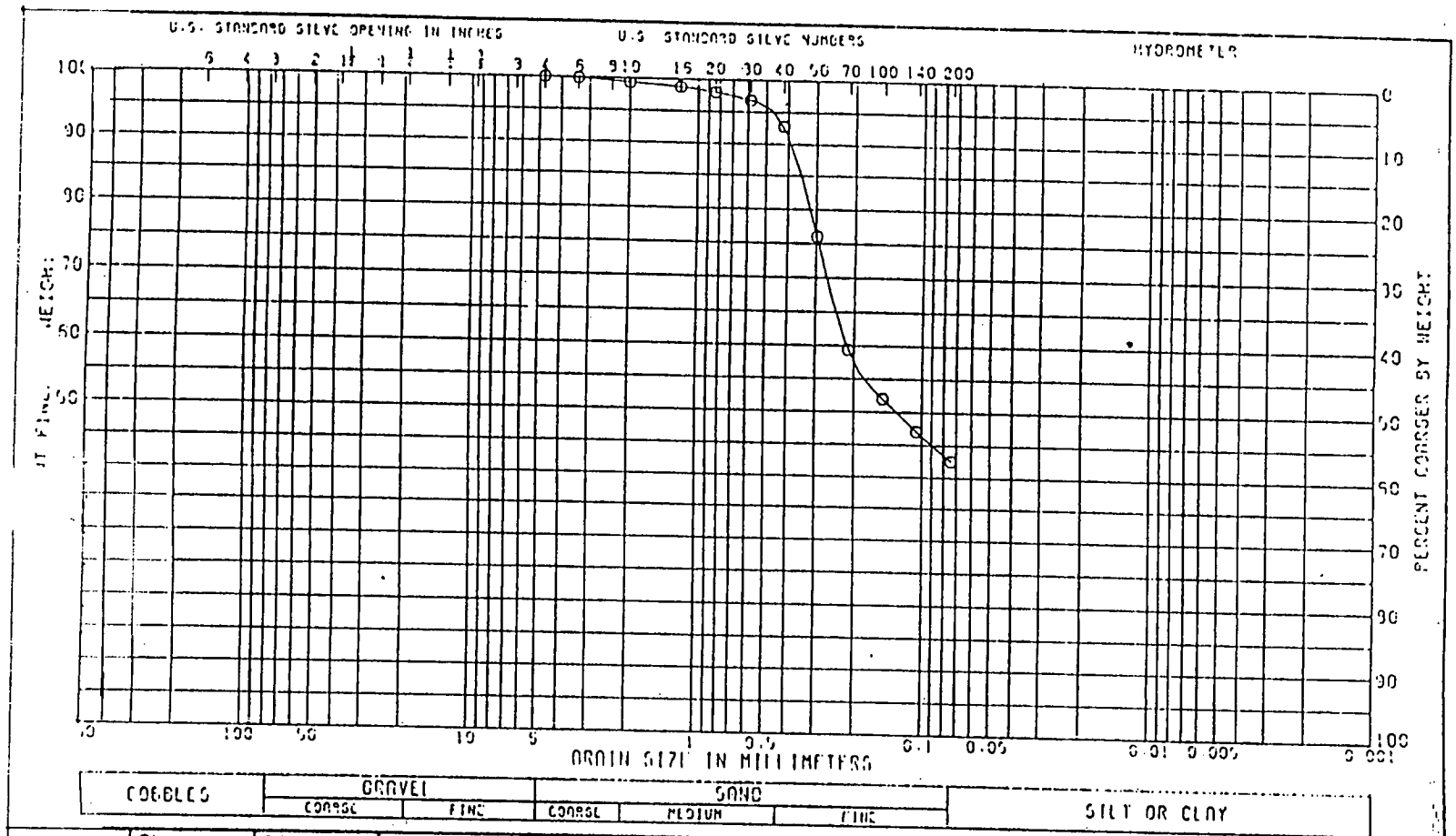


LL	PL	PI	GS	NAT W.%	
29	15	14		15.0	

CLASSIFICATION
SANDY CLAY (CL), TAN

GRADATION CURVE

PROJECT CRANE MAGC
MCCOMISH GORGE
BORING NO. 4-1-91 SAMPLE NO. 1
DEPTH/ELEV 0.0-2.09 DATE 09 MAR 92



PL 16	PI 11	OS	NAT W.% 17.8

TION

EY SAND (SC), TAN

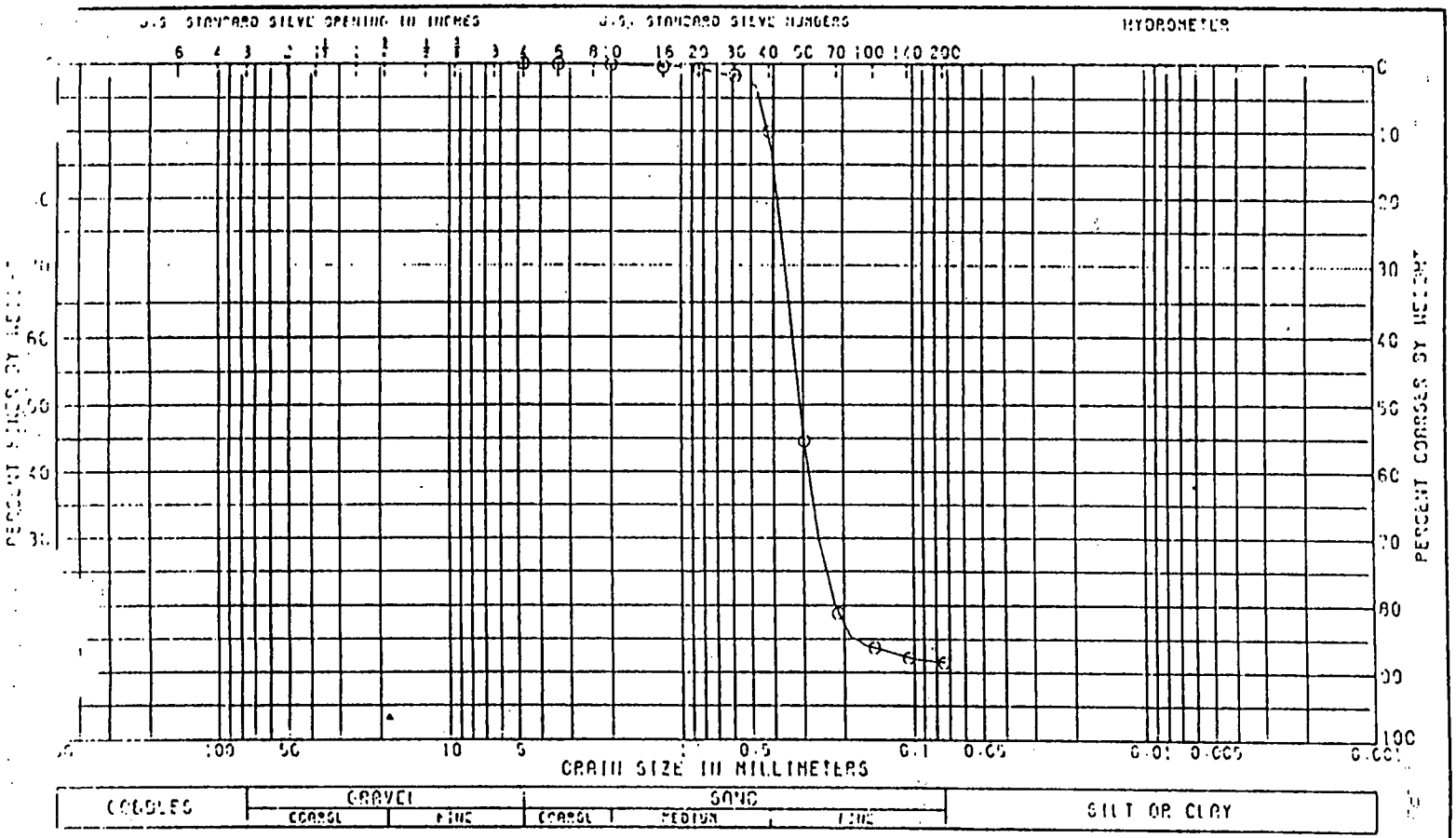
GRADATION CURVE

PROJECT CRANE NWSC

MCCOMISH GORGE

BORING NO. 4-1-91 SAMPLE NO 2

DEPTH/ELEV 5.0-6.5 DATE 30 MAR 92



LL	PL 12	PI 7	CS	NAT W.% 10.3

CLASSIFICATION

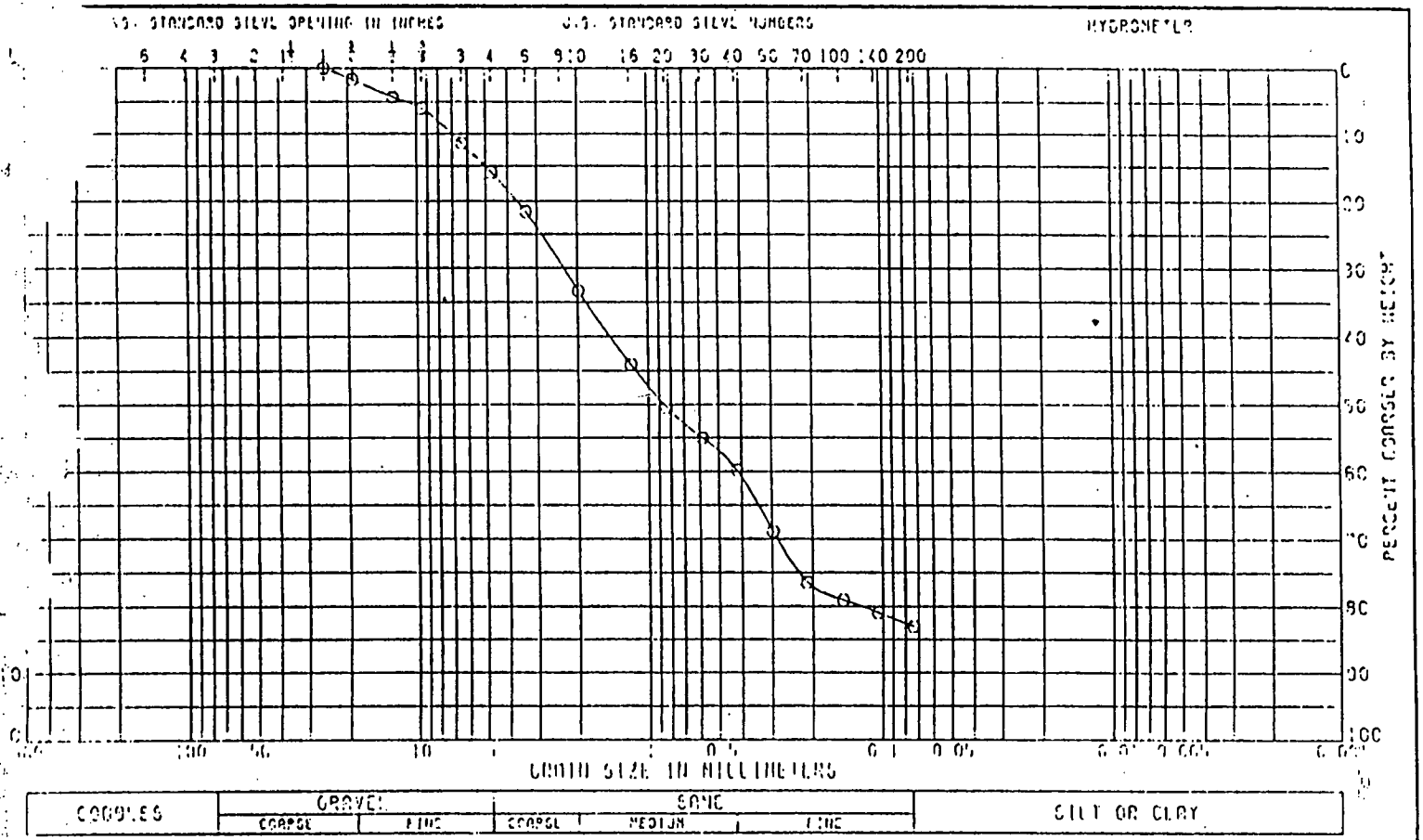
CLAYEY SAND (SP-SC), REDDISH BROWN

GRADATION CURVE

PROJECT CRANE MESC
MCCOMISH CORGE

BORING NO. 4-1-91 SAMPLE NO 3

DEPTH/ELEV 10.0-10.3 DATE 09 MAR 92



LL 28	PL 17	PI 11	GS	NAT W.C. 15.0	

CLASSIFICATION

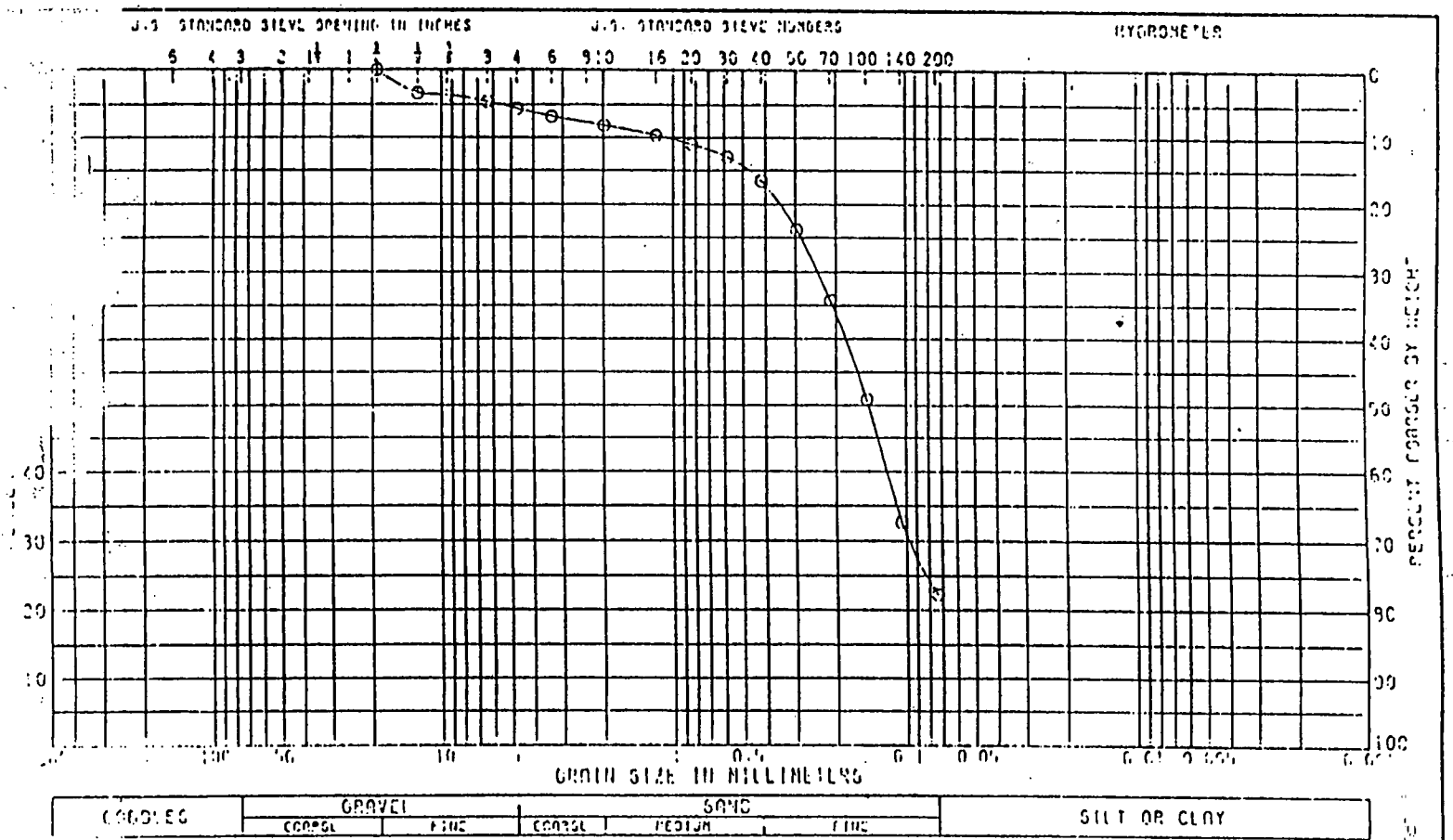
GRAVELLY CLAYEY SAND (SC), BROWN

GRADATION CURVE

PROJECT CRANE MISC
MCCONNISH CORGE

BORING NO. A-1-91 SAMPLE NO.

DEPTH/ELEV 15.0-16.07 DATE 09 MAR 92

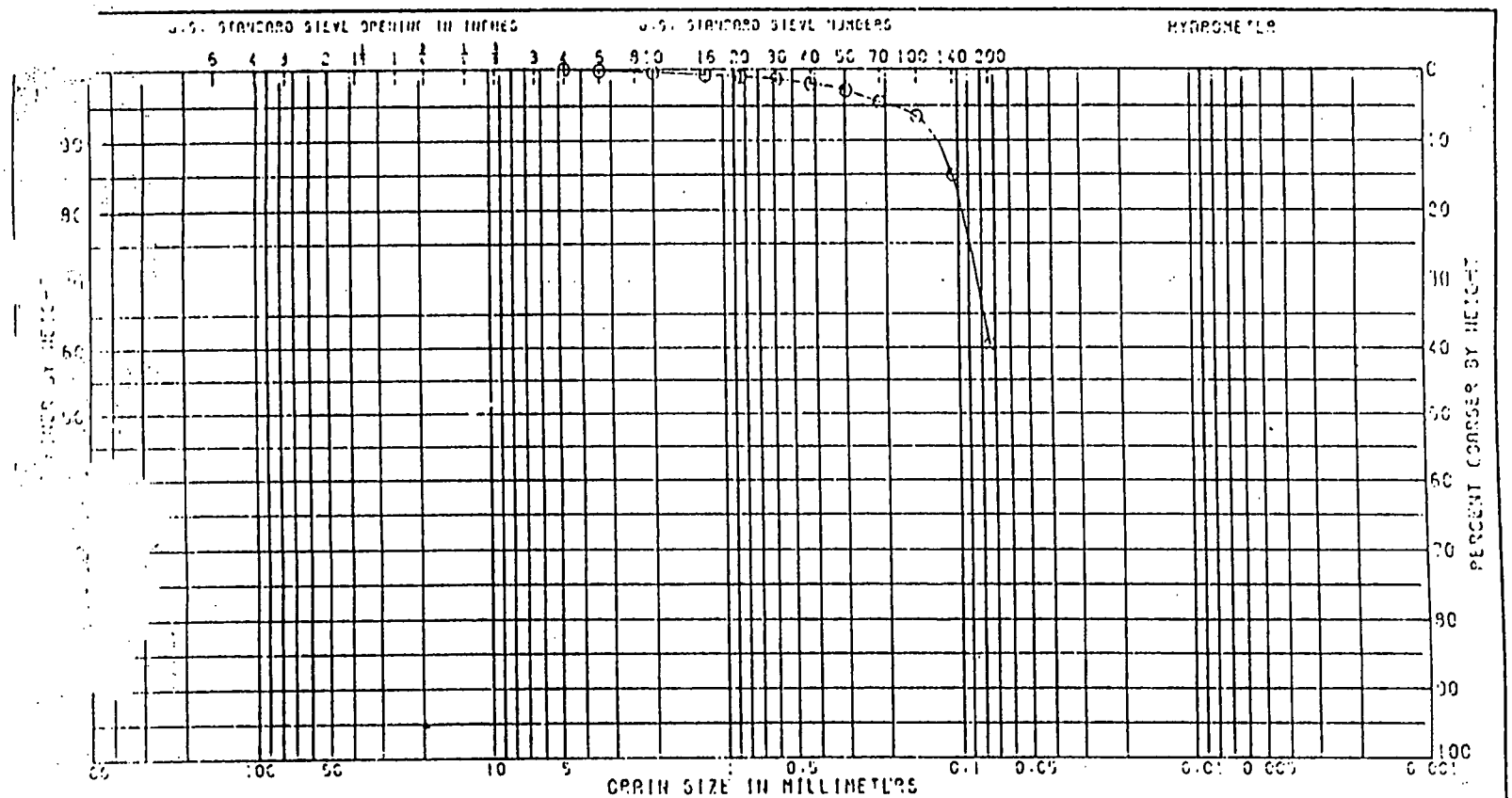


	D1	D3	NAT W.% 15.5

(SM) BROWN: WITH GRAVEL

GRADATION CURVE

PROJECT CRANE MILL
MCCONNISH GORGE
BORING NO 4-1-91 SAMPLE NO 6
DEPTH/ELEV 25.0-27.0 DATE 09 MAR 92



PL 19	PI 7	GS	NAT M.C. 19.1

LIQ

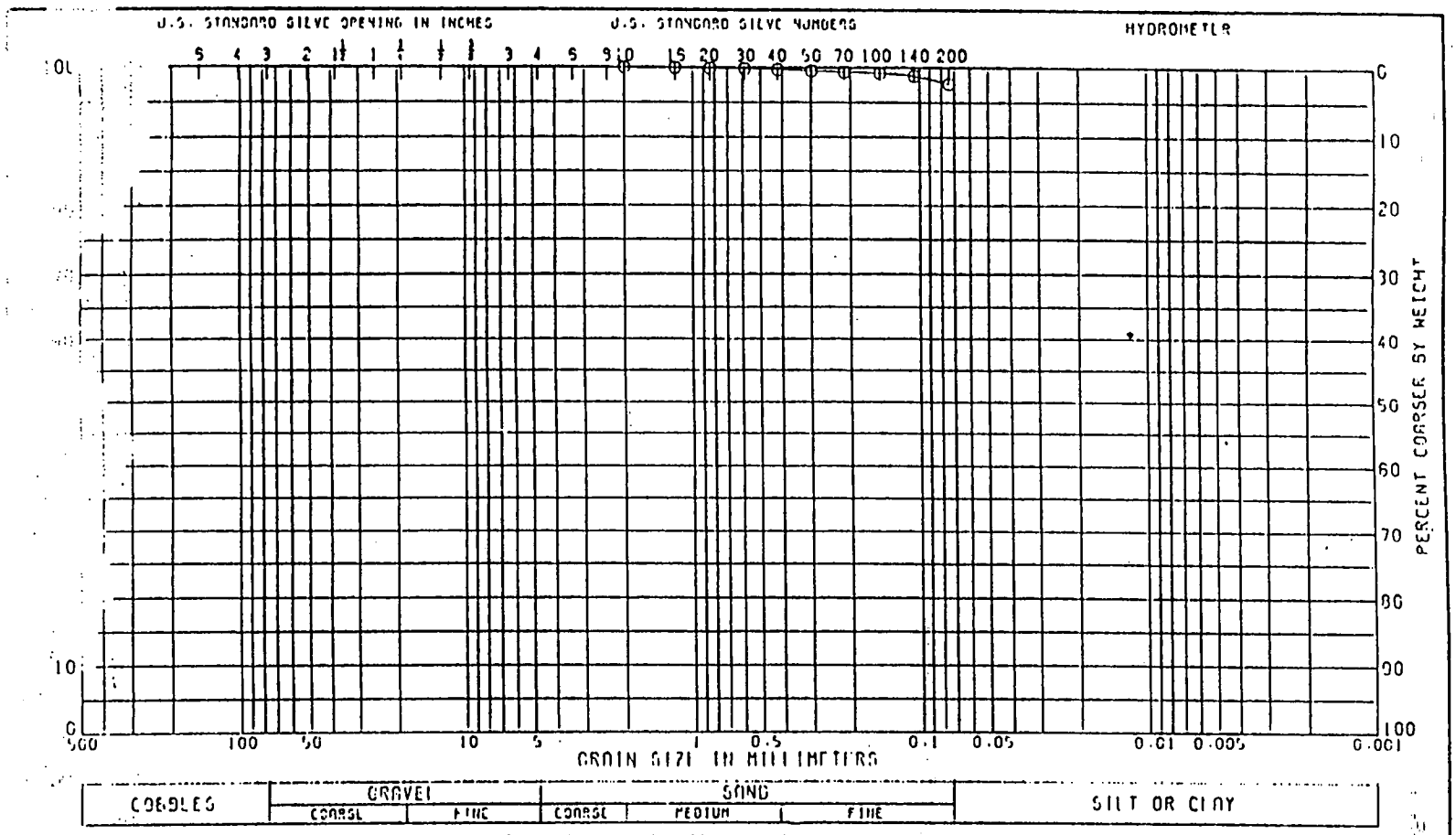
DY CLAY (CL), BROWN

GRADATION CURVE

PROJECT CRANE MESC
MCCONNIGH GORGE

BORING NO 4-1-91 SAMPLE NO B

DEPTH/ELEV 32.5-33.0 DATE 09 NOV 92



LL 26	PL 18	PI 8	GS	NAT W.% 23.1	

CLASSIFICATION

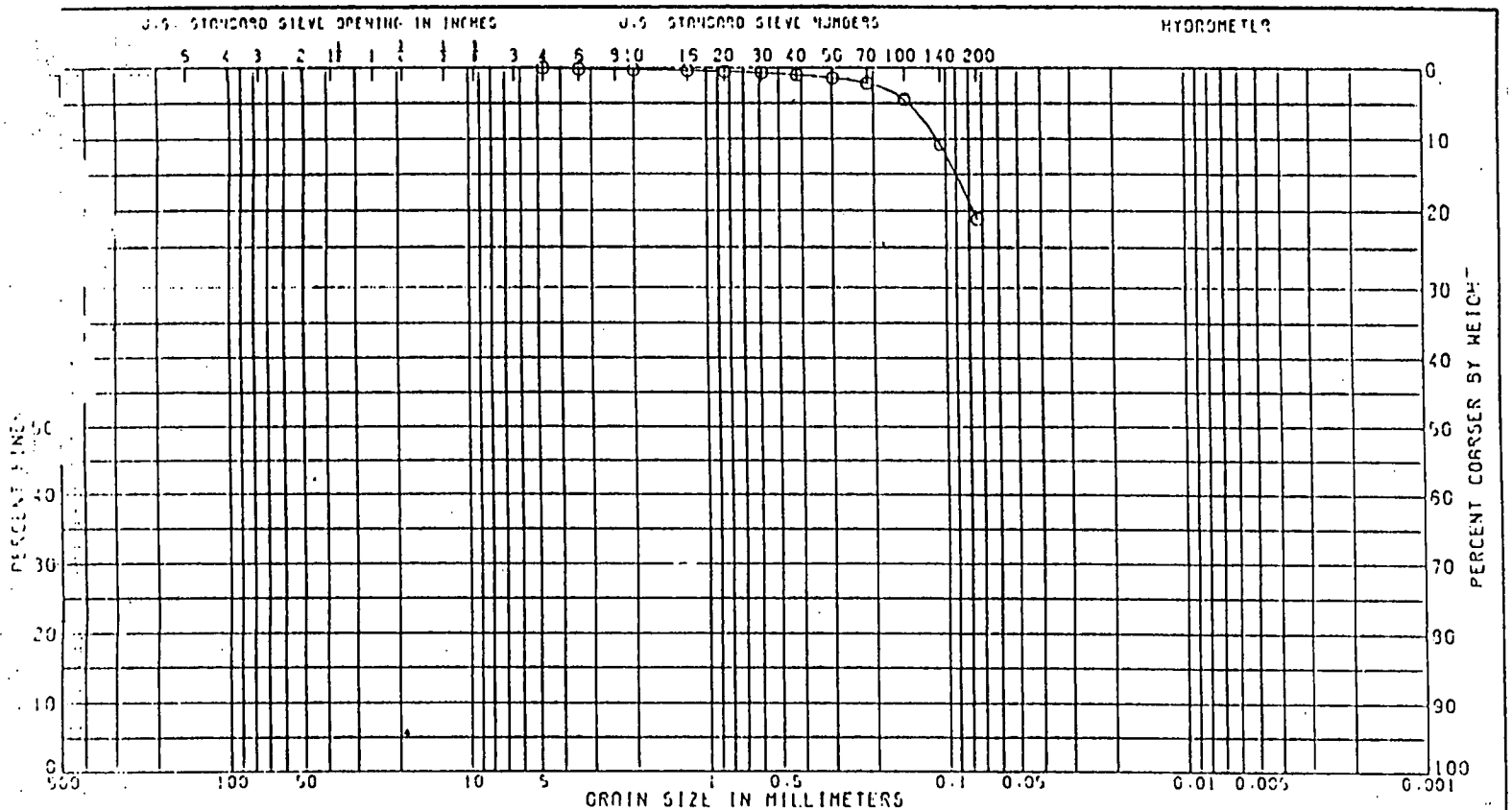
CLAY (CL), GRAY

GRADATION CURVE

PROJECT CRANE NHSC
MCCOMISH GORGE

BORING NO. 4-1-81 SAMPLE NO. 9

DEPTH/ELEV 37.5-39.55 DATE 30 MAR 82

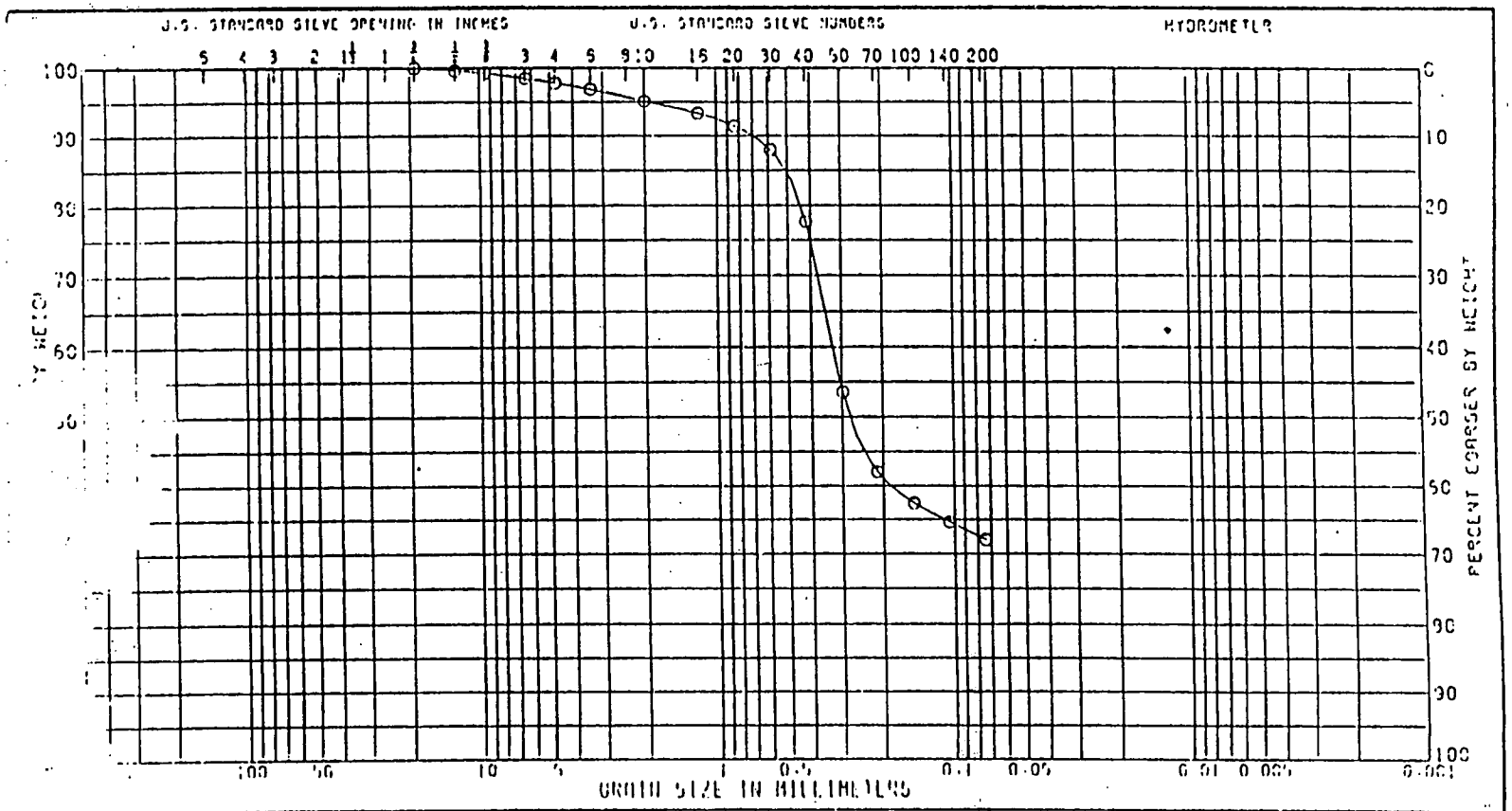


	PI	CC	NAT W.C 17.2

CLAY (ML), GRAY

GRADATION CURVE

PROJECT CRANE NWSC
MCCOMISH GORGE
BORING NO. 4-1-81 SAMPLE NO. 10
DEPTH/ELEV 40.3-42.48 DATE 30 MAR 82



PL	PI	CC	NAT W.C
13	9		10.6

CLASSIFICATION

CLAYEY SAND (SC), BROWN

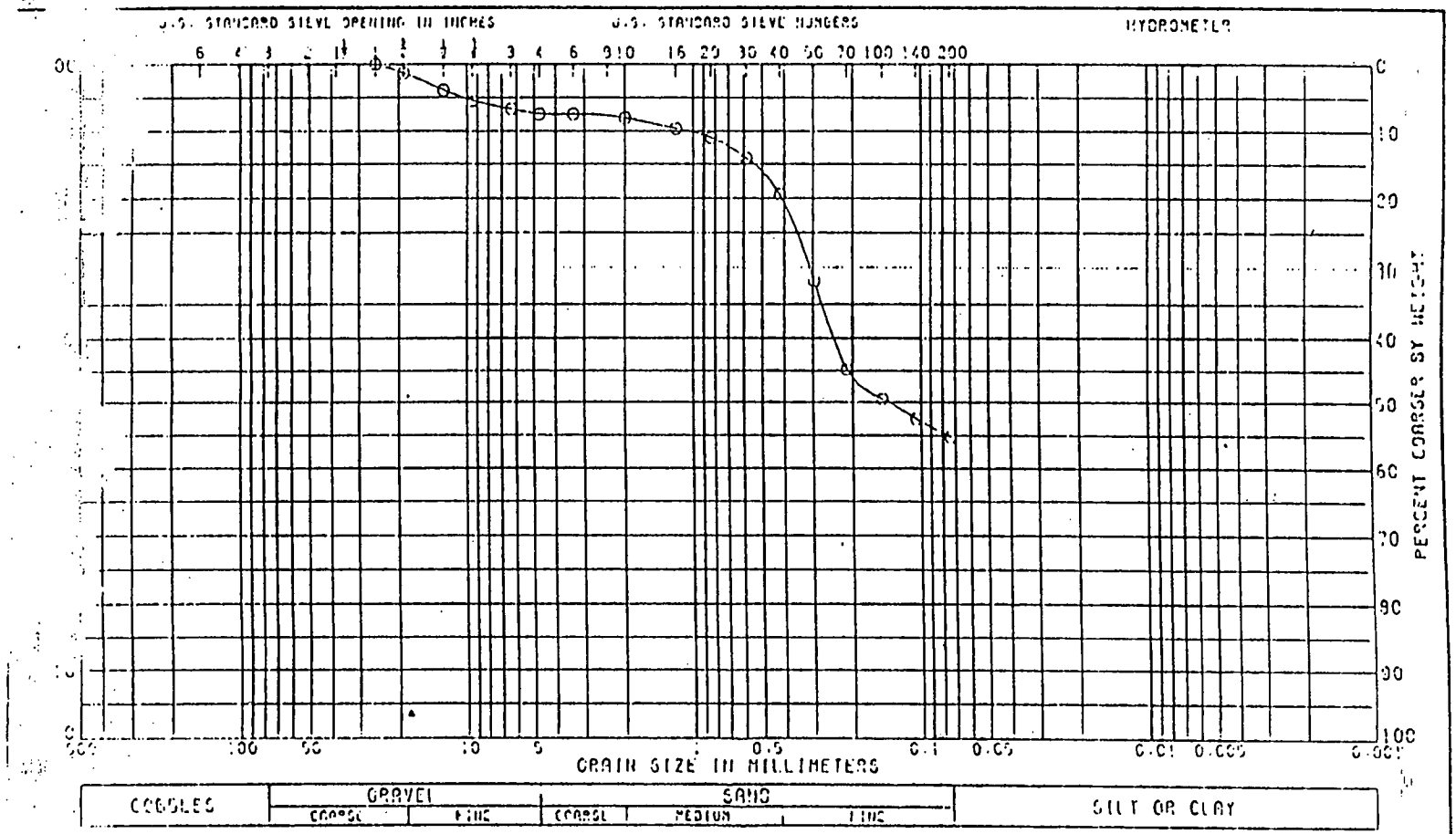
GRADATION CURVE

PROJECT CRANE NAVSC

MCCOMISH GORGE

BORING NO. 4-2-81 SAMPLE NO. 1

DEPTH/ELEV 0.0-1.27 DATE 30 MAR 82



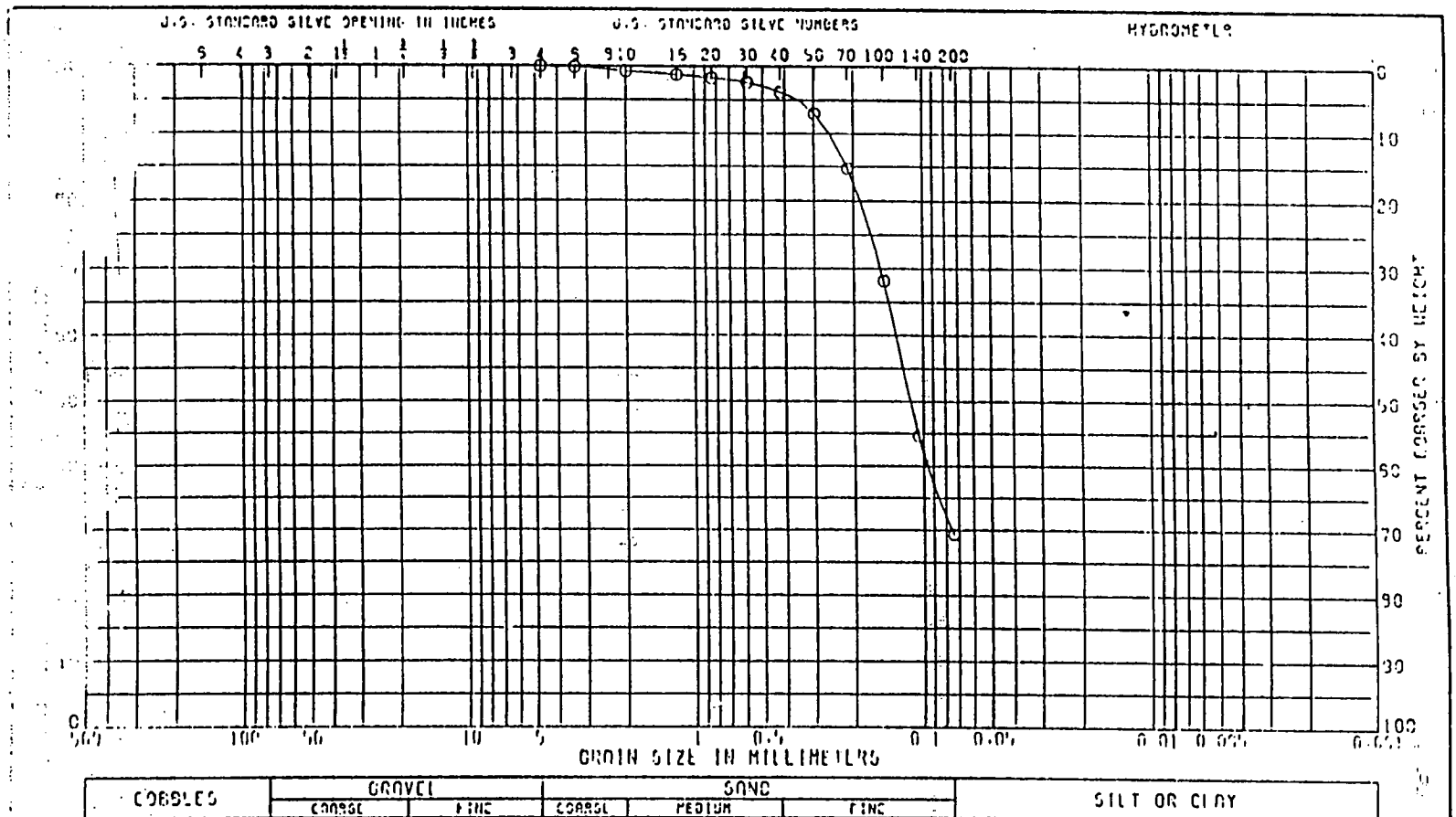
LL	PL	PI	OS	NAT W.%
27	12	15		12.6

CLASSIFICATION

CLAYEY SAND (SC), REDDISH BROWN: WITH GRAVEL
INSUFFICIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE

PROJECT CRANE MASC
MCCOMISH CORCE
BORING NO 4-2-81 SAMPLE NO 2
DEPTH/ELEV 5.0-5.0 DATE 00 MAR 82



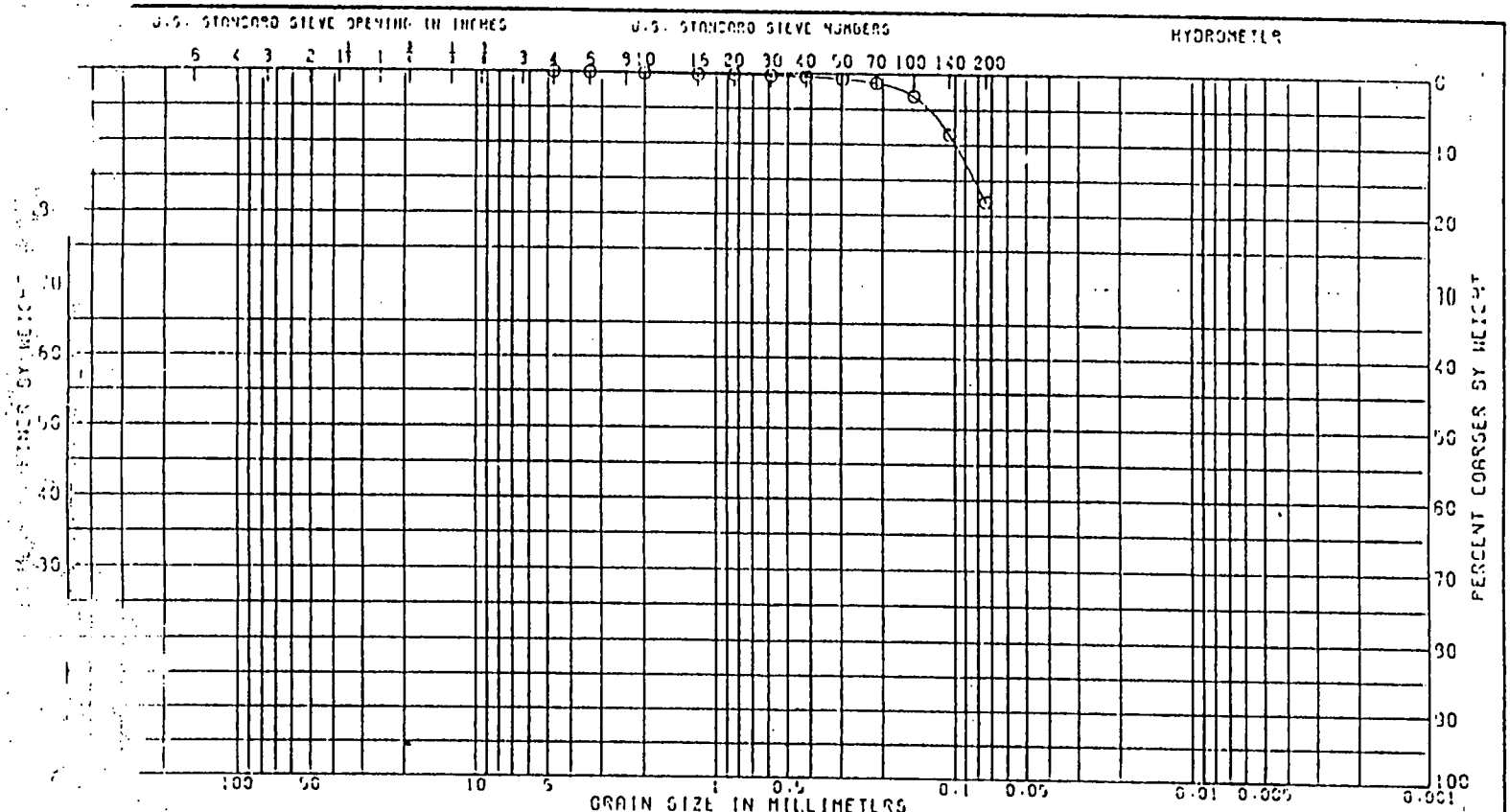
LL 24	PL 15	PI 9	GS	NAT W.% 13.9

CLASSIFICATION

CLAYEY SAND (SC), BROWN

GRADATION CURVE

PROJECT CRANE NRSC
MCCOMISH GORGE
BORING NO. 4-2-91 SAMPLE NO 3
DEPTH/ELEV 10.0-11.97 DATE 30 MAR 92



LL	PI	GS	NAT W.%
24	5		22.9

CATION

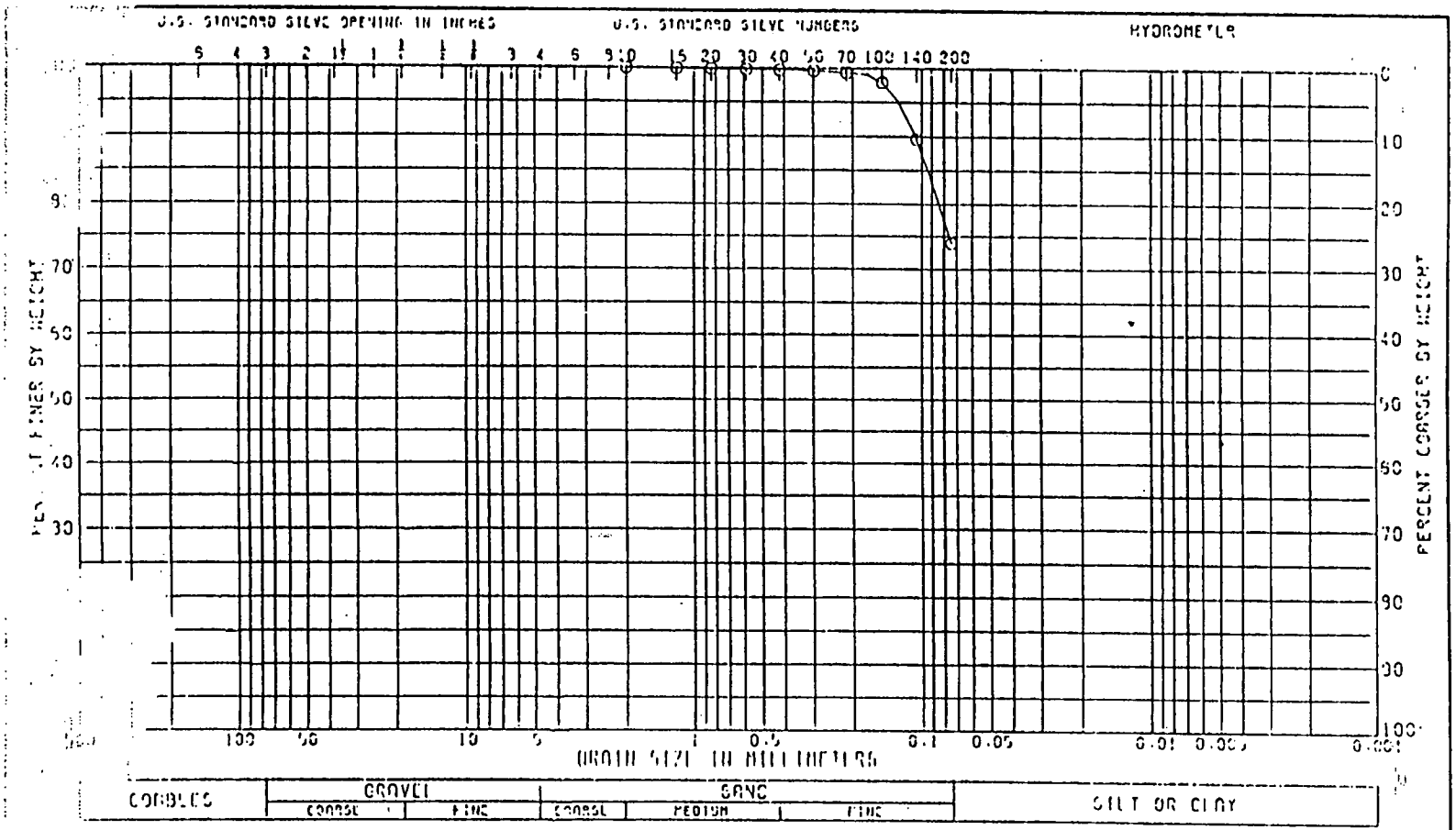
DY SILT (ML), BROWN

GRADATION CURVE

PROJECT CRANE NRSC
MCCOMISH GORGE

BORING NO. 4-2-91 SAMPLE NO 4

DEPTH/ELEV 15.0-16.60 DATE 30 MAR 92



	PL 16	PI 5	CC	NAT W.C. 30.0	

LOCATION

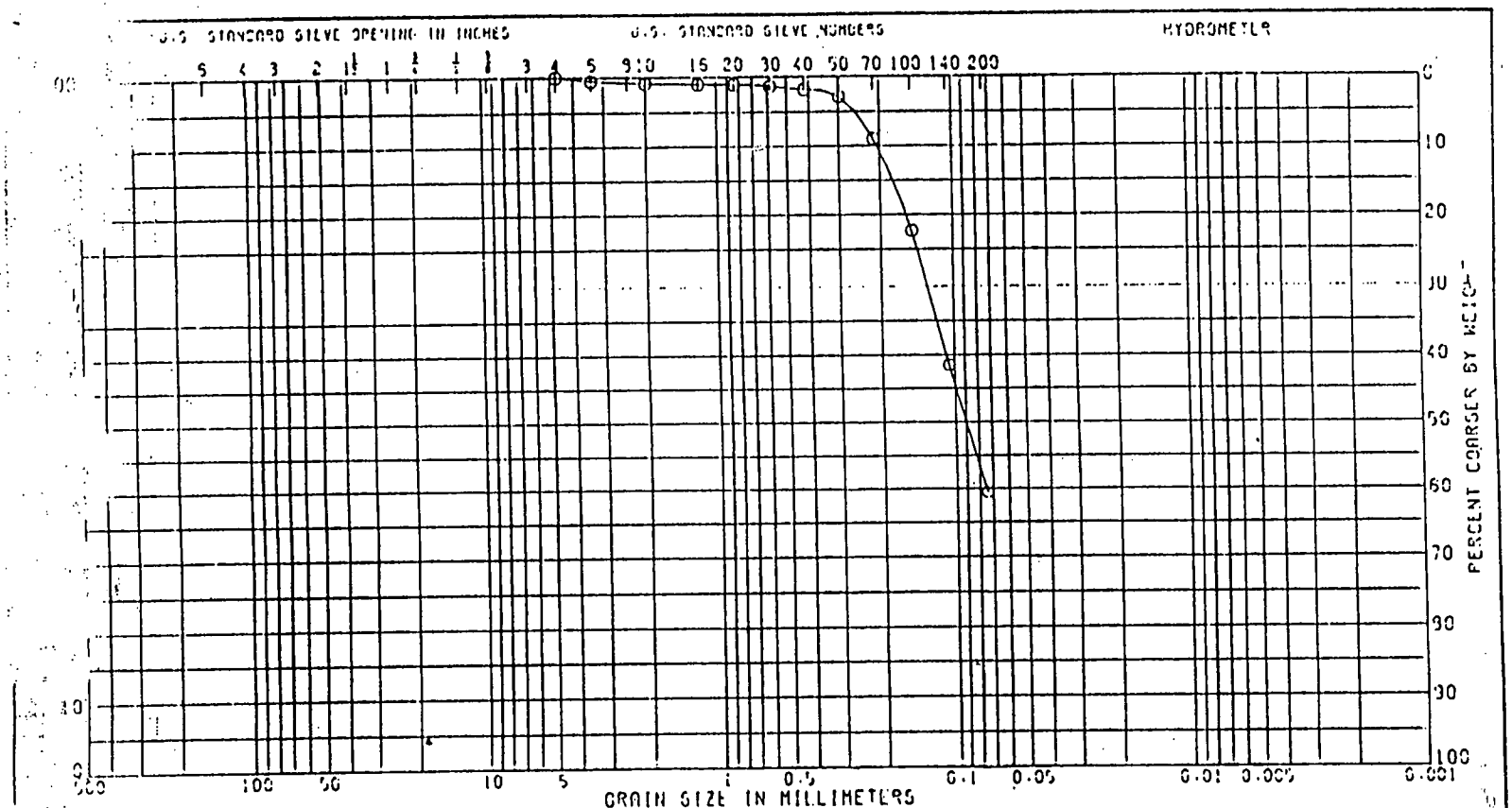
SANDY CLAYEY SILT (ML-CL), BROWN

GRADATION CURVE

PROJECT CRANE NUSC
MCCOMISH GORGE

BORING NO. 4-2-91 SAMPLE NO S6

DEPTH/ELEV 20.0-21.5 DATE 30 MAR 92



LL NP	PL	PI	CS	NAT W.% 13.6

CLASSIFICATION

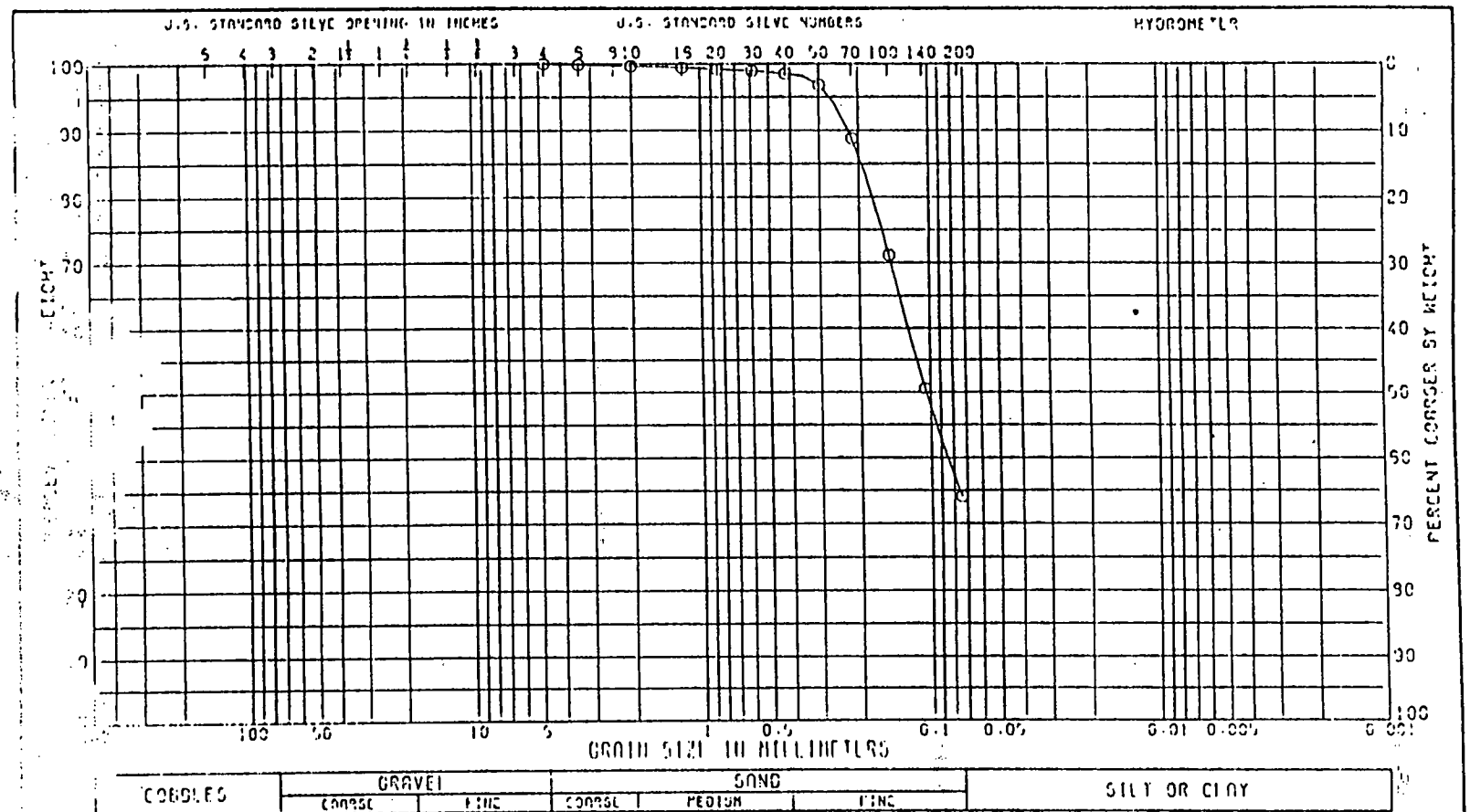
SILTY SAND (SM), GRAYISH BROWN,

GRADATION CURVE

PROJECT CRANE NAVAL
MCCOMISH GORGE

BORING NO. 4-2-81 SAMPLE NO. 6

DEPTH/ELEV 25.0-27.0S DATE 30 MAR 82

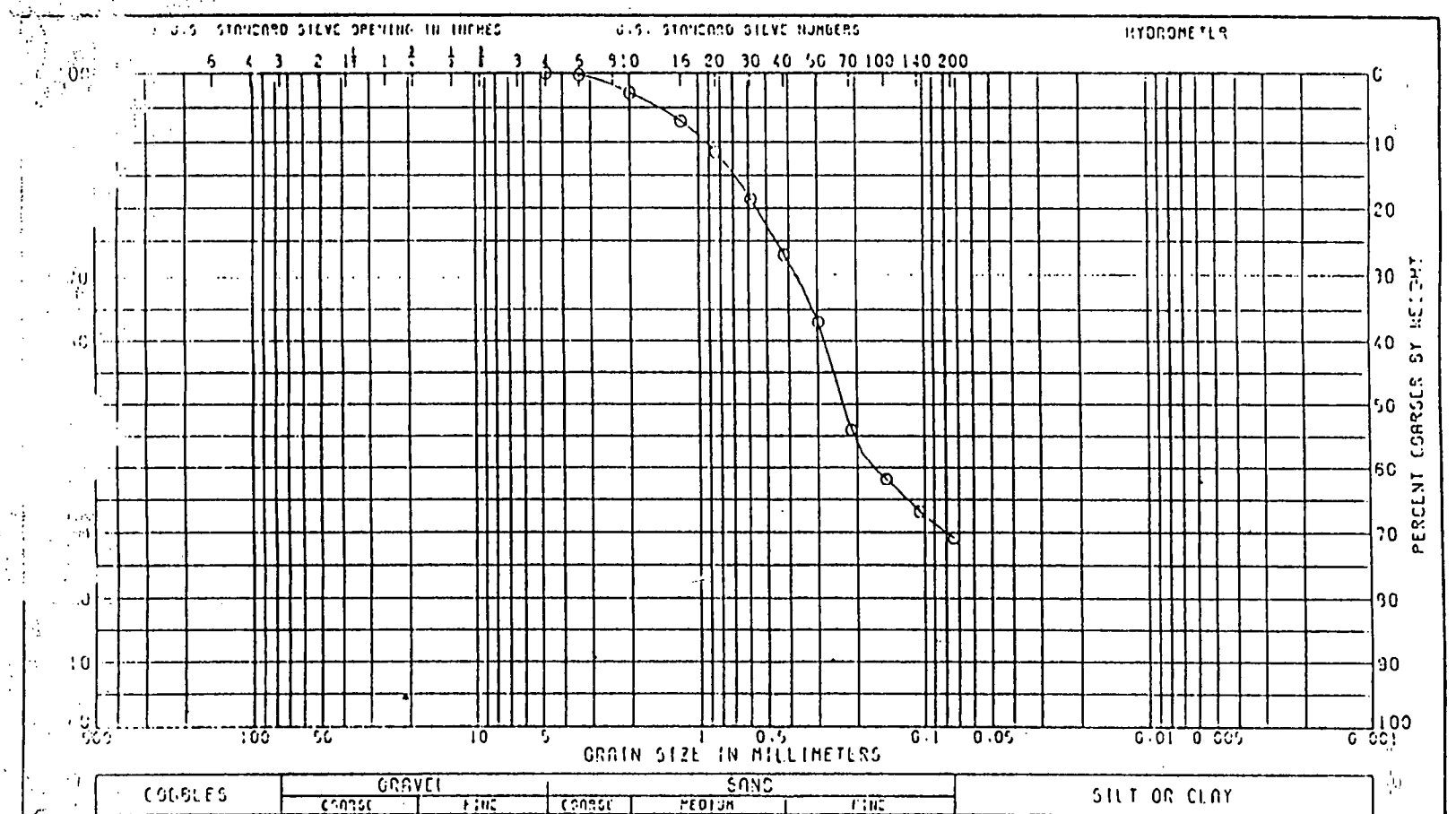


NP	PL	PI	CC	NAT W.% 14.6	

CLASSIFICATION
SILTY SAND (SM), BROWN

GRADATION CURVE

PROJECT CRANE MESC
MCCOMISH GORGE
BORING NO. 4-2-91 SAMPLE NO 7
DEPTH/ELEV 30.0-32.0' DATE 30 MAR 92



LL 29	PL 13	PI 12	CC	NAT W.% 14.1	

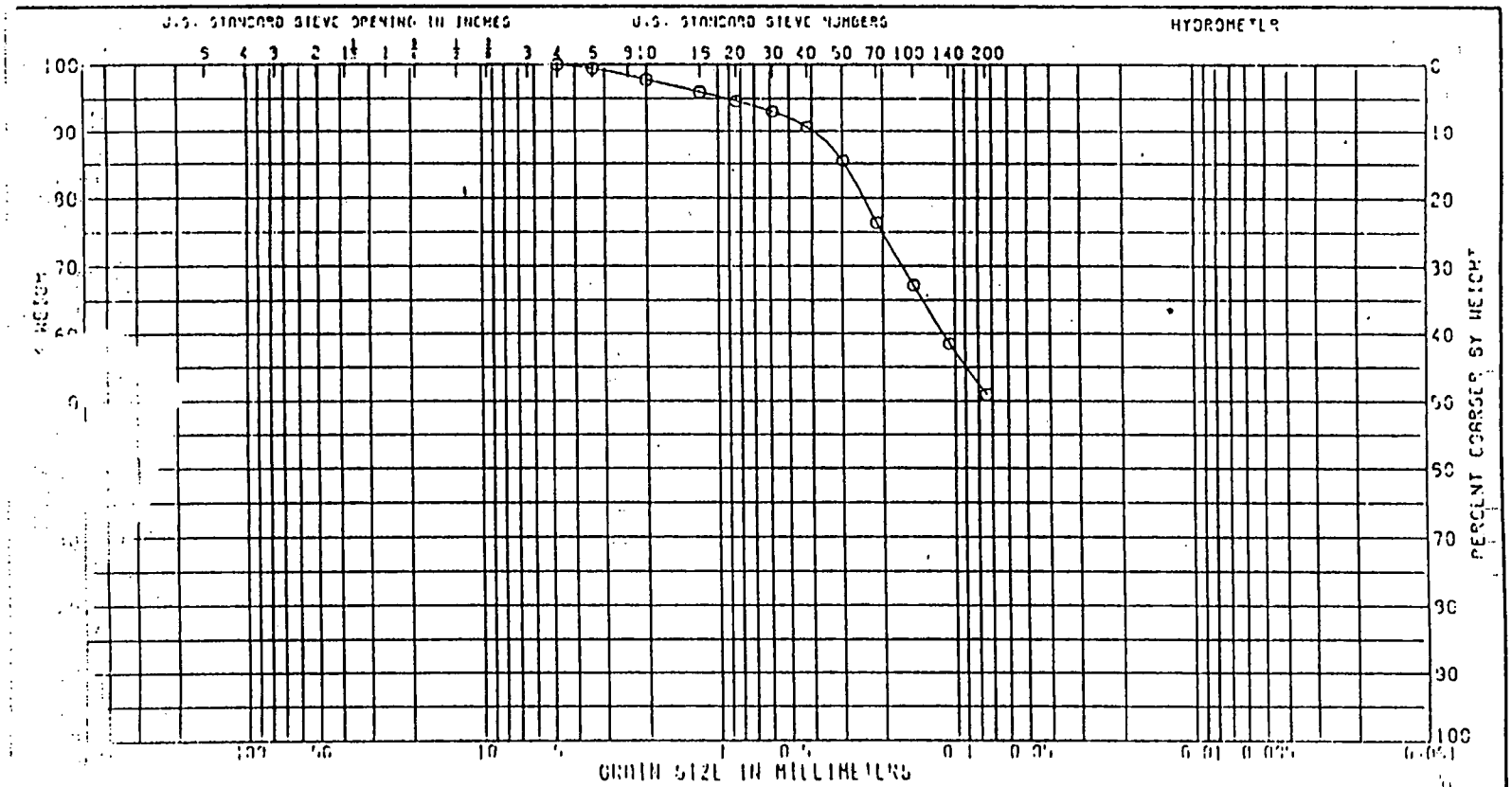
CLASSIFICATION
LAYEY SAND (SC), BROWN

GRADATION CURVE

PROJECT CRANE NUSC MCCOMISH GORGE

BORING NO. 4-3-91 SAMPLE NO. 1

DEPTH/ELEV 0.0-2.09 DATE 11 FEB 92



	PL	PI	GS	NAT W.C. 19.7	

LOCATION

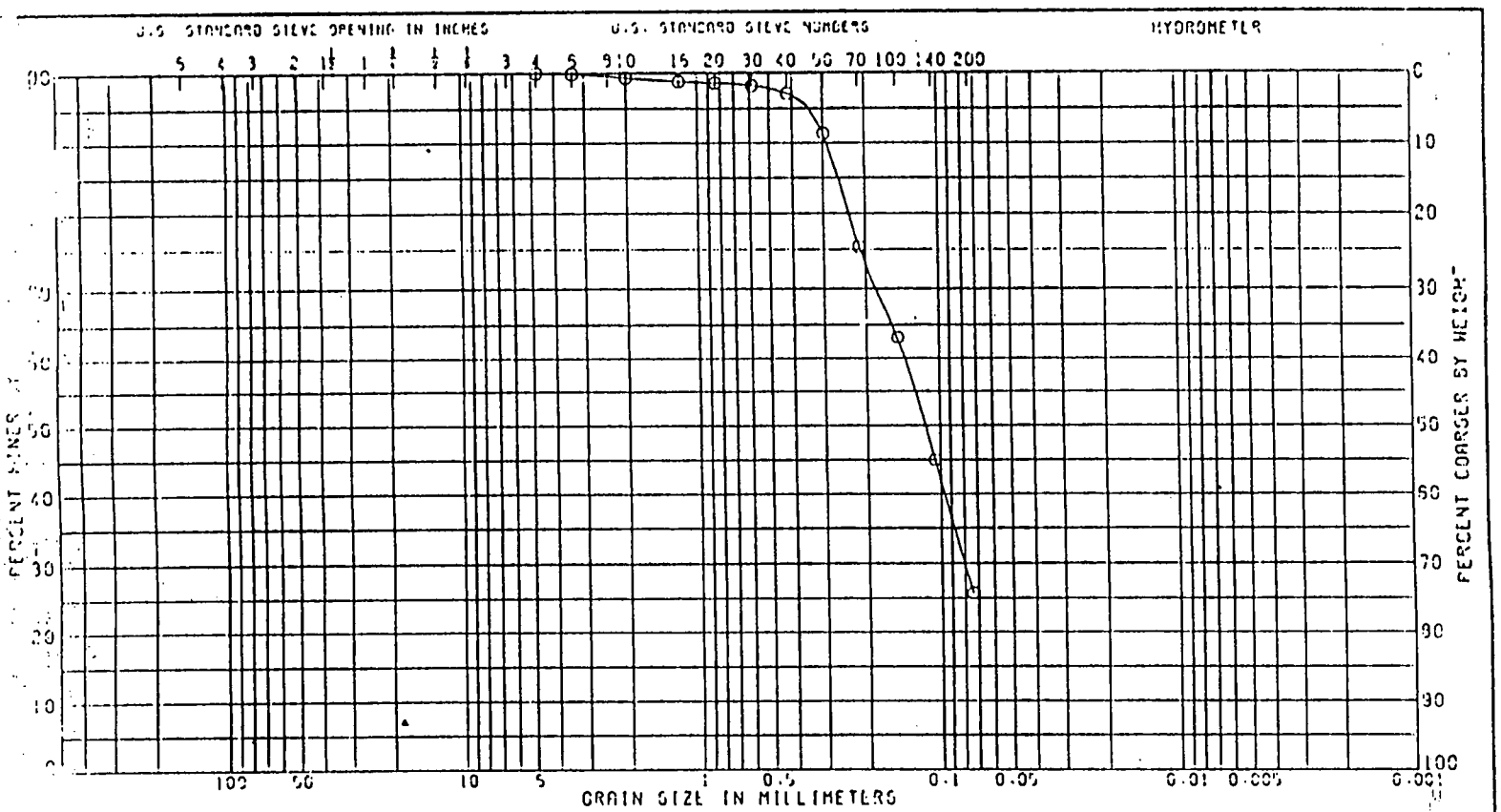
DY SILT (ML), GRAYISH BROWN

GRADATION CURVE

PROJECT CRANE NWSC
MCCOMISH GORGE

BORING NO. 4-3-81 SAMPLE NO 2

DEPTH/ELEV 5.0-7.13 DATE 30 MAR 82



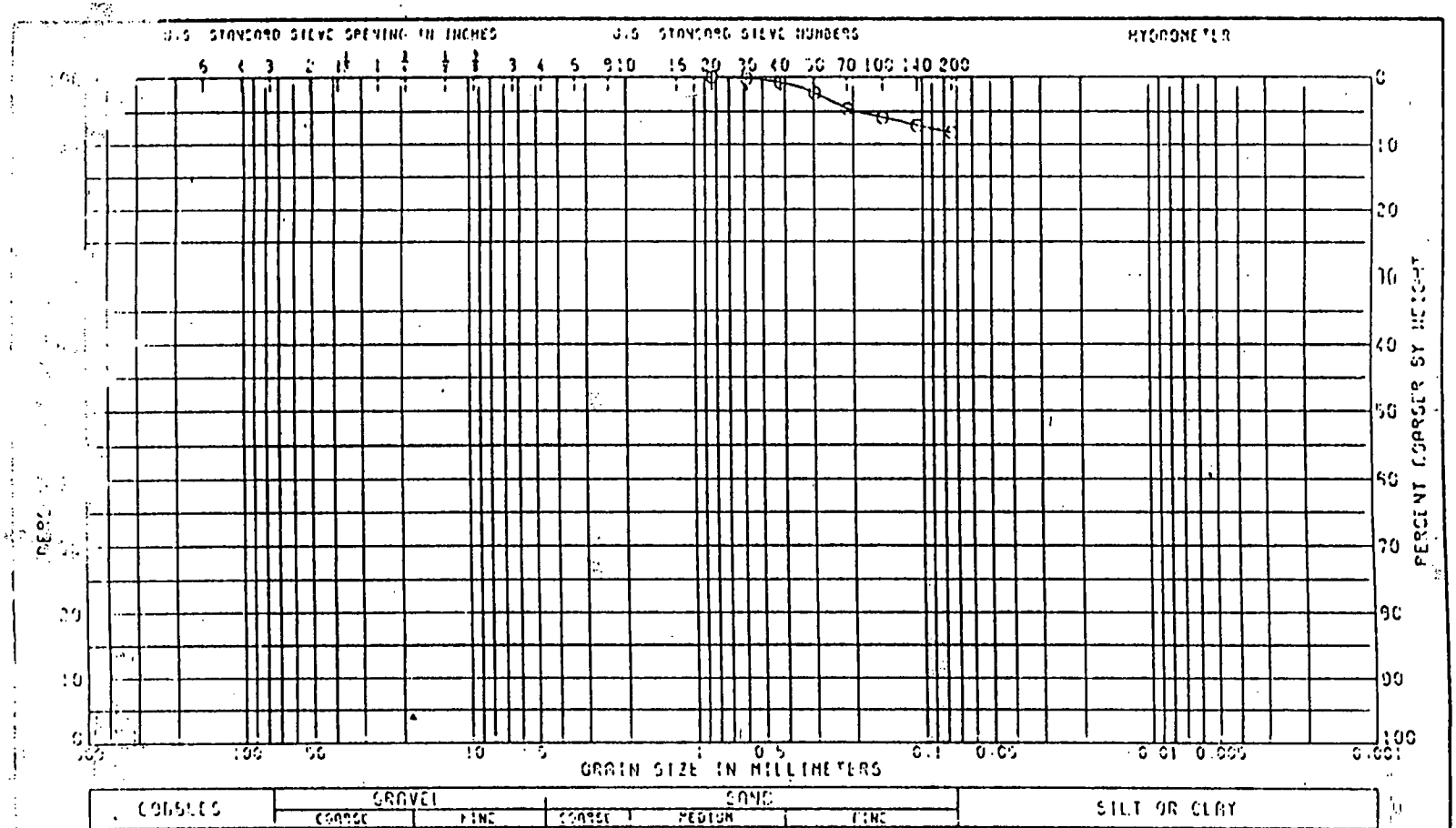
PL	PI	GS	NAT W.C. 4.9	

ATION

...IY SAND (SM), BROWN

GRADATION CURVE

PROJECT CRANE NWSC
MCCOMISH GORGE
BORING NO. 4-3-81 SAMPLE NO. 3
DEPTH/ELEV 10.0-11.83 DATE 30 MAR 82



LL 30	PL 18	PI 21	CS	NAT W.% 20.7	

CLASSIFICATION

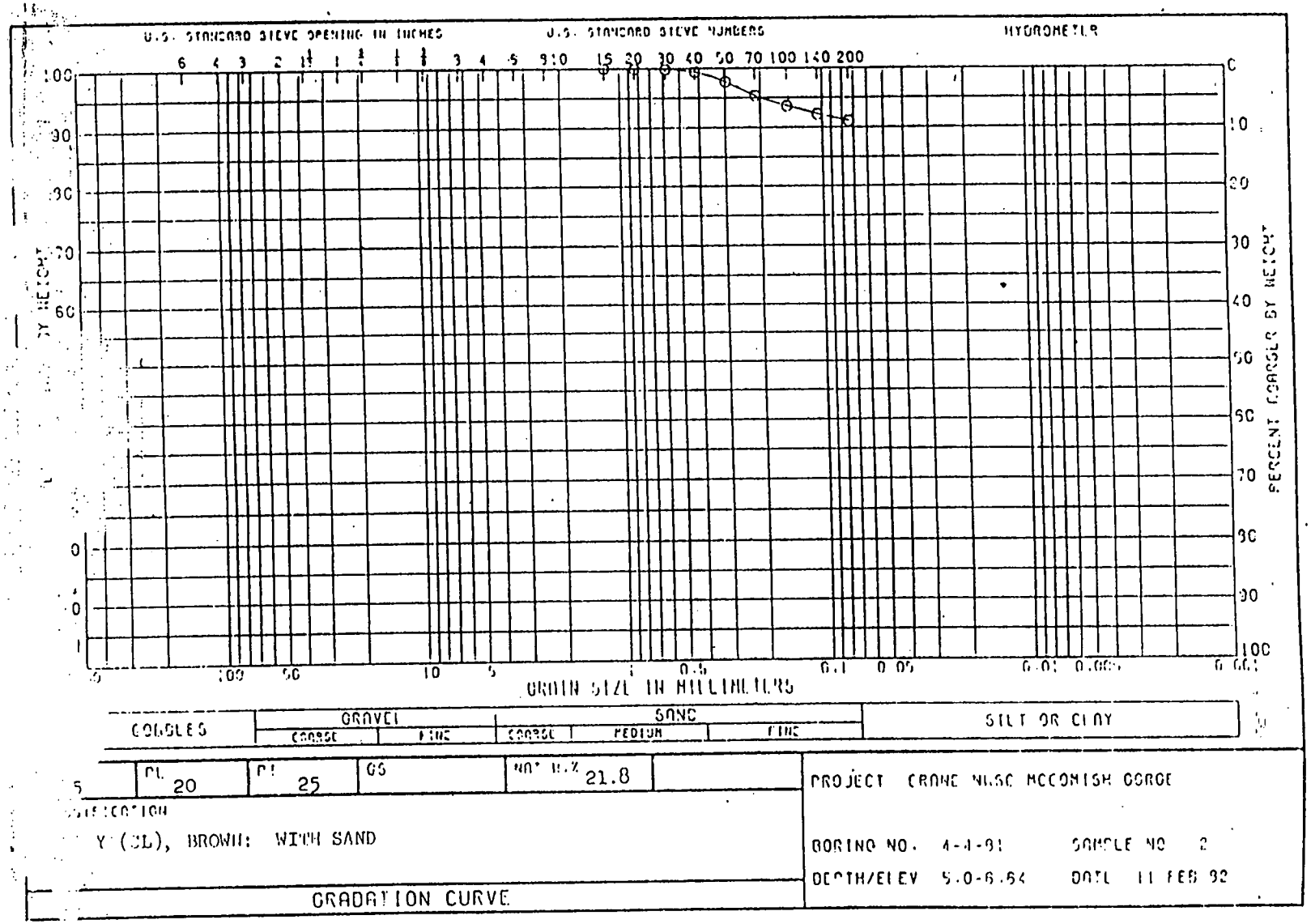
L), REDDISH BROWN; WITH SAND

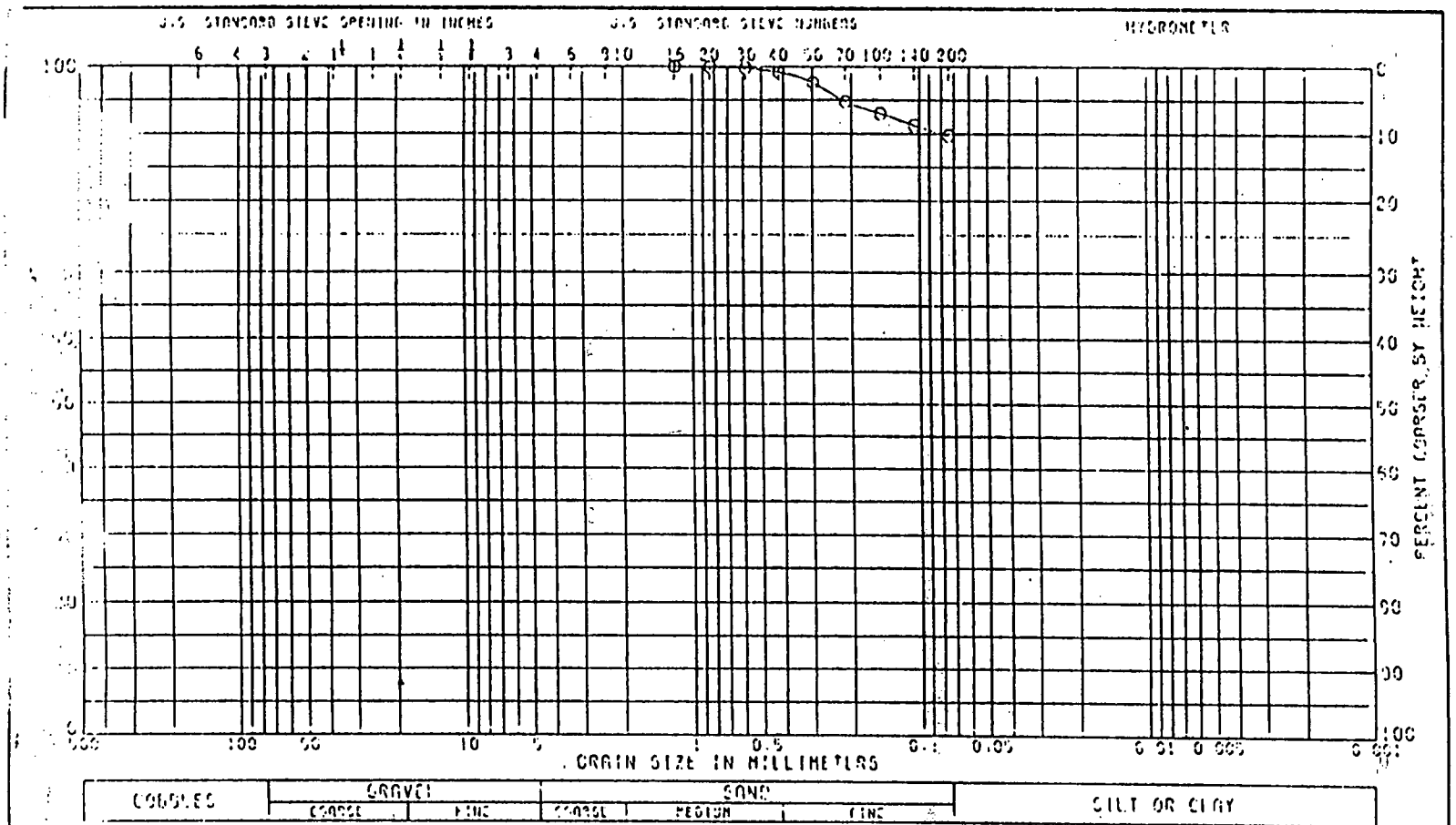
GRADATION CURVE

PROJECT CRANE MESA
MCCOMISH GORGE

BORING NO 4-A-01 SAMPLE NO 1

DEPTH/ELEV 0.0-2.26 DATE 26 FEB 02


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
6 4 3 2 1½ 1 ¾ ½ ⅜ 3 4 5 9 10 15 20 30 40 50 70 100 140 200
100 90 80 70 60 0 0 1
PERCENT FINER BY WEIGHT
0 10 20 30 40 50 60 70 80 90 100
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
PL 20
PI 25
GS
NAT W.% 21.8
CLASSIFICATION
Y (CL), BROWN; WITH SAND
GRADATION CURVE
PROJECT CRANE NAVSC MCCONNISH CORDE
BORING NO. 4-4-91
SAMPLE NO 2
DEPTH/ELEV 5.0-6.5
DATE 11 FEB 92



LL 35	PL 19	PI 16	CC	NAT W.% 12.0	

CLASSIFICATION

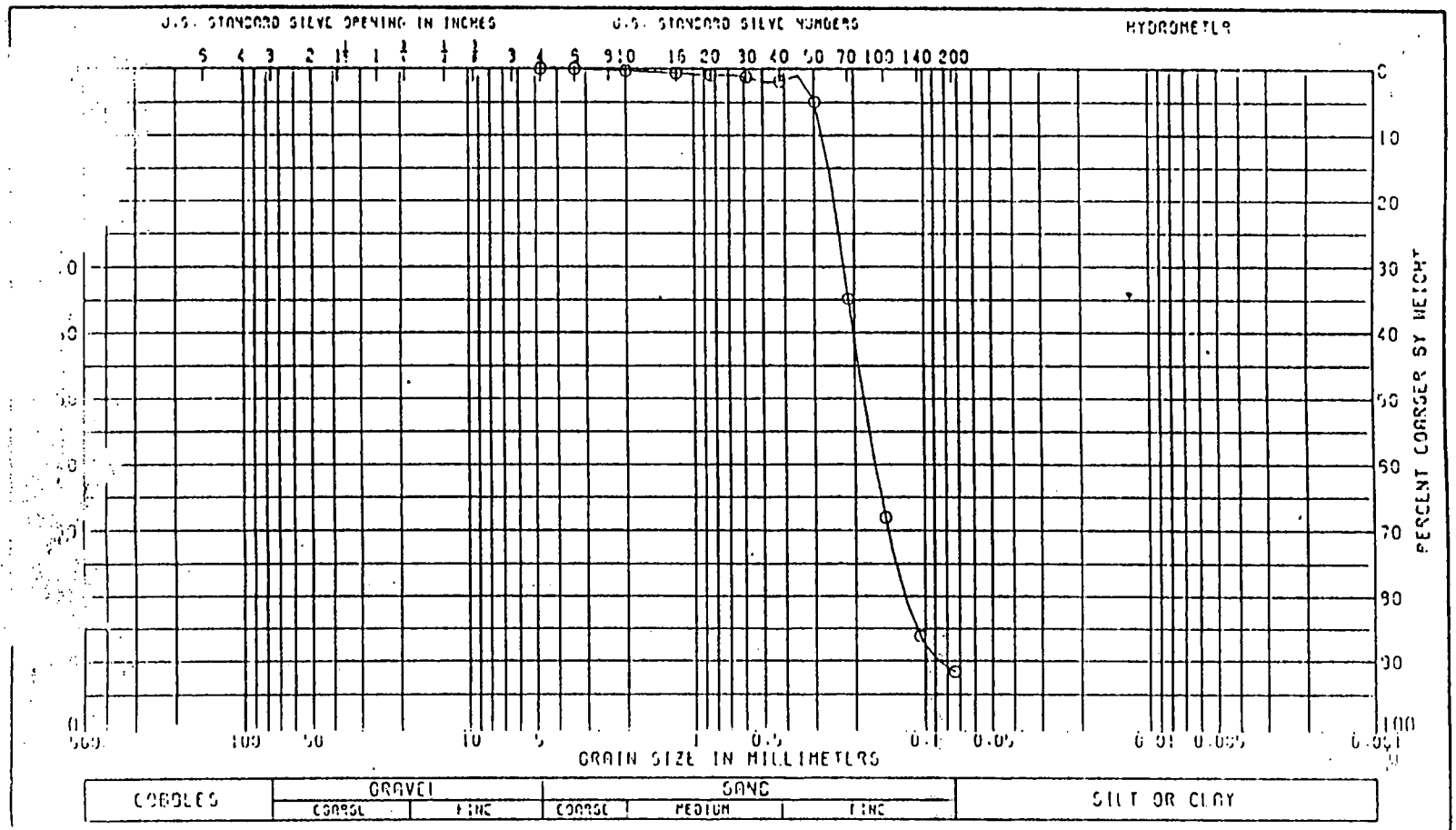
CLAY (CL), BROWN; WITH SAND

GRADATION CURVE

PROJECT CRANE NECK
MCCOMISH GORGE

BORING NO 4-1-91 SAMPLE NO 3

DEPTH/ELEV 10.0-12.19 DATE 25 FEB 92

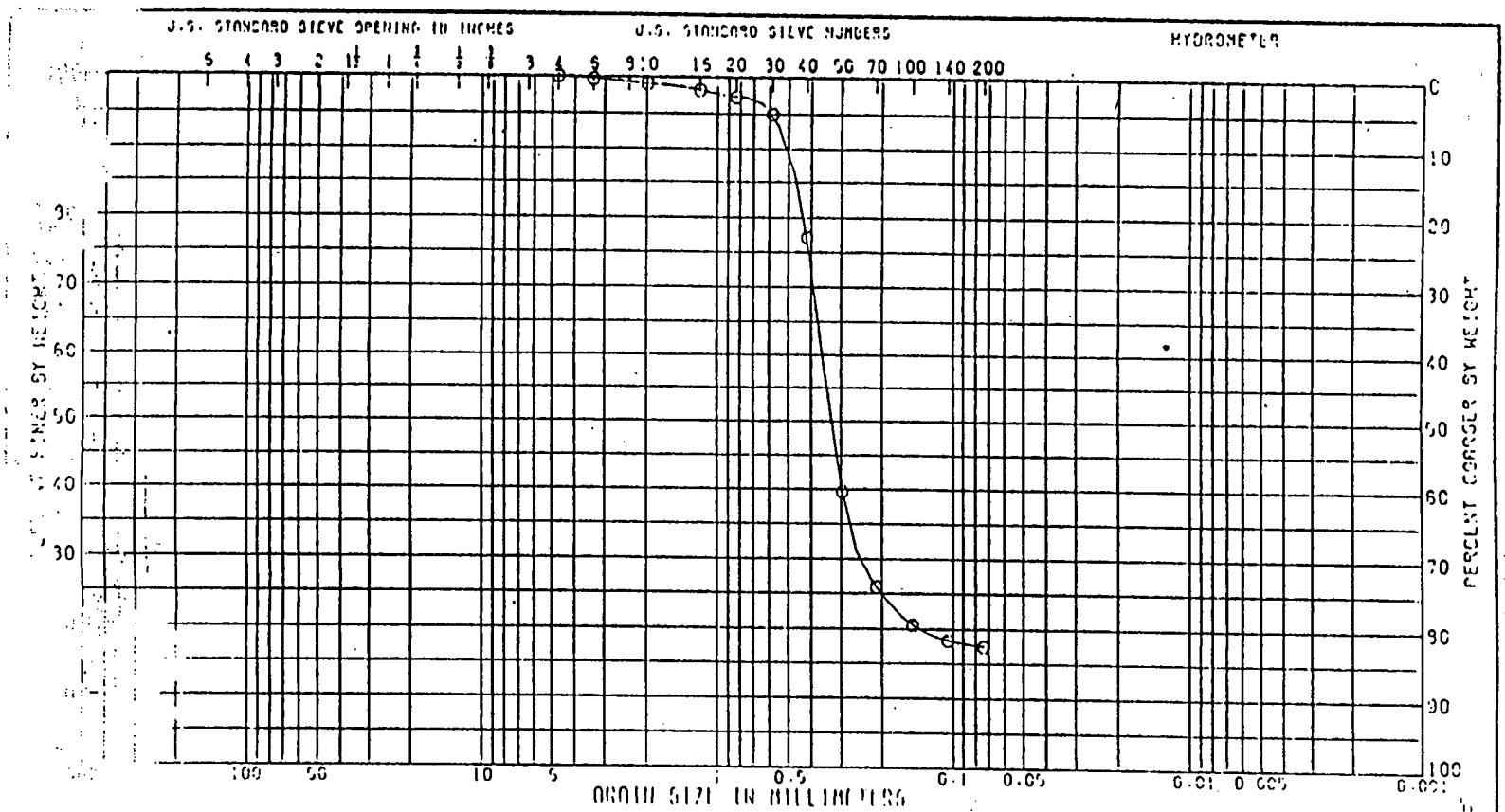


LL NP	PL	PI	GS	NAT W.% 24.3	

CLASSIFICATION
SILTY SAND (SP-SM), GRAY

GRADATION CURVE

PROJECT CRANE NWSC
MCCOMISH GORGE
BORING NO. 4-3-91 SAMPLE NO. 4S
DEPTH/ELEV 15.0-17.0 DATE 30 MAR 92



LL 14	PI 18	CS	NAT W.% 9.9	

DESCRIPTION

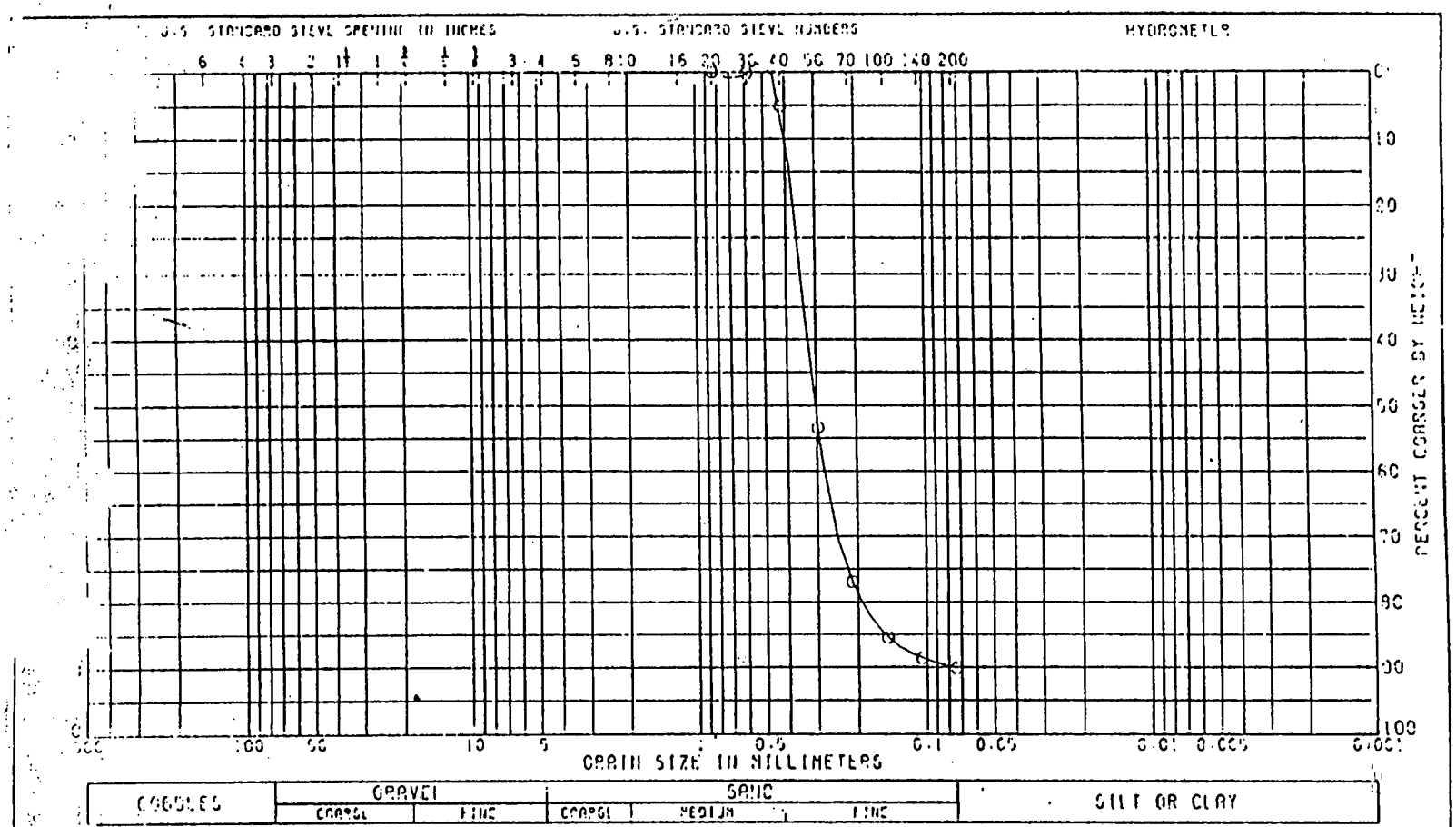
...Y SAND (SC), BROWN

GRADATION CURVE

PROJECT CRANE MILL MCCOMISH GORGE

BORING NO. 4-4-91 SAMPLE NO. 4

DEPTH/ELEV 15.0-16.97 DATE 11 FEB 92



LL	PL	PI	GS	NAT W.%
NP				5.8

CLASSIFICATION

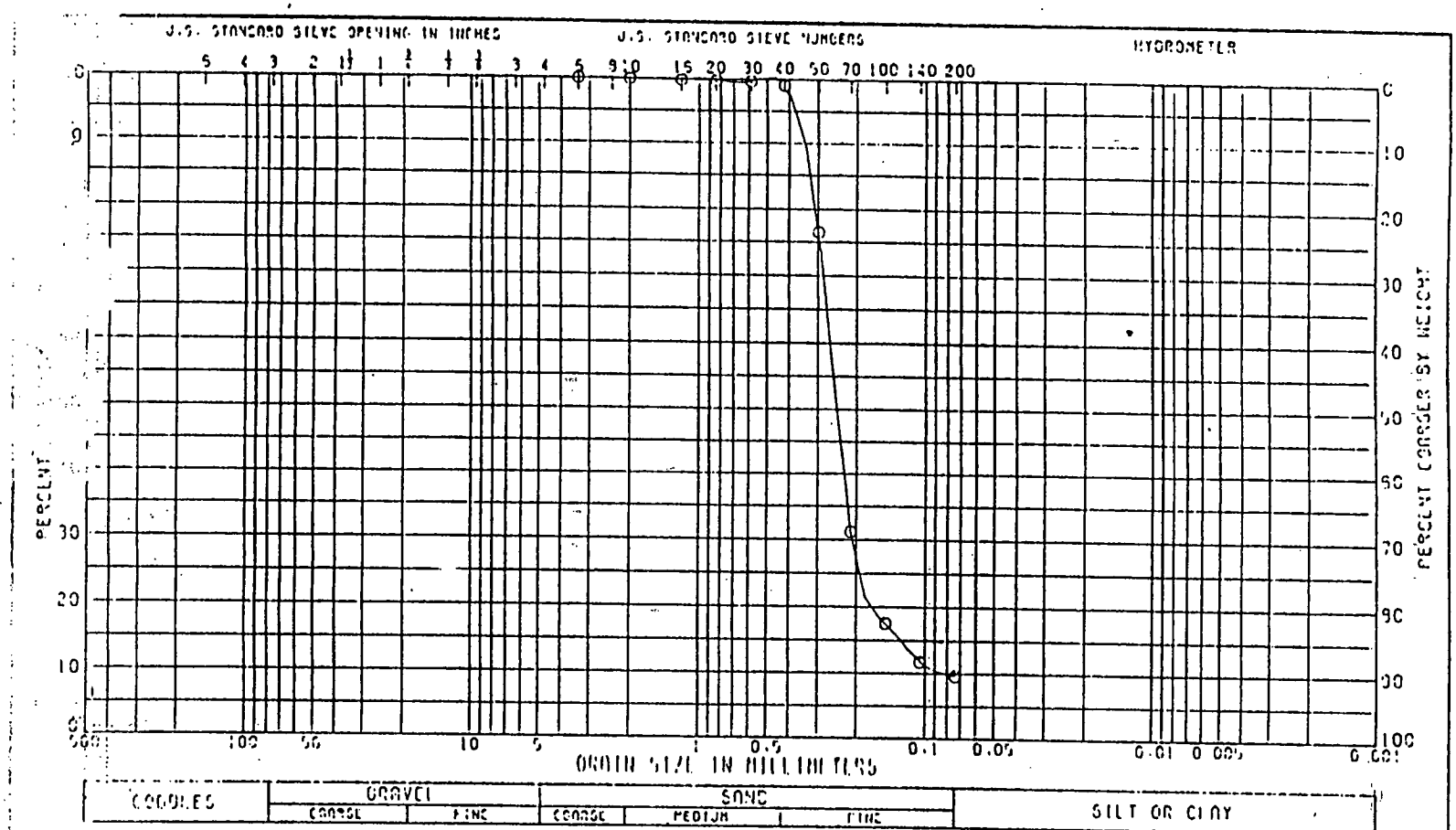
SILTY SAND (SP-SM), BROWN

GRADATION CURVE

PROJECT CRANE MISC
MCCONISH GORGE

BORING NO. 4-1-81 SAMPLE NO. 5

DEPTH/ELEV 20.0-22.08 DATE 09 NOV 82



LL	PL	PI	GS	NAT W.% 18.4

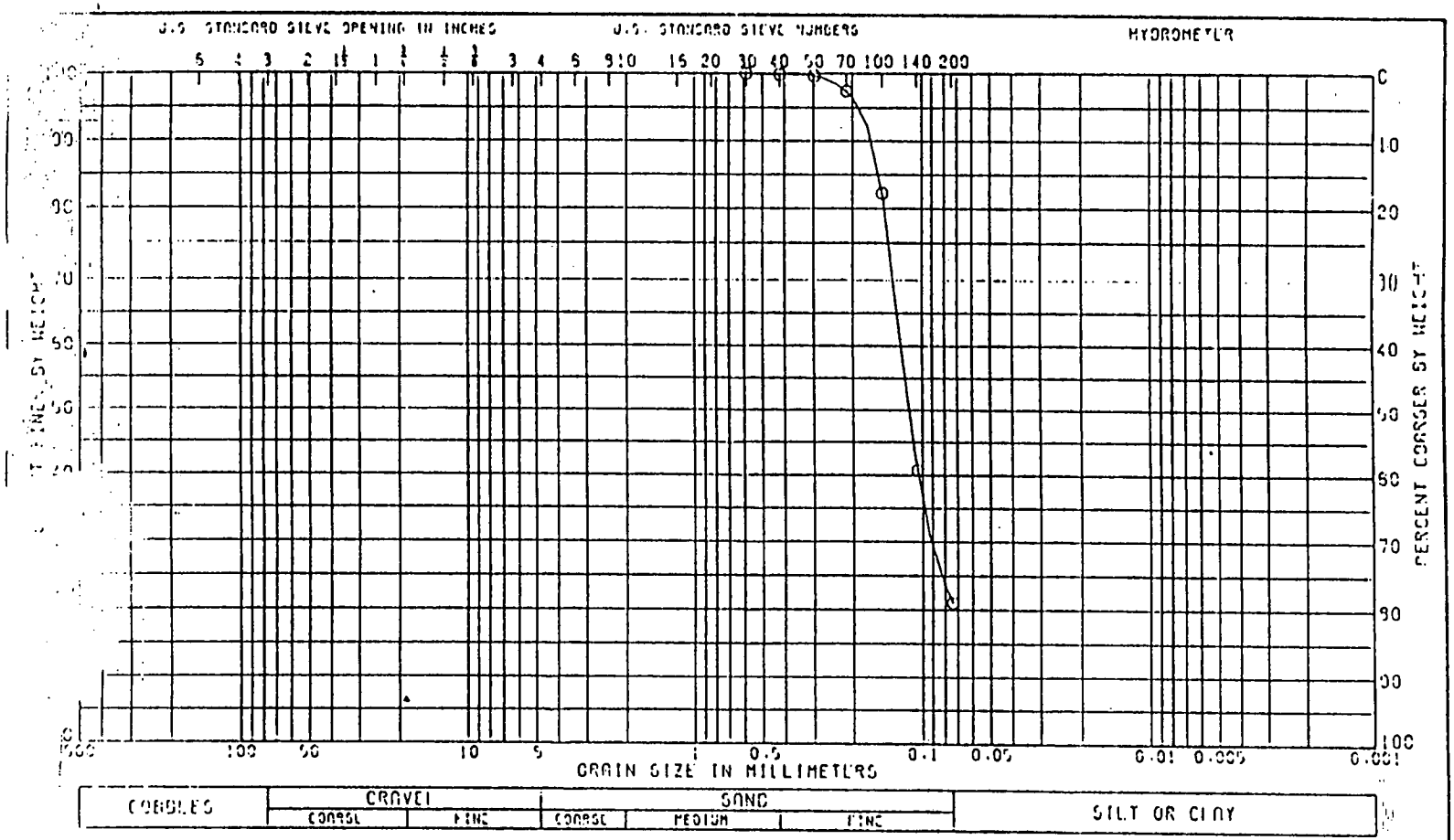
AND (SP-SM), REDDISH BROWN

GRADATION CURVE

PROJECT CRANE NSWC MCCOMISH GORGE

BORING NO. 4-4-91 SAMPLE NO S

DEPTH/ELEV 25.0-26.50 DATE 11 FEB 92



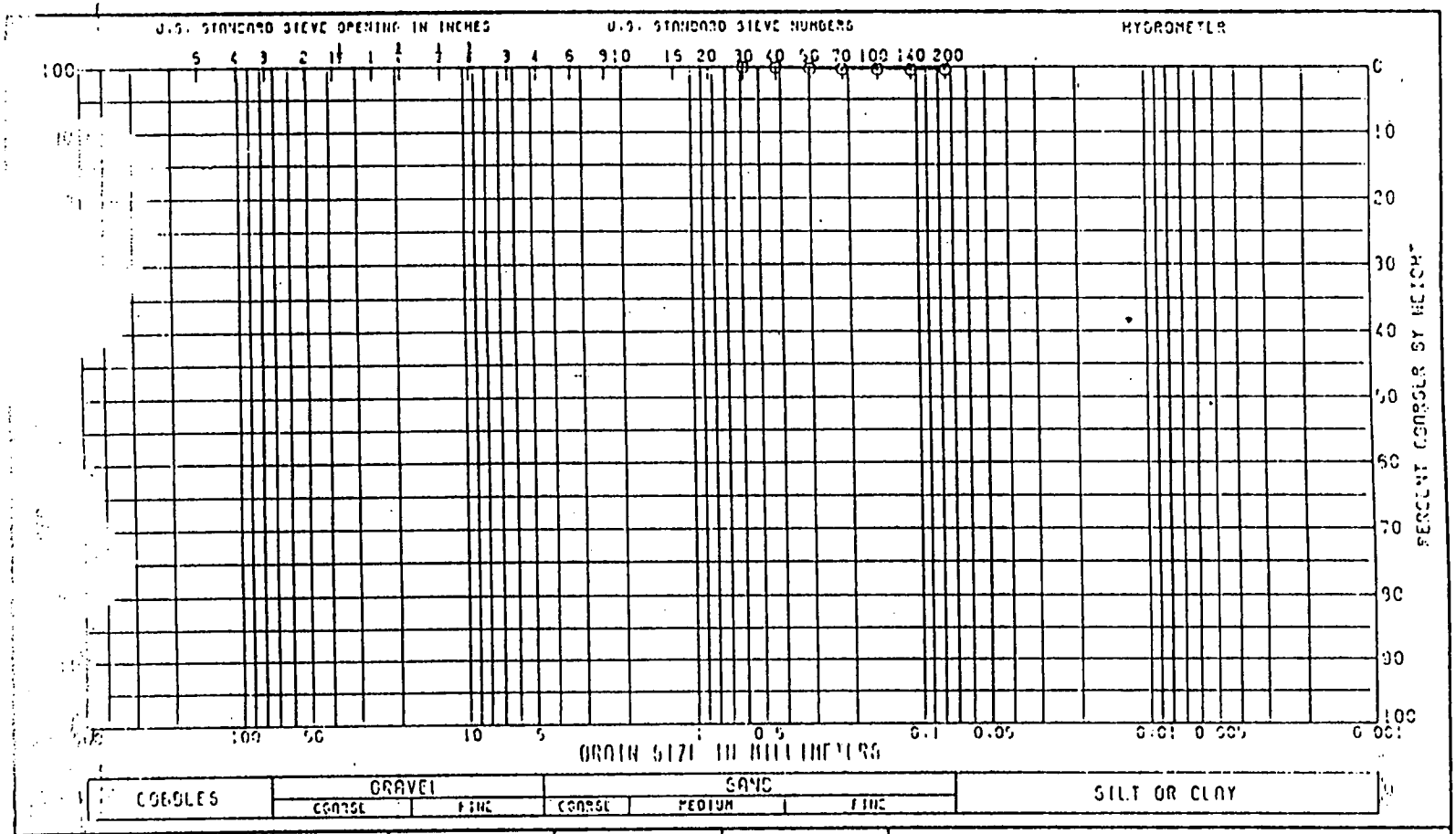
NP	PL	PI	CC	NAT W.C 23.9

CLASSIFICATION

CLAYEY SAND (SM), REDDISH BROWN

GRADATION CURVE

PROJECT CRANE NWSC
MCCOMISH CORCE
BORING NO. 4-4-91 SAMPLE NO. 7
DEPTH/ELEV 27.8-29.00 DATE 30 MAR 92



LL 31	PL 16	PI 15	GS	NAT W.% 33.6

CLASSIFICATION

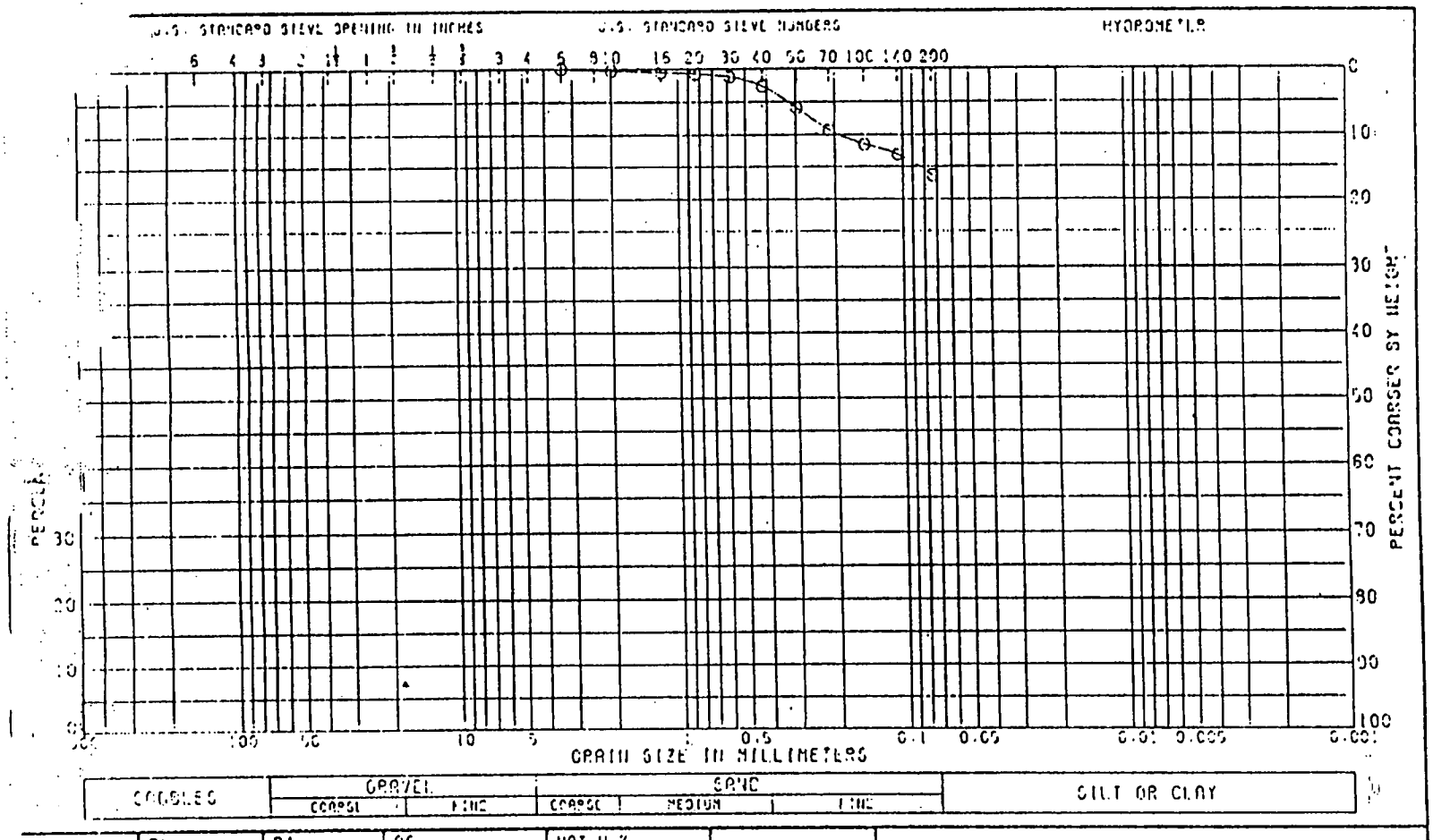
CLAY (CL), GRAY

GRADATION CURVE

PROJECT CRANE NLSC MCCOMISH GORGE

BORING NO. 4-4-91 SAMPLE NO 9

DEPTH/ELEV 35.0-37.05 DATE 11 FEB 92

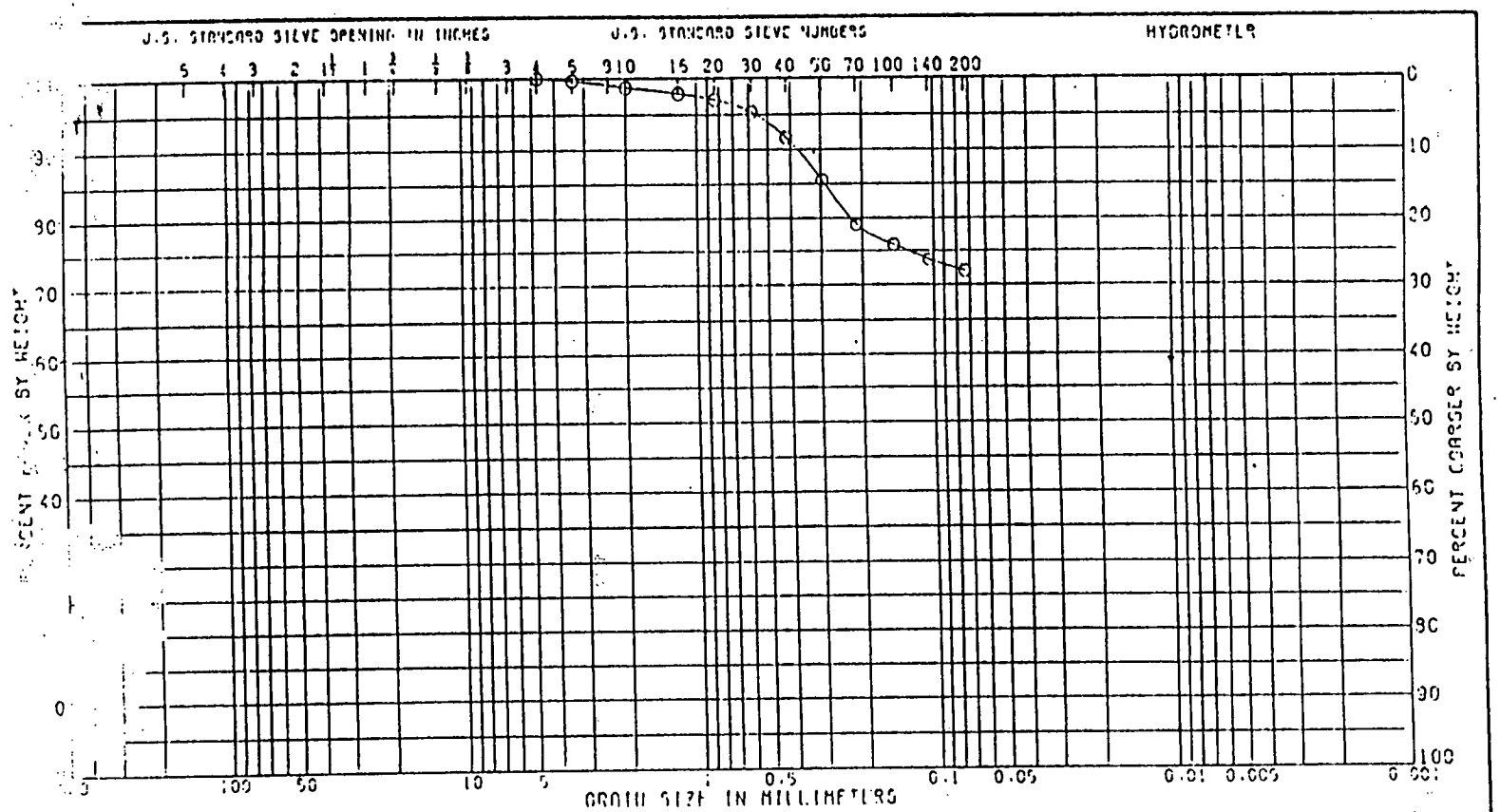


LL 35	PL 16	PI 19	OS	NAT W.% 23.6	

CLAY (CL), TAN

GRADATION CURVE

PROJECT CRANE MILL
MCCOMISH GORGE
BORING NO. 4--5--81 SAMPLE NO 1
DEPTH/ELEV 0.0-1.8 DATE 00 MAR 82



	CL 19	P' 20	GS	NAT W.% 21.1

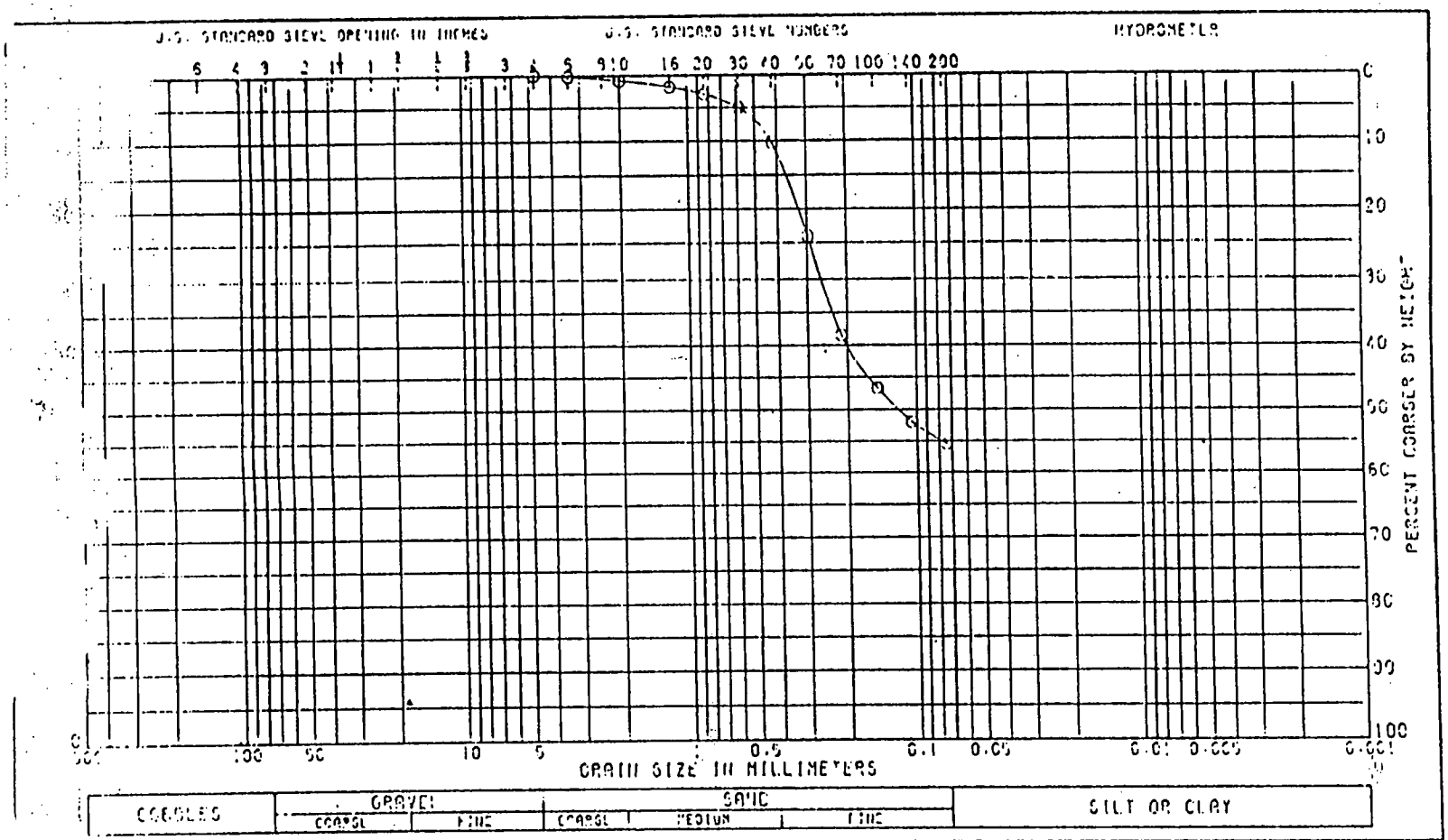
ATION
CLAY (CL), BROWN

GRADATION CURVE

PROJECT CRANE NAVSC MCCOMISH GORGE

BORING NO. 4-5-91 SAMPLE NO 2

DEPTH/ELEV 5.0-6.5S DATE 11 FEB 92

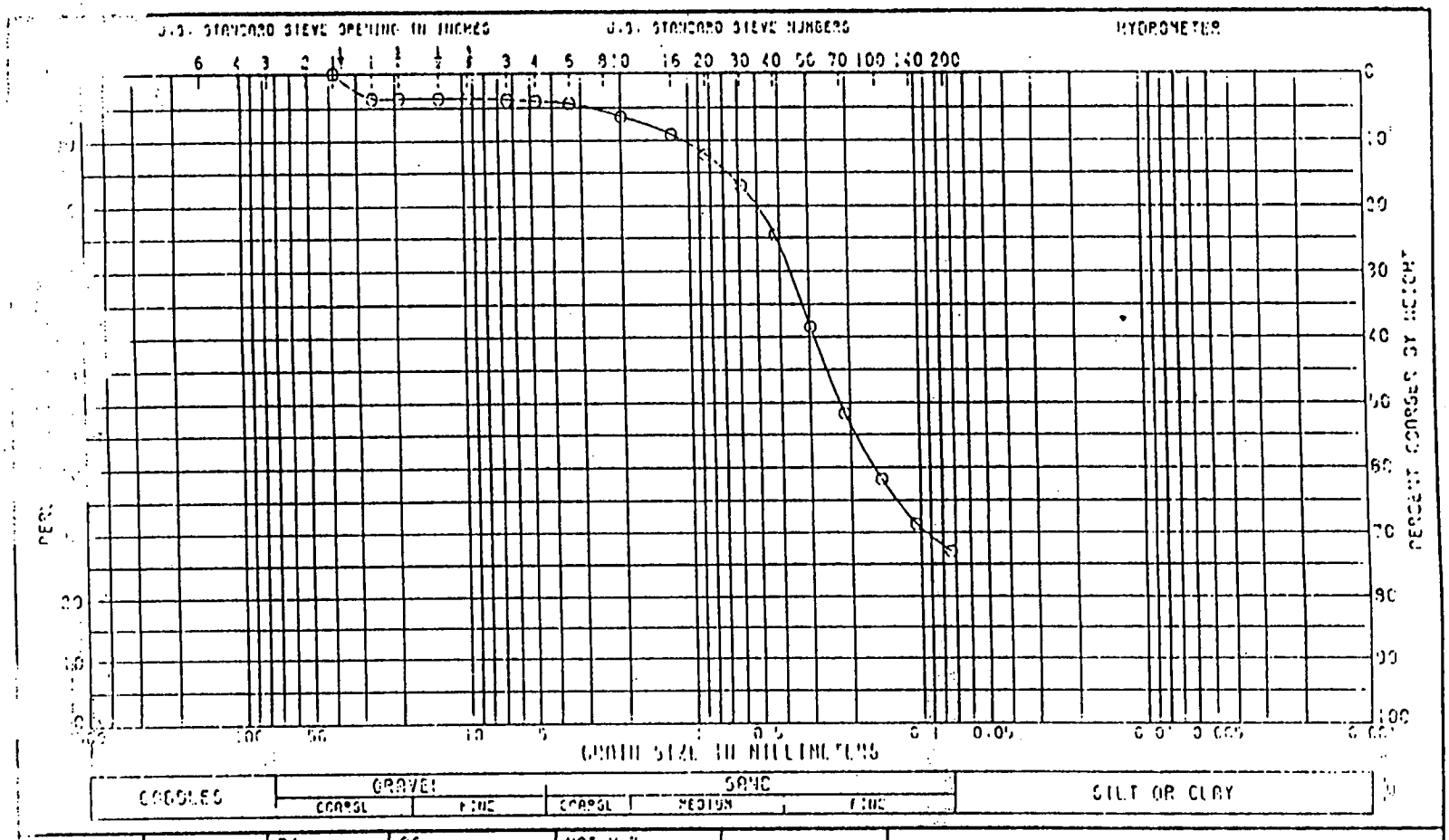


LL 30	PL 17	PI 13	GS	NAT W.% 22.9

CLASSIFICATION
CLAYEY SAND (SC), DARK BROWN ,

GRADATION CURVE

PROJECT CRANE MISC
MCCOMISH CORCL
BORING NO. 4-5-81 SAMPLE NO 3
DEPTH/ELEV 10.0-11.10 DATE 09 MAR 82



LL	PL	PI	GS	NAT W.%
				12.4

CLASSIFICATION

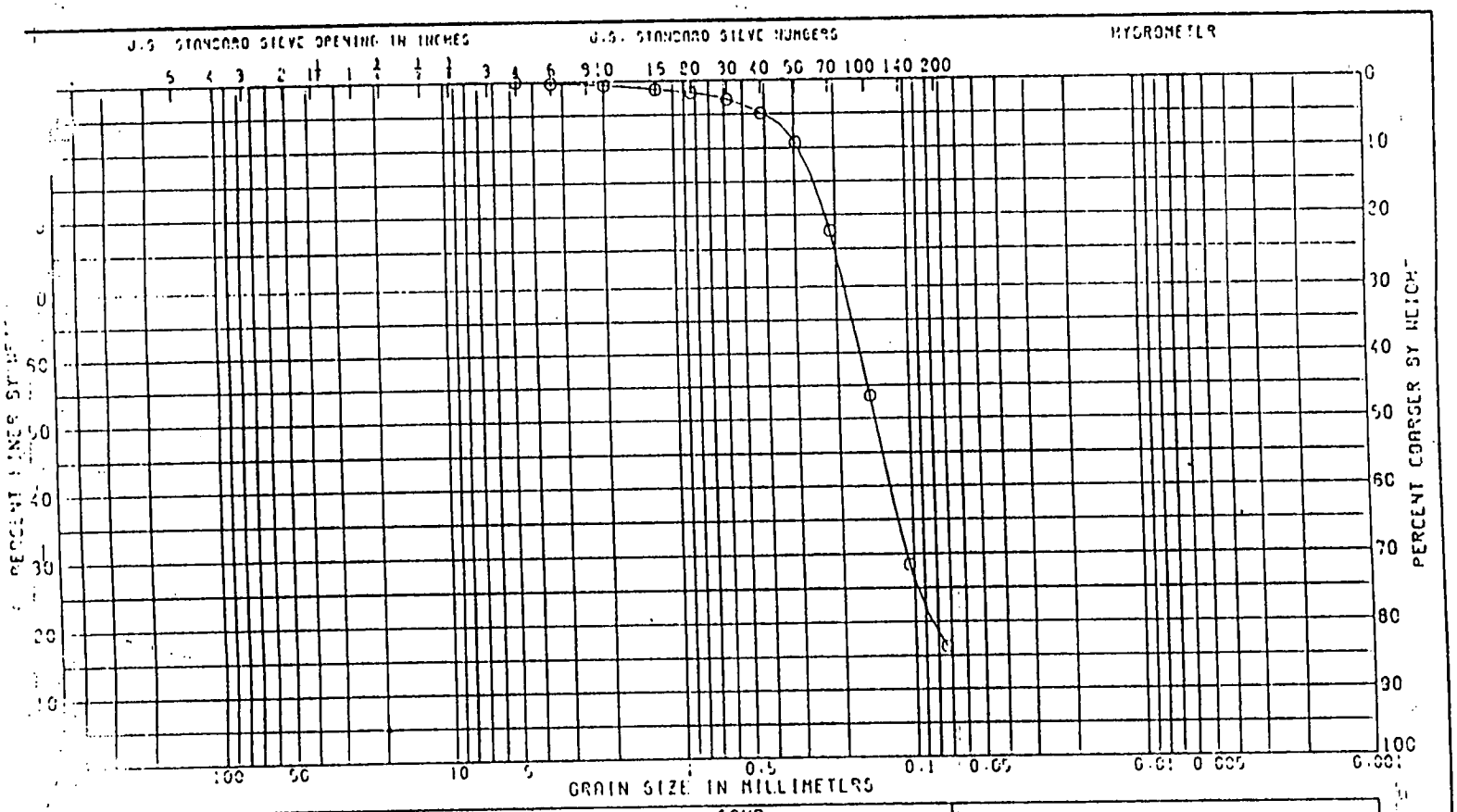
SAND (SM), LIGHT BROWN; TRACE OF GRAVEL
CLIENT SAMPLE FOR ACCURATE GRADATION

GRADATION CURVE

PROJECT CRANE MISC
MCCONISH GORGE

BORING NO 4-6-81 SAMPLE NO 1

DEPTH/ELEV 0.0-2.0 SOIL CO USB 80



	PL	PI	GS	NAT W.% 10.2	

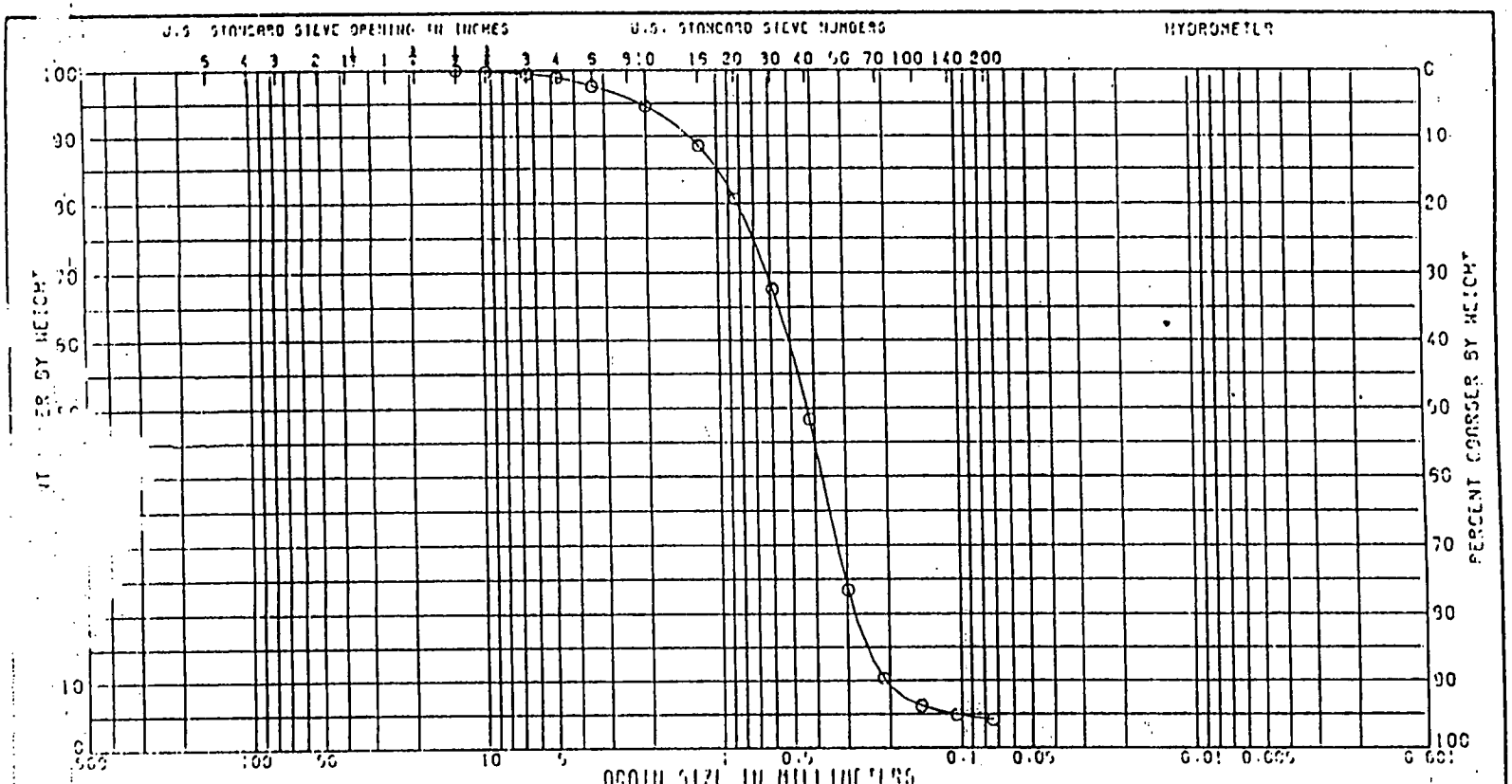
SILTY SAND (SM), DARK BROWN

GRADATION CURVE

PROJECT CRANE NUSC MCCOMISH CORE

BORING NO. 4-6-01 SAMPLE NO. 2

DEPTH/ELEV 5.0-7.09 DATE 11 FEB 02



LL	PL	PI	CC	NAT W.% 14.7	

CLASSIFICATION

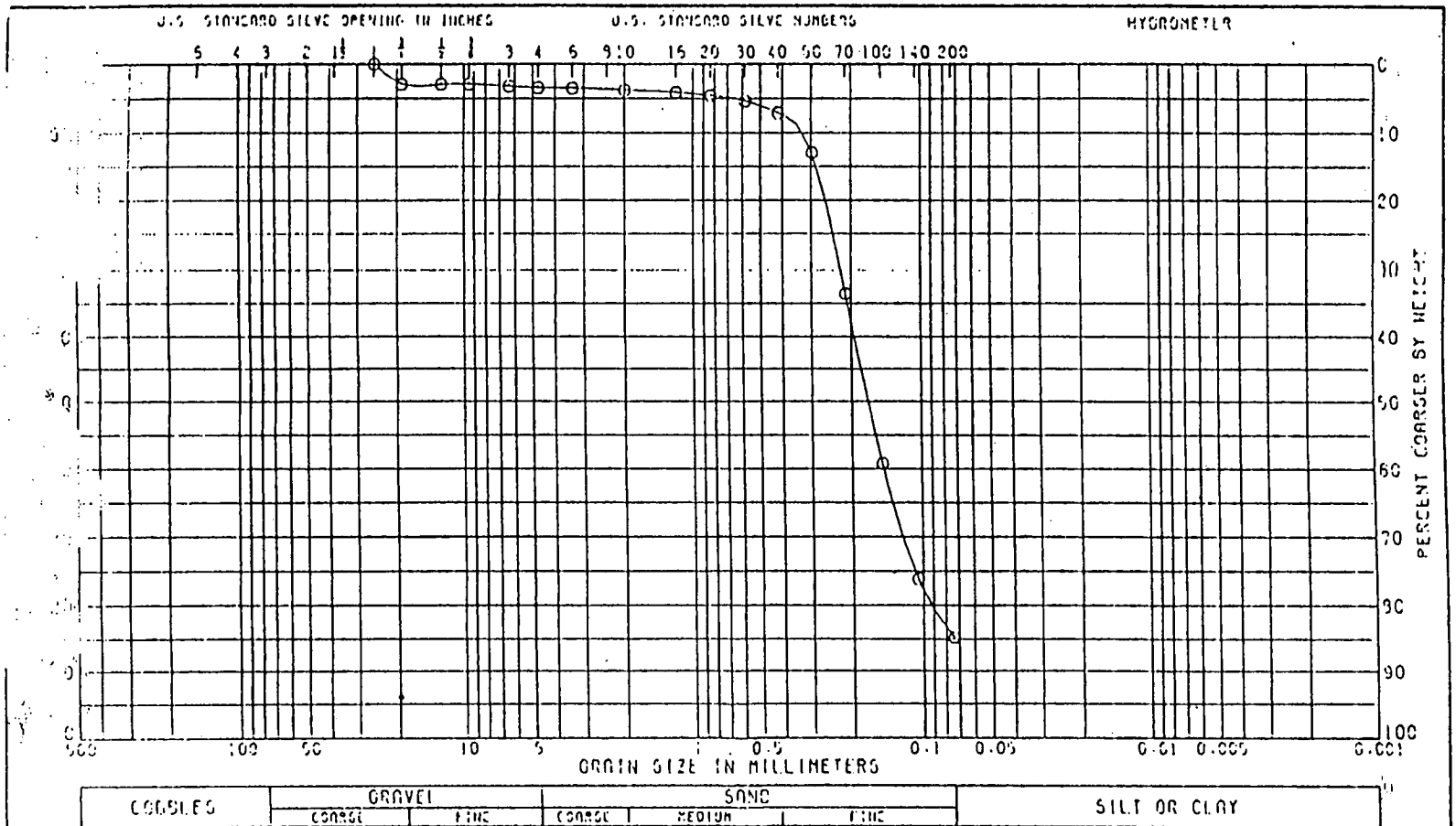
SAND (SP), GRAY

GRADATION CURVE

PROJECT CRANE NAVSC MCCOMISH GORGE

BORING NO. 4-S-91 SAMPLE NO. 4

DEPTH/ELEV 14.3-16.0 DATE 11 FEB 92



LL	PL	PI	GS	NAT W.% 22.4

CLASSIFICATION

SILTY SAND (SM), BROWN: TRACE OF GRAVEL

GRADATION CURVE

PROJECT CRANE NWSC MCCOMISH GORGE

BORING NO. 4-5-01 SAMPLE NO 5

DEPTH/ELEV 18.6-20.05 DATE 11 FEB 02

Appendix D
Chain of Custody and Validation Report

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

Sites

PROJECT NAME (SWMU # 04/02)
NWSC-CRANE : McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES PCBS	HERBICIDES	EXPLOSIVES		REMARKS
										8120 - 8140
11-6-90	0840	04/02-04-90 #1V	2		✓					
"	0845	04/02-04-90 #1	2	✓		✓	✓	✓		
"	0850	04/02-04-90 #2V	2		✓					
"	0855	04/02-04-90 #2	2	✓		✓	✓	✓		
11-7-90	0925	TRIP BLANK	2							Bubbles

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11-7-90 0930	Linda K. Stevenson			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 89 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

PROJECT NAME (SWMU #04/02)
NNSC - CRANE : McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES, PCBs	HERBICIDES	EXPLOSIVES	REMARKS
									Sites
11-6-90	1300	REINSATE	10						
11-7-90	0931	TRIP BLANK	2						Bubbler

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11-7-90 0932	[signature]			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 89 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

8605

PROJECT NAME (GWMR #04/02)

NWSC CRANE: McComish Gorge

SAMPLERS: (Signature)

Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES / PCBs	HERBICIDES	EXPLOSIVES	REMARKS
									8094-8125
11-2-90	1015	04/02-05-90 #1V	2		✓				
"	1020	04/02-05-90 #1	2	✓		✓	✓	✓	
"	1040	04/02-05-90 #2V	2		✓	✓			
"	1045	04/02-05-90 #2	2	✓		✓	✓	✓	
11-5-90	0758	TRIP BLANK	2						Bubbles

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Larry Benjamin	11/5/90 0800	Linda K. Stevenson			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Remarks	

WES FORM R Nov 89 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

PROJECT NAME (SWMU # 04/02)
NWSC CRANE ; McComisit GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES, PCBS	HERBICIDES	EXPLOSIVES	REMARKS
11-2-90	1305	04/02-07-90 #1V	4		✓				DUPLICATE SAMPLES TAKEN
11	1315	04/02-07-90 #1	4	✓		✓	✓	✓	ON THIS HOLE.
"	1325	04/02-07-90 #2V	4		✓				
"	1335	04/02-07-90 #2	4	✓		✓	✓	✓	
11-5-90	0808	TRIP BLANK	2						Bubbles

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11-5-90 0810	Linda K. Stevenson			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 89 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

PROJECT NAME (SWMU # 04/02)
NWSC CRANE: McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	PESTICIDES / PCBS / HERBICIDES	REMARKS
11-2-90	1545	REINSATE	10		
11-5-90	0803	TRIP BLANK	2		Bubbles

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11-5-90 0805	Linda K. Stevenson			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 89 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

Lab 5

PROJECT NAME (SWMU # 04/02)
NWSC CRANE ; McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES/PCBs	HERBICIDES	EXPLOSIVES	REMARKS
									8026-8055
10/30-90	1335	04/02-06-90 #1V	2		✓				
"	1340	04/02-06-90 #1	2	✓		✓	✓	✓	
"	1345	04/02-06-90 #2V	2		✓				
"	1355	04/02-06-90 #2	2	✓		✓	✓	✓	
10-31-90	1600	REINSATE	10						
11-1-90	1045	TRIP BLANK	2						Bubbles
			1V		2			✓	
		0930 04/02-08-90	2		2			2	✓ ✓ ✓ ✓
		0935							

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11/1/90 1100	Linda K. Stevenson			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM 2196 R Nov 80 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

PROJECT NAME (SWMU # 04/02)
NWSC CRANE ; McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES, PCBS	HERBICIDES	EXPLOSIVES	REMARKS
10/31/90	1045	04/02-09-90 # IV	2		✓				
"	1050	04/02-09-90 # 1	2	✓		✓	✓	✓	
"	1110	04/02-09-90 # 2V	2		✓				
"	1115	04/02-09-90 # 2	2	✓		✓	✓	✓	
11/1/90	0830	04/02-08-90 # IV	2		✓				
"	0835	04/02-08-90 # 1	2	✓		✓	✓	✓	
"	1005	04/02-10-90 # IV	2		✓				
"	1010	04/02-10-90 # 1	2	✓		✓	✓	✓	
"	1043	TRIP BLANK	2						

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	11/1/90 1102				
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 80 2196 PREVIOUS EDITIONS OBSOLETE

CHAIN OF CUSTODY RECORD

2 of 5

PROJECT NAME (SWMU # 04/02)
NWSC CRANE: McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES, PCBS	HERBICIDES	EXPLOSIVES	REMARKS
									7980-8001
10-24-90	1500	04/02-03-90 #1V	2		✓				
"	1505	04/02-03-90 #1	2	✓		✓	✓	✓	
"	1605	04/02-03-90 #2V	2		✓				
"	1610	04/02-03-90 #2	2	✓		✓	✓	✓	
10-25-90	0950	04/02-1A-90 #1V	2		✓				
"	0955	04/02-1A-90 #1	2	✓		✓	✓	✓	
"	1020	04/02-1A-90 #2V	2		✓				
"	1025	04/02-1A-90 #2	2	✓		✓	✓	✓	
"	1030	REINSATE	5						
"	1105	TRIP BLANK	2						Bubbles

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	10/25/90 1120	Linda K. Stevenson			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM R Nov 88 2196 PREVIOUS EDITIONS OBSOLETE

USAE WATERWAYS EXPERIMENT STATION

CHAIN OF CUSTODY RECORD

D-165

PROJECT NAME (SWMU # 04/02)
NWSC CRANE; McCOMISH GORGE

SAMPLERS: (Signature)
Larry Benjamin

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	8240	8270	PESTICIDES + PCBS	HERBICIDES	EXPLOSIVES	REMARKS
									7948-7979
10-22-90	1532	04/02-01-90 #1V	2		✓				
"	1534	04/02-01-90 #1	2	✓		✓	✓	✓	
"	1555	04/02-01-90 #2V	2		✓				
"	1600	04/02-01-90 #2	2	✓		✓	✓	✓	
"	1430	DEONIZED WATER	5						
"	1400	TANK WATER	5						
10-23-90	1630	REINSATE	5						1 VOA vial broken
"	1550	04/02-02-90 #1V	2		✓				1 vial broken
"	1555	04/02-02-90 #1	2	✓		✓	✓	✓	
"	1605	04/02-02-90 #2V	2		✓				
"	1610	04/02-02-90 #2	2	✓		✓	✓	✓	
10-24-90	0820	TRIP BLANK	2						Bubbles

Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Larry Benjamin	10/24/90 0830	Linda K. Stevens			
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Relinquished by: (Signature)	Date /Time	Received by: (Signature)
Relinquished by: (Signature)	Date /Time	Received by: (Signature)	Date /Time	Remarks	

WES FORM 2196 R Nov 89 PREVIOUS EDITIONS OBSOLETE

Appendix E
Monitoring Wells Sampling Results

RUN DATE: 05 MAR 82

INSTALLATION: CRANE AAA, IN

FACILITY: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1	4-2	4-4	4-3	4-5	4-6
WATER									
LEVEL: A	13 DEC 81		FT	573.59	566.39	566.74	562.52	564.89	564.44
ARSENIC	07 DEC 81	.010	MGL	.010	ND	ND	ND	ND	ND
BARIUM	07 DEC 81	.1	MGL	ND	ND	ND	ND	ND	ND
CADMIUM	07 DEC 81	.005	MGL	ND	ND	ND	ND	ND	ND
CHROMIUM	07 DEC 81	.010	MGL	ND	ND	ND	ND	.010	.010
FLUORIDE	07 DEC 81	.10	MGL	.13	.13	ND	.14	ND	.14
LEAD	07 DEC 81	.010	MGL	ND	ND	ND	ND	ND	ND
MERCURY	07 DEC 81	.2	UGL	ND	ND	ND	ND	ND	ND
NO2+NO3 AS N	07 DEC 81	.05	MGL	.38	1.10	.19	ND	.07	.58
SELENIUM	07 DEC 81	.005	MGL	ND	ND	ND	ND	ND	ND
SILVER	07 DEC 81	.01	MGL	ND	ND	ND	ND	ND	ND
ENDRIN	07 DEC 81	.04	UGL	ND	ND	ND	ND	ND	ND
LINDANE	07 DEC 81	.08	UGL	ND	ND	ND	.19C	ND	ND
TOXAPHENE	07 DEC 81	1.6	UGL	ND	ND	ND	ND	ND	ND
METHOXYCHLOR	07 DEC 81	1.6	UGL	ND	ND	ND	ND	ND	ND
2,4-D	07 DEC 81	3.8	UGL	ND	ND	ND	ND	ND	ND
SILVEX	07 DEC 81	.5	UGL	ND	ND	ND	ND	ND	ND
GROSS ALPHA	07 DEC 81	1.96	PCL	ND	ND	ND	ND	ND	ND
GROSS BETA	07 DEC 81	1.30	PCL	1.65	2.42	3.55	2.25	2.19	1.17
TOTCOLIBACT	08 DEC 81	1.	PHM	ND	ND	TNTC *	ND	45.*	ND
CHLORIDE	07 DEC 81	1.0	MGL	1.7	3.0	41.0	7.6	12.4	7.2
IRON	07 DEC 81	.03	MGL	.80 *	.59 *	.15	1.15 *	20.60 *	.20
MANGANESE	07 DEC 81	.01	MGL	.82 *	.38 *	10.30 *	1.08 *	7.30 *	.65 *
PHENOL	07 DEC 81	.01	MGL	ND	ND	ND	ND	ND	ND
SODIUM	07 DEC 81	1.	MGL	9.	5.	21.	33.	20.	10.
SULFATE	07 DEC 81	5.0	MGL	7.7	37.0	11.8	28.5	20.4	38.9
PH(FIELD)	07 DEC 81		PH	6.9	7.1	6.6	6.7	6.3 *	6.9
PH(FIELD)	07 DEC 81		PH	7.0	7.0	6.6	6.7	6.3 *	6.9
PH(FIELD)	07 DEC 81		PH	7.0	7.1	6.6	6.7	6.3 *	6.8
PH(FIELD)	07 DEC 81		PH	7.0	7.1	6.6	6.7	6.3 *	6.9
SPEC COND	07 DEC 81	1.	UMC	330.	540.	880.	530.	630.	550.
SPEC COND	07 DEC 81	1.	UMC	330.	550.	870.	520.	630.	550.
SPEC COND	07 DEC 81	1.	UMC	330.	540.	880.	530.	640.	550.
SPEC COND	07 DEC 81	1.	UMC	340.	540.	880.	530.	630.	550.
TOC	07 DEC 81	1.0	MGL	7.0	15.0	33.0	19.0	7.0	18.0
TOC	07 DEC 81	1.0	MGL	8.0	14.0	33.0	19.0	7.0	18.0
TOC	07 DEC 81	1.0	MGL	7.0	15.0	33.0	19.0	7.0	18.0
TOC	07 DEC 81	1.0	MGL	7.0	14.0	33.0	19.0	7.0	18.0

RUN DATE: 05 MAR 82

INSTALLATION: CRANE AAA, IN

FACILITY: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1	4-2	4-4	4-3	4-5	4-6
TOX	07 DEC 81	10.	UGL	18.C	ND	112.C	72.C	47.C	ND
TOX	07 DEC 81	10.	UGL	25.C	ND	111.C	90.C	37.C	ND
TOX	07 DEC 81	10.	UGL	36.C	ND	68.C	103.C	38.C	16.C
TOX	07 DEC 81	10.	UGL	12.C	55.C	117.C	56.C	33.C	37.C

LEGEND

NOTES: ALL METALS AND OTHER PARAMETERS WHERE APPROPRIATE ARE ON A DISSOLVED (FILTERED) BASIS UNLESS OTHERWISE NOTED. DETECTION LIMITS SHOWN ARE NORMAL LEVELS; ACTUAL LIMITS MAY VARY IN ENVIRONMETAL SAMPLES. ANALYTICAL RESULTS ARE ACCURATE TO EITHER 2 OR 3 SIGNIFICANT FIGURES; TRAILING ZEROES DO NOT ALWAYS INDICATE SIGNIFICANCE, BUT ARE THE RESULTS OF COMPUTER FORMATTING.

A VALUES SHOWN ARE FOR WATER LEVEL ELEVATION ABOVE A REFERENCE DATUM

B UPGRADIENT SITE

C RESULTS ARE FOR UNFILTERED SAMPLE

DA[illegible] 18 JUN 82

[illegible]LLATION: CRANE NWSC, IN

FACILITY: MCCOMISH GORGE

SAMPLING SITES
RESULTS

[illegible]ETER	SAMPLING DATE	DETECTION LIMIT	UNITS	B 4-1	4-2	4-4	4-3	4-5	4-6
[illegible](A)	23 MAR 82		FT	575.5	571.2	568.1	564.2	567.9	566.7
	23 MAR 82	.010	MGL	ND	ND	ND	ND	ND	ND
	23 MAR 82	.1	MGL	ND	ND	ND	ND	ND	ND
	23 MAR 82	.005	MGL	ND	ND	ND	ND	ND	ND
[illegible]M	23 MAR 82	.010	MGL	ND	ND	ND	ND	ND	.10
[illegible]IDE	23 MAR 82	.10	MGL	.14	.11	.11	.12	ND	ND
	23 MAR 82	.010	MGL	ND	ND	ND	ND	ND	ND
	23 MAR 82	.2	UGL	ND	ND	ND	ND	.06	.51
[illegible]RY	23 MAR 82	.05	MGL	.38	.17	.70	ND	ND	ND
[illegible]3 AS N	23 MAR 82	.005	MGL	ND	ND	ND	.01	ND	ND
[illegible]UM	23 MAR 82	.01	MGL	ND	ND	ND	ND	ND	ND
[illegible]X	23 MAR 82	.04	UGL	ND	ND	ND	ND	ND	ND
ENDRIN	23 MAR 82	.08	UGL	ND	ND	ND	ND	ND	ND
[illegible]NE	23 MAR 82	1.6	UGL	ND	ND	ND	ND	ND	ND
[illegible]OX[illegible]HENE	23 MAR 82	1.6	UGL	ND	ND	ND	ND	ND	ND
METHOXYCHLOR	23 MAR 82	3.8	UGL	ND	ND	ND	ND	ND	ND
2,4-D	23 MAR 82	.5	UGL	ND	ND	ND	ND	ND	ND
SILVEX	23 MAR 82	4.92	UGL	ND	ND	ND	ND	ND	1.15
GROSS ALPHA	23 MAR 82	1.56	PCL	1.55	1.27	1.95	1.71	ND	3.0
GROSS BETA	23 MAR 82	1.0	PCL	3.0	4.0	9.0	10.0	9.0	.25
CHLORIDE	23 MAR 82	.03	MGL	.78#	.30	.76#	6.30#	6.40#	.01
IRON	23 MAR 82	.01	MGL	.12#	.02	.95#	1.90#	4.50#	ND
MANGANESE	23 MAR 82	.01	MGL	ND	ND	ND	ND	ND	ND
PHENOL	23 MAR 82	1.	MGL	37.	4.	15.	30.	17.	7.
SODIUM	23 MAR 82	5.0	MGL	74.0	29.0	15.0	33.0	24.0	24.0
SULFATE	23 MAR 82		PH	6.5	6.6	6.3#	6.1#	5.7#	6.8
PH(FIELD)	23 MAR 82		PH	6.5	6.7	6.5	6.1#	5.8#	6.8
PH(FIELD)	23 MAR 82		PH	6.4#	6.6	6.5	6.1#	5.8#	6.5
PH(FIELD)	23 MAR 82		PH	6.5	6.7	6.4#	6.1#	5.8#	6.6
PH(FIELD)	23 MAR 82		PH	6.5	6.7	6.4#	6.1#	5.8#	6.6
SPEC COND	23 MAR 82	1.	UMC	380.	470.	748.	501.	521.	529.
SPEC COND	23 MAR 82	1.	UMC	383.	470.	745.	500.	520.	530.
SPEC COND	23 MAR 82	1.	UMC	383.	470.	745.	500.	520.	531.
[illegible]ND	23 MAR 82	1.	UMC	383.	470.	744.	501.	521.	530.
	23 MAR 82	1.0	MGL	2.0	2.0	3.0	4.0	3.0	2.0
	23 MAR 82	1.0	MGL	2.0	2.0	4.0	3.0	4.0	2.0
	23 MAR 82	1.0	MGL	2.0	2.0	4.0	3.0	4.0	2.0
[illegible]O	23 MAR 82	1.0	MGL	2.0	2.0	4.0	4.0	3.0	2.0
[illegible]C	23 MAR 82	1.0	MGL	ND	ND	.031 C	.010 C	.017 C	ND
	23 MAR 82	.010	MGL	.014 C	ND	.028 C	ND	.018 C	ND
	23 MAR 82	.010	MGL	.012 C	ND	.028 C	.015 C	.018 C	ND
	23 MAR 82	.010	MGL	.015 C	ND	.029 C	.012 C	.015 C	.011 C
[illegible]	23 MAR 82	.010	MGL						

...TE: 04 NOV 82

INS...LLATION: CRANE NWSC, IN

FACILITY: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1	4-2	4-4	4-3	4-5	4-6
WATER LEVELS (A)	21 JUN 82		FT	575.5	567.9	568.6	563.2	565.4	565.5
ARSENIC	22 JUN 82	.010	MGL	ND	ND	ND	ND	ND	ND
BARIUM	22 JUN 82	.1	MGL	ND	ND	.1	ND	.2	ND
CADMIUM	22 JUN 82	.005	MGL	ND	ND	ND	ND	ND	ND
CHROMIUM	22 JUN 82	.010	MGL	ND	ND	ND	ND	ND	ND
FLUORIDE	22 JUN 82	.10	MGL	.15	.10	.10	.10	ND	.11
LEAD	22 JUN 82	.010	MGL	ND	ND	ND	ND	ND	ND
MERCURY	22 JUN 82	.2	UGL	ND	ND	ND	ND	ND	ND
NO2+NO3 AS N	22 JUN 82	.05	MGL	.06	ND	.17	ND	ND	.08
SELENIUM	22 JUN 82	.005	MGL	ND	ND	ND	ND	ND	ND
SILVER	22 JUN 82	.01	MGL	ND	ND	ND	.02	ND	ND
[illegible]	22 JUN 82	.04	UGL	ND	ND	ND	ND	ND	ND
	22 JUN 82	.08	UGL	ND	ND	ND	ND	ND	ND
[illegible]	22 JUN 82	1.6	UGL	ND	ND	ND	ND	ND	ND
[illegible] HCHS	22 JUN 82	1.6	UGL	ND	ND	ND	ND	ND	ND
	22 JUN 82	3.8	UGL	ND	ND	ND	ND	ND	ND
	22 JUN 82	.5	UGL	ND	ND	ND	ND	ND	ND
[illegible] A	22 JUN 82	5.03	PCL	<1.30	<4.07	<4.34	<4.01	<5.08	<3.63
[illegible] A	22 JUN 82	1.64	PCL	ND	ND	1.51	2.48	ND	ND
	22 JUN 82	1.0	MGL	4.0	4.0	5.0	11.0	13.0	13.0
	22 JUN 82	.03	MGL	2.10#	.08	.78#	18.00#	13.50#	.12
E	22 JUN 82	.01	MGL	.17#	ND	.38#	2.16#	5.90#	ND
	22 JUN 82	.01	MGL	.10	.04	.02	.08	.01	.05
UM	22 JUN 82	1.	MGL	15.	7.	10.	35.	20.	6.
[illegible]	22 JUN 82	5.0	MGL	12.0	23.0	6.0	16.0	25.0	36.0
IELD)	22 JUN 82		PH	6.8	6.8	6.7	6.2#	6.1#	6.7
IELD)	22 JUN 82		PH	6.8	6.8	6.7	6.2#	6.1#	6.7
IELD)	22 JUN 82		PH	6.8	6.8	6.7	6.2#	6.1#	6.7
IELD)	22 JUN 82		PH	6.8	6.8	6.7	6.2#	6.0#	6.7
COND	22 JUN 82	1.	UMC	420.	500.	490.	580.	740.	545.
OND	22 JUN 82	1.	UMC	420.	500.	490.	580.	740.	545.
OND	22 JUN 82	1.	UMC	420.	500.	490.	580.	740.	545.
ND	22 JUN 82	1.	UMC	420.	500.	490.	580.	740.	550.
	22 JUN 82	1.0	MGL	60.0	55.0	52.0	65.0	88.0	53.0
	22 JUN 82	1.0	MGL	62.0	55.0	53.0	65.0	87.0	53.0
	22 JUN 82	1.0	MGL	63.0	54.0	52.0	65.0	88.0	53.0
	22 JUN 82	1.0	MGL	62.0	53.0	53.0	65.0	88.0	53.0
	22 JUN 82	.010	MGL	ND	.014 C	ND	ND	.011 C	ND
	22 JUN 82	.010	MGL	ND	.014 C	ND	ND	.018 C	ND
	22 JUN 82	.010	MGL	.014 C	.011 C	ND	.016 C	.014 C	ND
	22 JUN 82	.010	MGL	.011 C	.012 C	ND	ND	.016 C	ND

RUN DATE: 14 JAN 83

INSTALLATION: CRANE NWSC, IN

FACILITY: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1		4-2		4-4		4-3		4-5		4-6	
WATER LEVELS (A)	04 OCT 82		FT	575.0		587.2			D	581.7		583.9		585.0	
ARSENIC	05 OCT 82	.010	MGL	ND		ND				ND		ND		ND	
BARIUM	05 OCT 82	.1	MGL	ND		ND				ND		.2		ND	
CADMIUM	05 OCT 82	.005	MGL	ND		ND				ND		ND		ND	
CHROMIUM	05 OCT 82	.010	MGL	ND		ND				ND		.100*		ND	
FLUORIDE	05 OCT 82	.10	MGL	.15		.11				.11		.10		.11	
LEAD	05 OCT 82	.010	MGL	ND		ND				ND		ND		ND	
MERCURY	05 OCT 82	.2	UGL	77.0*		.8				.9		.5		1.8	
NO2+NO3 AS N	05 OCT 82	.05	MGL	.16		.11				.06		.12		.11	
SELENIUM	05 OCT 82	.005	MGL	ND		ND				ND		ND		ND	
SILVER	05 OCT 82	.01	MGL	ND		ND				ND		ND		ND	
ENDRIN	05 OCT 82	.04	UGL	ND		ND				ND		ND		ND	
LINDANE	05 OCT 82	.08	UGL	ND		ND				ND		ND		ND	
TOXAPHENE	05 OCT 82	1.6	UGL	ND		ND				ND		ND		ND	
METHOXYCHLOR	05 OCT 82	1.6	UGL	ND		ND				ND		ND		ND	
2,4-D	05 OCT 82	3.8	UGL	ND		ND				ND		ND		ND	
SILVEX	05 OCT 82	.5	UGL	ND		ND				ND		ND		ND	
GROSS ALPHA	05 OCT 82	3.25	PCL	ND		ND				2.98		ND		ND	
GROSS BETA	05 OCT 82	1.30	PCL	1.67		2.06				1.63		2.96		ND	
CHLORIDE	05 OCT 82	1.0	MGL	ND		ND				ND		5.0		1.0	
IRON	05 OCT 82	.03	MGL	1.83#		ND				2.83#		32.20#		ND	
MANGANESE	05 OCT 82	.01	MGL	.39#		.01				1.09#		6.70#		.08#	
PHENOL	05 OCT 82	.01	MGL	.01		.01				ND		ND		ND	
SODIUM	05 OCT 82	1.	MGL	11.		4.				11.		15.		6.	
SULFATE	05 OCT 82	5.0	MGL	ND		18.0				ND		9.0		30.0	
PH(FIELD)	05 OCT 82		PH	7.0		6.9				6.6		6.1#		6.8	
PH(FIELD)	05 OCT 82		PH	7.1		6.9				6.7		6.1#		6.8	
PH(FIELD)	05 OCT 82		PH	7.0		7.0				6.8		6.2#		6.8	
PH(FIELD)	05 OCT 82		PH	7.0		7.0				6.8		6.1#		6.8	
SPEC COND	05 OCT 82	1.	UMC	396.		475.				440.		670.		540.	
SPEC COND	05 OCT 82	1.	UMC	400.		475.				440.		670.		540.	
SPEC COND	05 OCT 82	1.	UMC	400.		475.				440.		670.		540.	
SPEC COND	05 OCT 82	1.	UMC	400.		475.				440.		670.		540.	
TOC	05 OCT 82	1.0	MGL	27.0		29.0				18.0		75.0		24.0	
TOC	05 OCT 82	1.0	MGL	27.0		30.0				17.0		72.0		23.0	
TOC	05 OCT 82	1.0	MGL	26.0		28.0				18.0		73.0		23.0	
TOC	05 OCT 82	1.0	MGL	27.0		29.0				16.0		72.0		23.0	
TOX	05 OCT 82	.010	MGL	.021	C	ND				ND		.036	C	.069	C
TOX	05 OCT 82	.010	MGL	.030	C	ND				ND		.068	C	.034	C
TOX	05 OCT 82	.010	MGL	.033	C	ND				ND		.057	C	.048	C
TOX	05 OCT 82	.010	MGL	.028	C	ND				ND		.069	C	.045	C

RUN DATE: 14 JAN 83

INSTALLATION: CRANE NWSC, IN

FACILITY: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1	4-2	4-4	4-3	4-5	4-6
GROSS ALPHA	07 DEC 81	2.71	PCL	ND	ND	ND	ND	ND	ND
GROSS ALPHA	23 MAR 82	4.92	PCL	ND	ND	ND	ND	ND	ND
GROSS ALPHA	22 JUN 82	5.08	PCL	<1.30	<1.07	<4.34	<4.01	<5.08	<3.63
GROSS ALPHA	05 OCT 82	3.25	PCL	ND	ND		2.98	ND	ND
GROSS BETA	07 DEC 81	1.30	PCL	1.65	2.42	3.55	2.25	2.19	1.17
GROSS BETA	23 MAR 82	1.58	PCL	1.55	1.27	1.95	1.71	ND	1.15
GROSS BETA	22 JUN 82	1.64	PCL	ND	ND	1.51	2.48	ND	ND
GROSS BETA	05 OCT 82	1.30	PCL	1.67	2.08		1.63	2.98	ND

RUN DATE: 14 JAN 83

INSTALLATION: CRANE NWSC, IN

FACILITY: MCCOMISH GORGE

LEGEND
NOTES: ALL METALS AND OTHER PARAMETERS WHERE APPROPRIATE ARE ON A DISSOLVED (FILTERED) BASIS UNLESS OTHERWISE NOTED. DETECTION LIMITS SHOWN ARE NORMAL LEVELS; ACTUAL LIMITS MAY VARY IN ENVIRONMETAL SAMPLES. ANALYTICAL RESULTS ARE ACCURATE TO EITHER 2 OR 3 SIGNIFICANT FIGURES.
A VALUES SHOWN ARE FOR WATER LEVEL ELEVATION ABOVE A REFERENCE DATUM
B UPGRADIENT SITE
C RESULTS ARE FOR UNFILTERED SAMPLE
* VALUE EXCEEDS A NATIONAL INTERIM PRIMARY DRINKING WATER REGULATION STANDARD
# VALUE EXCEEDS A NATIONAL SECONDARY DRINKING WATER REGULATION CRITERIA
D - WELL WAS DRY

MGL - MILLIGRAMS/LITER
UGL - MICROGRAMS/LITER
PCL - PICOCURIES/LITER
UMC - MICROMHOS/CENTIMETER
NTU - NEPHELOMETRIC TURBIDITY UNITS
TON - THRESHOLD ODOR NUMBER
TDN - TASTE DILUTION INDEX NUMBER
CU - COLOR UNITS
PHM - PER 100 MILLILITERS

RUN DATE: 01 JUN 03

INSTALLATION: CRANE NWSC, IN

SITE: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	B 4-1	SAMPLING SITES RESULTS 4-2	4-4	4-3	4-5	4-6
WATER LEVELS (A)	25 FEB 03		FT		568.0	568.2	563.5	566.3	566.1
CHLORIDE	01 MAR 03	1.0	MGL		ND	ND	5.0	4.0	3.0
IRON	01 MAR 03	.03	MGL		ND	ND	18.00#	16.70#	ND
MANGANESE	01 MAR 03	.01	MGL		.01	.65#	2.60#	5.70#	ND
PHENOL	01 MAR 03	.01	MGL		ND	ND	ND	ND	ND
SODIUM	01 MAR 03	1.	MGL		3.	10.	22.	14.	7.
SULFATE	01 MAR 03	5.0	MGL		11.0	ND	19.0	15.0	36.0
PH(FIELD)	01 MAR 03		PH		7.0		6.2#	6.2#	7.1
PH(FIELD)	01 MAR 03		PH		7.0		6.2#	6.2#	7.1
PH(FIELD)	01 MAR 03		PH		6.9		6.2#	6.2#	7.1
PH(FIELD)	01 MAR 03		PH		7.0		6.2#	6.2#	7.1
SPEC COND	01 MAR 03	1.	UMC		455.	625.	375.	430.	445.
SPEC COND	01 MAR 03	1.	UMC		455.	620.	375.	428.	446.
SPEC COND	01 MAR 03	1.	UMC		460.	620.	375.	430.	445.
SPEC COND	01 MAR 03	1.	UMC		460.	623.	373.	428.	445.
TOC	01 MAR 03	1.0	MGL		31.0	44.0	40.0	50.0	23.0
TOC	01 MAR 03	1.0	MGL		30.0	44.0	41.0	50.0	22.0
TOC	01 MAR 03	1.0	MGL		30.0	45.0	41.0	50.0	22.0
TOC	01 MAR 03	1.0	MGL		31.0	44.0	42.0	50.0	22.0
TOX	01 MAR 03	.010	MGL		ND	ND	ND	.010 C	ND
TOX	01 MAR 03	.010	MGL		ND	.014 C	ND	.011 C	ND
TOX	01 MAR 03	.010	MGL		ND	.017 C	ND	.015 C	ND
TOX	01 MAR 03	.010	MGL		ND	.011 C	ND	ND	ND

RUN DAT 21 JUN 03

INSTALLATION: CRANE NWSC, IN

SITE: MCCOMISH GORGE

LEGEND
NOTES: ALL METALS AND OTHER PARAMETERS WHERE APPROPRIATE ARE ON A DISSOLVED (FILTERED) BASIS UNLESS OTHERWISE NOTED. DETECTION LIMITS SHOWN ARE NORMAL LEVELS; ACTUAL LIMITS MAY VARY IN ENVIRONMENTAL SAMPLES. ANALYTICAL RESULTS ARE ACCURATE TO EITHER 2 OR 3 SIGNIFICANT FIGURES.
A VALUES SHOWN ARE FOR WATER LEVEL ELEVATION ABOVE A REFERENCE DATUM
B UPGRADIENT SITE
C RESULTS ARE FOR UNFILTERED SAMPLE
VALUE EXCEEDS A NATIONAL SECONDARY DRINKING WATER REGULATION CRITERIA

MGL - MILLIGRAMS/LITER
UGL - MICROGRAMS/LITER
PCL - PICOCURIES/LITER
UMC - MICROMHOS/CENTIMETER
NTU - NEPHELOMETRIC TURBIDITY UNITS
TON - THRESHOLD ODOR NUMBER
TDN - TASTE DILUTION INDEX NUMBER
CU - COLOR UNITS
PHM - PER 100 MILLILITERS

RUN DATE: 24 OCT 83

INSTALLATION: CRANE NWSC, IN

SITE: MCCOMISH GORGE

PARAMETER	SAMPLING DATE	DETECTION LIMIT	UNITS	SAMPLING SITES RESULTS B 4-1	4-2	4-4	4-3	4-5	4-6
WATER LEVELS (A)	29 JUL 83		FT	576.1	567.9	567.8	562.9	564.9	565.2
PH(FIELD)	29 JUL 83		PH		7.0	6.3	6.3	6.0	7.0
PH(FIELD)	29 JUL 83		PH		6.9	6.3	6.2	5.9	7.0
PH(FIELD)	29 JUL 83		PH		6.9	6.3	6.3	6.0	7.0
PH(FIELD)	29 JUL 83		PH		6.8	6.3	6.3	5.9	7.0
PH(FIELD)	02 AUG 83		PH	7.0					
PH(FIELD)	02 AUG 83		PH	7.0					
PH(FIELD)	02 AUG 83		PH	6.9					
PH(FIELD)	02 AUG 83		PH	7.0					
SPEC COND	29 JUL 83	1.	UMC		500.	410.	510.	540.	560.
SPEC COND	29 JUL 83	1.	UMC		490.	420.	510.	550.	560.
SPEC COND	29 JUL 83	1.	UMC		495.	420.	510.	550.	560.
SPEC COND	29 JUL 83	1.	UMC		500.	420.	510.	540.	560.
SPEC COND	02 AUG 83	1.	UMC	390.					
SPEC COND	02 AUG 83	1.	UMC	390.					
SPEC COND	02 AUG 83	1.	UMC	390.					
SPEC COND	02 AUG 83	1.	UMC	395.					
TOC	29 JUL 83	1.0	MGL		33.0	29.0	30.0	65.0	30.0
TOC	29 JUL 83	1.0	MGL		32.0	29.0	37.0	64.0	30.0
TOC	29 JUL 83	1.0	MGL		32.0	30.0	37.0	65.0	30.0
TOC	29 JUL 83	1.0	MGL		33.0	30.0	37.0	65.0	29.0
TOC	02 AUG 83	1.0	MGL	22.0					
TOC	02 AUG 83	1.0	MGL	22.0					
TOC	02 AUG 83	1.0	MGL	23.0					
TOC	02 AUG 83	1.0	MGL	22.0					
TOX	29 JUL 83	.010	MGL		.012 C	.037 C	.036 C	.043 C	.021 C
TOX	29 JUL 83	.010	MGL		.014 C	.015 C	.041 C	.050 C	.017 C
TOX	29 JUL 83	.010	MGL		.013 C	.030 C	.047 C	.045 C	.017 C
TOX	29 JUL 83	.010	MGL		ND	.020 C	.058 C	.048 C	ND
TOX	02 AUG 83	.010	MGL	.043 C					
TOX	02 AUG 83	.010	MGL	.040 C					
TOX	02 AUG 83	.010	MGL	.054 C					
TOX	02 AUG 83	.010	MGL	.018 C					

Table VII. Crane Naval Weapons Support Center. January 1985
Groundwater Sampling Project. Area 4-CERCLA.

ATEC Lab No.	214-85	215-85	216-85
Well No.	4-1	4-2	4-3
Date Sampled	1/9/85	1/9/85	1/9/85
pH, Field, S.U.	6.3	6.5	6.5
Cond., Field, umho	610	450	450
Chloride, mg/l	<1	<1	<1
Iron, ug/l	30	<20	3160
Manganese, ug/l	270	10	1230
Phenols, ug/l	<50	<50	<50
Sodium, mg/l	4.3	8.8	19
Sulfate, mg/l	220	150	160
TOC, mg/l	4.8	6.4	7.7
TOX, ug/l	28	<5.0	9.5

ATEC Lab No.	217-85	218-85	219-85
Well No.	4-4	4-5	4-6
Date Sampled	1/9/85	1/9/85	1/9/85
pH, Field, S.U.	6.0	5.9	6.3
Cond., Field, umho	610	450	540
Chloride, mg/l	<1	<1	<1
Iron, ug/l	<20	800	<20
Manganese, ug/l	960	1960	130
Phenols, ug/l	<50	<50	<50
Sodium, mg/l	9.8	9.6	5.1
Sulfate, mg/l	25	54	50
TOC, mg/l	7.8	4.1	0.6
TOX, ug/l	45	10	5.6

Appendix F
Tables 1 to 19

TABLE 1. (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of soil analysis for inorganic compounds.
Concentrations are mg/kg (ppm) dry weight. Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	01/#1	01/#2	1A/#1	1A/#2	02/#1	02/#2	03/#1	03/#2	04/#1	04/#2
SB	< 1.5 N	< 1.5 N	1.89 BN	2.33 BN	< 1.5 N	< 1.5 N	2.11 BN	2.22 BN	< 1.5 N	< 1.5 N
AS	9.13	7.13	7.76	11.5	7.98	10.7	6.13	23.7	6.68	9.06
BE	1.8	1.4	1.8	1.4	1.7	1.4	1.3	2.4	1.3	1.5
CD	< 0.4	< 0.4	2.3	5.8	0.8	< 0.4	0.9	1	< 0.4	< 0.4
CR	26.6 *N	16.2 *N	23.1	18.2	16.4 *N	12 *N	28.7	12.9	27.9 *	44.6 *
CU	16.7	15	17.1	45.4	38.1	28.5	10.7	33.7	11.9	11.2
PB	23.1	18.9	15.9	133	75.6	12.8	16	14.7	15.3	16.9
HG	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
SE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
AG	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TL	< 0.2	0.21 B	0.29 B	< 0.2	< 0.2	< 0.2	0.21 B	0.22 B	0.22 B	0.32 B
ZN	114	52	65.6	1150	152	52.9	47.6	118	42.7	45.2
AL	21000	20400	23200	15600	27800	11200	17300	15100	18200	17600
BA	510	1870	108	6150	36500	8640	97.5	50.7	67.2	70.8
CA	1230	440 B	1470	49700	1760	426 B	1700	685	866	317 B
CO	7.29	6.49	7.79	7.69	7.3	7.99	9.2	16.6	6.79	8.09
FE	27400	23000	30000	25400	31400	12300	17900	38000	21500	25200
MG	1460	3120	1470	12500	15200	1330	1420	1060	1350	1310
MN	501	350	503	445	494	269	745	316	321	363
NA	49.4 B	44.7 B	55.5 B	79.2 B	59.8 B	67.4 B	57.9 B	65.7 B	57.4 B	62.5 B
TP	50	69.9	86.2	135	82.4	90.3	62.7	178	70.6	103

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure 5.1

B - Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.

J - Estimated value below the statistical limits.

N - Spiked sample recovery not witin control limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

* - Duplicate analysis not within control limits.

TABLE 1. (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of soil analysis for inorganic compounds. Concentrations are mg/kg (ppm) dry weight. Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	05/#1	05/#2	06/#1	06/#2	07/#1	07/#2	08/#1	09/#1	09/#2	10/#1
SB	0.89 BN	1.44 BN	2 B	3.11 B	0.89 BN	1.11 BN	3.4 B	13.2	4.1 B	3.56 B
AS	9.27	7.26	7.18	10.8	7.58	6.76	7.13	6.61	5.22	7.84
BE	2.3	2.1	1.6	2.5	1.8	1.7	2.1	1.9	0.799	1.6
CD	< 0.4	0.799	1.6	2	1.1	< 0.4	2.3	2.2	< 0.7	3.3
CR	26.5 *	54.1 *	14.6 N*	25.4 N*	22.2 *	22 *	22.6 N*	22.5 N*	14.2 N*	20.1 N*
CU	17.9	41.9	10.9	18.2	14.3	13	15.9	35.4	6.39	15.4
PB	12.9	34.9	12.1	12.1	14.3	13.3	15.9	16.7	8.29	36.5
HG	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
SE	0.31 B	0.33 B	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
AG	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TL	0.33 B	< 0.2	< 0.2	< 0.2	0.28 B	< 0.2	0.32 B	0.24 B	0.22 B	0.38 B
ZN	79.8	160	48.2	71.6	83.3	63.8	61.6	57.7	18.1	111
AL	17100	9850	14700	25900	15800	17000	12700	18800	6650	11100
BA	78.4	91.7	62.4	128	82.6	69.6	94.5	77.3	34.6	114
CA	1370	2210	618	972	795	293 B	813	1410	386	4410
CO	8.09	7.3	6.7	7.9	7.8	6.4	8.3	7.4	2.1 B	5.7
FE	29700	31500	17400	27300	22900	22000	26000	22700	6300	17800
MG	1430	1020	1020	1700	1480	1310	1260	1610	640	937
MN	348	399	370	537	593	299	659	574	68.8	324
NA	53.1 B	78.6 B	41 B	82.7 B	53.6 B	44.7 B	66.9 B	66.2 B	48 B	49.2 B
TP	64.2	123	82.2	42.2	65	92.6	63.9	53.6	70.9	91.1

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure 5.1

B - Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.

J - Estimated value below the statistical limits.

N - Spiked sample recovery not witin control limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

* - Duplicate analysis not within control limits.

TABLE 2. (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Statistical analysis of results of Inorganic analysis of soil samples

SAMPLE / TYPE	STATISTIC	Analyte Concentration mg/kg dry weight (ppm)										
REMARKS		SB (a)(b)	AS	BE	CD (c)	CR (b)	CU	PB	HG (a)	SE (a)	AG (a)	TL (c)
BORINGS 1,1A,2,3 #1	MEAN		7.75	1.65	1.10	23.70	20.65	32.65				0.23
	S.D.		1.24	0.24	0.83	5.39	12.00	28.83				0.04
	MAX		9.13	1.80	2.3	28.7	38.10	75.60				0.29
	MIN		6.13	1.30	0.4	16.4	10.70	15.90				0.2
	N		4	4	4	4	4	4				4
BORINGS 4-10 #1	MEAN		7.47	1.80	1.61	22.34	17.39	17.67				0.28
	S.D.		0.91	0.34	1.07	4.34	8.29	8.46				0.07
	MAX		9.27	2.30	3.3	27.9	35.40	36.50				0.38
	MIN		6.61	1.30	0.4	14.6	10.90	12.10				0.2
	N		7	7	7	7	7	7				7
BORINGS 1,1A,2,3 #2	MEAN		13.26	1.65	1.90	14.83	30.65	44.85				0.21
	S.D.		7.22	0.50	2.62	2.88	12.60	58.82				0.01
	MAX		23.70	2.40	5.8	18.2	45.40	133.00				0.22
	MIN		7.13	1.40	0.4	12	15.00	12.80				0.2
	N		4	4	4	4	4	4				4
BORINGS 4-7,9 #2	MEAN		7.82	1.7198	0.86	32.06	18.14	17.10				0.23
	S.D.		2.16	0.64	0.66	16.64	13.94	10.42				0.05
	MAX		10.80	2.50	2.00	54.10	41.90	34.90				0.32
	MIN		5.22	0.80	0.40	14.20	6.39	8.29				0.20
	N		5.00	5.00	5	5	5	5				5

Table Notes :

(a) All or most data was reported as less than detection limit therefore no statistical comparison could be made.
(b) Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.
(c) Some samples reported less than insrument detection level; instrument detection level used in statistical analysis.
(d) Questionable data results.

TABLE 2. (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Statistical analysis of results of Inorganic analysis of soil samples

SAMPLE / TYPE	STATISTIC	Analyte Concentration mg/kg dry weight (ppm) ZN	AL	BA	CA	CO	FE	MG	MN	NA	TP
REMARKS										(b)	
	MEAN	94.80	22325.00	32.65	1540.00	7.90	26675.00	4887.50	560.75	55.65	70.33
BORINGS 1,1A,2,3	S.D.	47.33	4387.39	28.83	241.52	0.90	6080.23	6875.03	122.89	4.52	17.02
	MAX	152.00	27800.00	75.60	1760.00	9.20	31400.00	15200.00	745.00	59.8	86.20
#1	MIN	47.60	17300.00	15.90	1230.00	7.29	17900.00	1420.00	494.00	49.4	50.00
	N	4	4	4	4	4	4	4	4	4	4
	MEAN	69.19	15485.71	17.67	1468.86	7.25	22571.43	1298.14	455.57	55.34	70.09
BORINGS 4-10	S.D.	23.78	2848.06	8.46	1331.36	0.92	4346.54	244.83	146.41	9.19	12.64
	MAX	111.00	18800.00	36.50	4410.00	8.30	29700.00	1610.00	659.00	66.90	91.10
#1	MIN	42.70	11100.00	12.10	618.00	5.70	17400.00	937.00	321.00	41.00	53.60
	N	7	7	7	7	7	7	7	7	7	7
	MEAN	343.23	15575.00	4177.68	12812.75	9.69	24675.00	4502.50	345.00	64.25	118.30
BORINGS 1,1A,2,3	S.D.	538.74	3770.39	3922.57	24591.79	4.65	10551.90	5409.46	74.48	14.35	48.20
	MAX	1150.00	20400.00	8640.00	49700.00	16.60	38000.00	12500.00	445.00	79.2	178.00
#2	MIN	52.00	11200.00	50.70	426.00	6.49	12300.00	1060.00	269.00	44.7	69.90
	N	4	4	4	4	4	4	4	4	4	4
	MEAN	71.74	15400.00	78.94	835.60	6.36	22460.00	1196.00	333.36	63.30	86.34
BORINGS 4-7,9	S.D.	53.47	7500.25	34.24	817.48	2.47	9669.69	393.74	171.63	17.26	31.01
	MAX	160.00	25900.00	128.00	2210.00	8.09	31500.00	1700.00	537.00	82.70	123.00
#2	MIN	18.10	6650.00	34.60	293.00	2.10	6300.00	640.00	68.80	44.70	42.20
	N	5	5	5	5	5	5	5	5	5	5

Table Notes :

(a) All or most data was reported as less than detection limit therefore no statistical comparison could be made.
(b) Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.
(c) Some samples reported less than instrument detection level; instrument detection level used in statistical analysis.
(d) Questionable data results.

TABLE 3. McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Statistical analysis of results of Inorganic analysis of soil samples.

		Analyte Concentration mg/kg dry weight (ppm)										
SAMPLE / TYPE	STATISTIC	SB	AS	BE	CD	CR	CU	PB	HG	SE	AG	TL
REMARKS		(a)(b)			(c)	(b)			(a)	(a)	(a)	(c)
	MEAN		10.50	1.65	1.50	19.26	25.65	38.75				0.22
BORINGS 1,1A,2,3	S.D.		5.62	0.36	1.85	6.21	12.58	43.38				0.03
	MAX		23.70	2.40	5.80	28.70	45.40	133.00				0.29
#1,#2	MIN		6.13	1.30	0.40	12.00	10.70	12.80				0.20
	N		8	8	8	8	8	8				8
	MEAN		7.62	1.77	1.30	26.39	17.70	17.43				0.26
BORINGS 4-10/ #1	S.D.		1.47	0.46	0.97	11.66	10.41	8.86				0.06
and	MAX		10.80	2.50	3.30	54.10	41.90	36.50				0.38
BORINGS 4-7,9/ #2	MIN		5.22	0.80	0.40	14.20	6.39	8.29				0.20
	N		12	12	12	12	12	12				12

SAMPLE / TYPE	STATISTIC	ZN	AL	BA	CA	CO	FE	MG	MN	NA	TP
REMARKS										(b)	
	MEAN	219.01	18950.00	6740.78	7176.38	8.79	25675.00	4695.00	452.88	59.95	94.31
BORINGS 1,1A,2,3	S.D.	378.13	5230.68	12449.89	17190.50	3.25	8043.94	5730.64	148.83	10.87	42.16
	MAX	1150.00	27800.00	36500.00	49700.00	16.60	38000.00	15200.00	745.00	79.20	178.00
#1,#2	MIN	47.60	11200.00	50.70	426.00	6.49	12300.00	1060.00	269.00	44.70	50.00
	N	8	8	8	8	8	8	8	8	8	8
	MEAN	70.25	15450.00	80.93	1205.00	6.88	22525.00	1255.58	404.65	58.66	76.86
BORINGS 4-10/ #1	S.D.	36.74	4988.21	24.39	1147.25	1.70	6656.52	303.04	162.37	13.08	22.52
and	MAX	160.00	25900.00	128.00	4410.00	8.30	31500.00	1700.00	659.00	82.70	123.00
BORINGS 4-7,9/ #2	MIN	18.10	6650.00	34.60	293.00	2.10	6300.00	640.00	68.80	41.00	42.20
	N	12	12	12	12	12	12	12	12	12	12

Table Notes :

(a) All or most data was reported as less than detection limit therefore no statistical comparison could be made.
(b) Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.
(c) Some samples reported less than Insrument detection level; instrument detection level used in statistical analysis.
(d) Questionable data results.

TABLE .4. (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Statistical analysis of results of inorganic analysis of soil samples.

SAMPLE / TYPE	STATISTIC	Analyte Concentration mg/kg dry weight (ppm)										
REMARKS		SB (a)(b)	AS	BE	CD (c)	CR (b)	CU	PB	HG (a)	SE (a)	AG (a)	TL (c)
OBP CONTROL	MEAN		5.79	1.4	1.02	16.85	14.58	20.97				(a)
BORINGS 1,2,3	VARIANCE		0.07	0.01	0.86	13.69	25.43	197.71				
	S.D.		0.26	0.08	0.93	3.7	5.04	14.06				
#1,#2	N		6	6	6	6	6	6				6
McCOMISH GORGE	MEAN		10.50	1.65	1.50	19.26	25.65	38.75				0.22
	VARIANCE		31.64	0.131429	3.408571	38.508393	158.3029	1881.631				0.000941
BORINGS 1,1A,2,3	S.D.		5.62	0.36	1.85	6.21	12.58	43.38				0.03
#1,#2	N		8	8	8	8	8	8				8

SAMPLE / TYPE	STATISTIC	ZN	AL	BA	CA	CO	FE	MG	MN	NA	TP
REMARKS										(b)	
OBP CONTROL	MEAN	64.15	17030	74.73	944.667	6.88	19333.33	1399.17			
BORINGS 1,2,3	VARIANCE	562.7	23382200	904.703	342235	2.02	1382667	236664			
	S.D.	23.72	4835.51	30.078	585.008	1.42	1175.87	486.48			
#1,#2	N	6	6	6	6	6	6	6	6	6	6
McCOMISH GORGE	MEAN	219.01	18950.00	6740.78	7176.38	8.79	25675.00	4695.00	452.88	59.95	94.31
	VARIANCE	142980.53	27360000	154999780	295513262	10.53917	64705000	32840229	22149.554	118.14571	1777.4013
BORINGS 1,1A,2,3	S.D.	378.13	5230.68	12449.89	17190.50	3.25	8043.94	5730.64	148.83	10.87	42.16
#1,#2	N	8	8	8	8	8	8	8	8	8	8

Table Notes :

(a) All or most data was reported as less than detection limit therefore no statistical comparison could be made.
(b) Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.
(c) Some samples reported less than instrument detection level; instrument detection level used in statistical analysis.
(d) Questionable data results.

TABLE .4. (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Statistical analysis of results of Inorganic analysis of soil samples.

		Analyte Concentration mg/kg dry weight (ppm)										
SAMPLE / TYPE	STATISTIC	SB	AS	BE	CD	CR	CU	PB	HG	SE	AG	TL
REMARKS		(a)(b)			(c)	(b)			(a)	(a)	(a)	(c)
OBP CONTROL	MEAN		5.79	1.4	1.02	16.85	14.58	20.97				(a)
BORINGS 1,2,3	VARIANCE		0.07	0.01	0.86	13.69	25.43	197.71				
	S.D.		0.26	0.08	0.93	3.7	5.04	14.06				
#1,#2	N		6	6	6	6	6	6				6
McCOMISH GORGE	MEAN		7.62	1.77	1.30	26.39	17.70	17.43				0.26
BORINGS 4-10/ #1	VARIANCE		2.17	0.214	0.935	136.019	108.313	78.572				0.004
and	S.D.		1.47	0.46	0.97	11.66	10.41	8.86				0.06
BORINGS 4-7,9/ #2	N		12	12	12	12	12	12				12

		Analyte Concentration mg/kg dry weight (ppm)									
SAMPLE / TYPE	STATISTIC	ZN	AL	BA	CA	CO	FE	MG	MN	NA	TP
REMARKS										(b)	
OBP CONTROL	MEAN	64.15	17030	74.73	944.667	6.88	19333.33	1399.17			
BORINGS 1,2,3	VARIANCE	562.7	23382200	904.703	342234.67	2.02	1382666.7	236664.17			
	S.D.	23.72	4835.51	30.078	585.008	1.42	1175.87	486.48			
#1,#2	N	6	6	6	6	6	6	6	6	6	6
McCOMISH GORGE	MEAN	70.25	15450.00	80.93	1205.00	6.88	22525.00	1255.58	404.65	58.66	76.86
BORINGS 4-10/ #1	VARIANCE	1349.565	24882273	594.640	1316172	2.890	44309318	91835.902	26363.725	171.183	507.017
and	S.D.	36.74	4988.21	24.39	1147.25	1.70	6656.52	303.04	162.37	13.08	22.52
BORINGS 4-7,9/ #2	N	12	12	12	12	12	12	12	12	12	12

Table Notes :

(a) All or most data was reported as less than detection limit therefore no statistical comparison could be made.
(b) Indicates reported value is less than the contract required detection limit but greater than the instrument detection limit.
(c) Some samples reported less than Insrument detection level; Instrument detection level used in statistical analysis.
(d) Questionable data results.

Table .5 McComish Gorge - NWSC Crane, Indiana, SWMU#04/02. Results of Inorganic analyses of method blanks associated with analyses of soil samples. Concentrations are in mg/kg (ppm) dry weight. Detectable concentrations are shown in bold

	Analyte									
Method Blank ID*	SB	AS	BE	CD	CR	CU	PB	HG	SE	AG
MB/Boring 1,2	< 1.5 UN	< 0.002 U	< 0.002 U	< 0.004 U	0.089 DN	< 0.006 U	< 0.025 U	< 0.1 U	< 0.003 U	< 0.001 U
MB/Boring 3,1A	< 0.003 U	< 0.002 U	< 0.002 U	< 0.007 U	**0.153**	**0.017 B**	< 0.025 U	< 0.1 U	< 0.003 U	< 0.001 U
MB/Boring 6,8,9,10	**0.024 B**	< 0.002 U	< 0.002 U	< 0.007 U	0.081 DN	< 0.005 U	< 0.026 U	< 0.1 U	< 0.003 U	< 0.001 U
MB/Boring 5,7	< 0.003 U	< 0.002 U	< 0.002 U	< 0.004 U	0.11 D	**0.011 B**	< 0.026 U	< 0.1 U	< 0.003 U	< 0.001 U
MB/Boring 4	< 0.003 U	< 0.002 U	< 0.002 U	< 0.004 U	< 0.011 DU	**0.006 B**	< 0.026 U	< 0.1 U	< 0.003 U	< 0.001 U

	Analyte										
Method Blank ID*	TL	ZN	AL	BA	CA	CO	FE	MG	MN	NA	TP
MB/Boring 1,2	< 0.002 U	< 0.008 U	**0.135 B**	< 0.011 U	**0.247 B**	< 0.03 U	**0.436**	< 0.13 U	< 0.005 U	**0.232 B**	< 0.05 U
MB/Boring 3,1A	< 0.002 U	**0.033**	**0.174 B**	< 0.01 U	**0.382 B**	< 0.005	**0.49**	< 0.13 U	< 0.005 U	**0.98 B**	< 0.05 U
MB/Boring 6,8,9,10	< 0.002 U	< 0.005 U	**0.12 B**	< 0.01 U	**0.327 B**	**0.006 B**	**0.305**	**0.149 B**	< 0.005 U	**0.315 B**	< 0.05 U
MB/Boring 5,7	< 0.002 U	**0.021**	**0.132 B**	< 10	**0.152 B**	**0.005 B**	**0.72**	< 0.13 U	**0.005 B**	**0.195 B**	< 0.05 U
MB/Boring 4	< 0.002 U	**0.016 B**	**0.176**	< 0.011 U	**0.075 B**	< 0.03 U	**0.315**	< 0.13 U	< 0.005 U	**0.241 B**	< 0.05 U

Note:

* Sample ID - MB (Method Blank)/Boring numbers associated with that method blank.

U Analyte was analyzed for but not detected.

B Reported value is less than the Contract Required Detection Limit but greater than the Insrument Detection Limit.

N Spiked sample recovery not within control limits.

D Duplicate analysis not within control limits

Table 6 McComish Gorge - NWSC Crane, Indiana, SWMU#04/02. Results of inorganic analysis for water collected from final equipment rinses. Results are in mg/l (ppm). Results in **bold** are concentrations greater than detection limits. Detection limits are given after the < symbol.

Sample ID	RINSE	RINSE	RINSE	RINSE	RINSE
Analyte/Boring	1,2	1A,3	6,8,9,10	5,7	4
SB	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U
AS	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
BE	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
CD	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
CR	< 0.011 U	< 0.011 U	< 0.011 U	< 0.011 U	< 0.011 U
CU	< 0.006 U	< 0.006 U	< 0.006 U	< 0.006 U	< 0.006 U
PB	< 0.003 U	< 0.003 U	< 0.003 U	**0.005 B**	< 0.003 U
HG	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
SE	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U
AG	< 0.013 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
TL	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
ZN	**0.017**	**0.016 B**	**0.238**	**0.178**	**0.029**
AL	**0.172 B**	**0.081**	**0.159 B**	< 0.01 U	**0.097 B**
BA	< 0.011	**0.011 B**	< 0.011 U	< 0.011 U	< 0.011 U
CA	**6**	**2.94 B**	**3.19 B**	**0.426 B**	**2.98 B**
CO	< 0.03	< 0.03 U	< 0.03 U	< 0.03 U	< 0.03 U
FE	**0.027 B**	**0.017 B**	**0.4**	**0.056 B**	**0.01 B**
MG	**1.17 B**	**0.653 B**	**0.755 B**	< 0.13 U	**0.599 B**
MN	< 0.005	< 0.005 U	**0.008 B**	< 0.005 U	< 0.005 U
NA	**1.91 B**	**1.01 B**	**1.01 B**	< 0.06 U	**1.01 B**

Note:

U Analyte was analyzed for but not detected.

B Reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

TABLE .7 (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8240 * (volatile organics) soil analysis.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	1A#1	1A#2	03#1	03#2	04#1	04#2	05#1V	05#2V	06#1	06#2
CIMETH	< 0.011	< 0.011	< 0.012	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.012
BrMETH	< 0.011	< 0.011	< 0.012	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.012
VNLCL	< 0.011	< 0.011	< 0.012	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.012
CIETHA	< 0.011	< 0.011	< 0.012	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.012
MECL	0.12 B	0.07 B	0.029 B	0.093 B	0.047 B	0.038 B	0.07 B	0.072 B	0.05 B	0.055 B
11DCIETE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
IIDCIETA	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
t-DCIETE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
c-DCIETE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
CHCL3	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
12DCIETA	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
111TCA	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
CCL4	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
BrDCIME	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
12DCIPR	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
t13CIPRE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
TCE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
DBrCIME	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
c13CIPRE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
112TCA	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
BENZENE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
CHBr3	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
1122TCIA	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
TECIETE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
TOLUENE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
CIBEN	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
ETBEN	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
ACETONE	0.082 BJ	0.2 B	0.092 BJ	0.23 B	0.055 BJ	0.066 BJ	0.084 J	0.05 J	0.013 BJ	0.01 BJ
BUTANO	< 0.11	< 0.11	< 0.12	< 0.12	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.12
CS2	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
2HEXANO	< 0.054	< 0.056	< 0.058	< 0.058	< 0.057	< 0.057	< 0.057	< 0.057	< 0.053	< 0.059
4Me2PE	< 0.054	< 0.056	< 0.058	< 0.058	< 0.057	< 0.057	< 0.057	< 0.057	< 0.053	< 0.059
STYRENE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006
VNACETA	< 0.054	< 0.056	< 0.058	< 0.058	< 0.057	< 0.057	< 0.057	< 0.057	< 0.053	< 0.059
T-XYLENE	< 0.005	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.005	< 0.006

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8240 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .7 (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8240 * (volatile organics) soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	07#1V	07#1VDUP	07#2V	07#2VDUP	08#1	09#1	09#2	10#1
CIMETH	< 0.011	< 0.011	< 0.011	< 0.011	< 0.02	< 0.011	< 0.011	< 0.011
BrMETH	< 0.011	< 0.011	< 0.011	< 0.011	< 0.02	< 0.011	< 0.011	< 0.011
VNLCL	< 0.011	< 0.011	< 0.011	< 0.011	< 0.02	< 0.011	< 0.011	< 0.011
CIETHA	< 0.011	< 0.011	< 0.011	< 0.011	< 0.02	< 0.011	< 0.011	< 0.011
MECL	0.17 B	0.11 B	0.18 B	0.056 B	0.54 B	0.044 B	0.067 B	0.22 B
11DCIETE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
IIDCIETA	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
t-DCIETE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
c-DCIETE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
CHCL3	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
12DCIETA	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
111TCA	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
CCL4	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
BrDCIME	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
12DCIPR	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
t13CIPRE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
TCE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
DBrCIME	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
c13CIPRE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
112TCA	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
BENZENE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
CHBr3	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
1122TCIA	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
TECIETE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
TOLUENE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
CIBEN	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
ETBEN	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
ACETONE	0.063 J	0.043 BJ	0.046 BJ	0.046 BJ	0.084 J	0.061 BJ	0.12 B	0.12 B
BUTANO	< 0.11	< 0.11	< 0.11	< 0.11	< 0.2	< 0.11	< 0.11	< 0.11
CS2	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
2HEXANO	< 0.055	< 0.056	< 0.056	< 0.057	< 0.099	< 0.057	< 0.056	< 0.055
4Me2PE	< 0.055	< 0.056	< 0.056	< 0.057	< 0.099	< 0.057	< 0.056	< 0.055
STYRENE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006
VNACETA	< 0.055	< 0.056	< 0.056	< 0.057	< 0.099	< 0.057	< 0.056	< 0.055
T-XYLENE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8240 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE 8 McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of volatile organic* analysis of method blanks associated with soil analysis.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

METHOD BLANK	MB1	MB2	MB1	MB2	MB1	MB2	MB1	MB2
ANALYTE / BORING	3,1A	3,1A	6,8,9,10	6,8,9,10	5,7	5,7	4	4
CIMETH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
BrMETH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
VNLCL	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
CIETHA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MECL	0.025	0.011	0.011	0.0036 J	0.0036 J	0.002 J	0.002 J	0.0035 J
11DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
IIDCIETA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
t-DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
c-DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CHCL3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
12DCIETA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
111TCA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CCL4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
BrDCIME	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
12DCIPR	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
t13CIPRE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TCE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DBrCIME	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
c13CIPRE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
112TCA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
BENZENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CHBr3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
1122TCIA	< 0.005	< 0.001 J	< 0.005	< 0.0014 J	< 0.0014 J	< 0.005	< 0.005	< 0.005
TECIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TOLUENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CIBEN	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ETBEN	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ACETONE	0.007 J	0.039 J	0.039 J	< 0.1	< 0.1	0.019 J	0.019 J	0.0091 J
BUTANO	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CS2	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
2HEXANO	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4Me2PE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
STYRENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
VNACETA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
T-XYLENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes: Sample ID is as follows - MB 3,1A - Method blank associated with analysis of soils from borings 3 and 1A.

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8240 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .9 Mccomish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of volatile organic* analysis of sampling equipment rinses associated with soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for compound names.

METHOD BLANK	Rinse	Rinse	Rinse	Rinse	Rinse
ANALYTE / BORING	1,2	1A,3	6,8,9,10	5,7	4
CIMETH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
BrMETH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
VNLCL	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
CIETHA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MECL	0.0032 BJ	0.011 B	0.003 BJ	0.0034 BJ	0.0039 BJ
11DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
IIDCIETA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
t-DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
c-DCIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CHCL3	0.017	0.0078	0.0089	0.0067	0.0083
12DCIETA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
111TCA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CCL4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
BrDCIME	< 0.005	0.0005 J	< 0.005	< 0.005	< 0.005
12DCIPR	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
t13CIPRE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TCE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DBrCIME	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
c13CIPRE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
112TCA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
BENZENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CHBr3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
1122TCIA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TECIETE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TOLUENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
CIBEN	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ETBEN	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ACETONE	0.024 BJ	0.061 BJ	0.0064 BJ	0.1 J	0.061 J
BUTANO	0.03 J	0.057 J	0.055 J	< 0.1	0.045 J
CS2	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
2HEXANO	0.0062 BJ	0.0068 BJ	0.0039 J	< 0.05	0.0062 J
4Me2PE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
STYRENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
VNACETA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
T-XYLENE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes: Sample ID is as follows - MB 3,1A - Method blank associated with analysis of soils from borings 3 and 1A.

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8240 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .10 (Page 1 of 4). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	01#1	01#2	1A#1	1A#2	02#1	02#2	03#1	03#2	04#1	04#2
PHENOL	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
2CIPHEN	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
2NIPHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
24DMePHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
24DCIPHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
4CI3MePH	< 1.5	< 1.5	< 1.4	< 15	< 1.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
246TCIPH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
24DNPH	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
4NPHE	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
2M46DNPH	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
PCIPHE	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
BENZOAC	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
2MEPHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
4MEPHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
245TCIPH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BZLAL	< 1.5	< 1.5	< 1.4	< 15	< 1.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
NNDMeAM	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BCIIPrE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
NNDNPAM	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
NITROBEN	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
ISOPHOR	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BCIEtoME	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
26DNTOL	< 0.73	< 0.74	< 0.71	4.4 J	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
24DNTOL	< 0.73	< 0.74	< 0.71	71	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
12DPHYD	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BENZIDI	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
33DCIBEZ	< 1.5	< 1.5	< 1.4	< 15	< 1.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
BCIEtE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
13DCIB	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
14DCIB	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
12DCIB	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
HCIETA	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
124TCIB	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .10 (Page 2 of 4). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	01#1	01#2	1A#1	1A#2	02#1	02#2	03#1	03#2	04#1	04#2
NAPHTH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
HCIBU	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
HCICYPD	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
2CINAPH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
ACENAY	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
DMePHTH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
ACENAP	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
FLUORE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
DEtPHTH	< 0.73	< 0.74	0.036 BJ	< 7.5	< 0.92	< 0.77	< 0.76	0.054 BJ	< 0.74	< 0.74
4ClPHPHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
NNDPHAM	< 0.73	< 0.74	< 0.71	3.6 J	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
4BrPHET	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
HCIBEN	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
PHENAN	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
ANTRAC	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
DBuPHTH	< 0.73	0.073 BJ	< 0.71	30 B	0.071 BJ	0.071 BJ	0.064 BJ	0.034 BJ	< 0.74	< 0.74
FLANTHE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
PYRENE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BuBePHTH	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
CHRYSE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BAANTHR	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
B2EHPH	< 0.14	0.034 J	0.036 J	< 7.5	0.12 J	0.074 J	0.081 J	0.26 J	< 0.74	< 0.74
DNOcPHT	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	0.026 J	0.027 J	< 0.74	< 0.74
BBFLANT	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BKFLANT	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
BAPYRE	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
I123PYR	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
DBAHANT	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
B-GHI-PY	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
ANILINE	< 1.5	< 1.5	< 1.4	< 15	< 1.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
4CIANIL	< 1.5	< 1.5	< 1.4	< 15	< 1.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
DBENZOFU	< 0.73	< 0.74	< 0.71	< 7.5	< 0.92	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
2MeNAPH	< 0.73	< 0.74	< 0.71	< 7.5	0.062 J	< 0.77	< 0.76	< 0.74	< 0.74	< 0.74
2NANIL	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
3NANIL	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7
4NANIL	< 3.6	< 3.7	< 3.6	< 38	< 4.6	< 3.8	< 3.8	< 3.7	< 3.7	< 3.7

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE 10 (Page 3 of 4). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) soil analysis.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	05#1	05#2	06#1	06#2	07#1	07#1DUP	07#2	07#2DUP	08#1	09#1	09#2	10#1
PHENOL	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
2ClPHEN	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
2NIPHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
24DMePHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
24DClPHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
4Cl3MePH	< 1.5	< 13	< 1.4	< 1.4	< 1.4	< 1.5	< 1.3	< 1.5	< 1.3	< 1.5	< 1.4	< 1.5
246TClPH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
24DNPH	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
4NPHE	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
2M46DNPH	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
PClPHE	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
BENZOAC	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
2MEPHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
4MEPHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
245TClPH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BZLAL	< 1.5	< 13	< 1.4	< 1.4	< 1.4	< 1.5	< 1.3	< 1.5	< 1.3	< 1.5	< 1.4	< 1.5
NNDMeAM	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BClIPrE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
NNDNPAM	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
NITROBEN	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
ISOPHOR	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BClEtoME	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
26DNTOL	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
24DNTOL	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
12DPHYD	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BENZIDI	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
33DClBEZ	< 1.5	< 13	< 1.4	< 1.4	< 1.4	< 1.5	< 1.3	< 1.5	< 1.3	< 1.5	< 1.4	< 1.5
BClEtE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
13DClB	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
14DClB	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
12DClB	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
HClETA	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
124TClB	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions

TABLE .10 (Page 4 of 4). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) soil analysis.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / SAMPLE	05#1	05#2	06#1	06#2	07#1	07#1DUP	07#2	07#2DUP	08#1	09#1	09#2	10#1
NAPHTH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
HCIBU	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
HCICYPD	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
2CINAPH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
ACENAY	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
DMePHTH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
ACENAP	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
FLUORE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
DEtPHTH	0.038 BJ	< 6.6	0.05 BJ	0.041 BJ	0.032 BJ	0.029 BJ	0.036 BJ	0.054 BJ	0.039 BJ	0.042 BJ	0.052 BJ	0.03 BJ
4ClPHPHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
NNDPHAM	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
4BrPHET	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
HCIBEN	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
PHENAN	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
ANTRAC	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
DBuPHTH	0.086 BJ	0.31 BJ	< 0.68	< 0.68	0.055 BJ	0.062 BJ	0.13 BJ	0.18 BJ	< 0.66	0.15 BJ	< 0.72	0.085 BJ
FLANTHE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
PYRENE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BuBePHTH	< 0.76	< 6.6	0.036 J	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
CHRYSE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BAANTHR	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
B2EHPH	0.055 BJ	< 6.6	0.1 J	0.18 J	0.21 BJ	0.29 BJ	0.75 B	0.93 B	0.14 J	0.045 J	0.048 J	0.1 BJ
DNOcPHT	< 0.76	< 6.6	0.088 J	0.053 J	< 0.72	< 0.73	< 0.66	0.038 J	< 0.66	< 0.75	0.054 J	< 0.73
BBFLANT	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BKFLANT	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
BAPYRE	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
I123PYR	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
DBAHANT	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
B-GHI-PY	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
ANILINE	< 1.5	< 13	< 1.4	< 1.4	< 1.4	< 1.5	< 1.3	< 1.5	< 1.3	< 1.5	< 1.4	< 1.5
4CIANIL	< 1.5	< 13	< 1.4	< 1.4	< 1.4	< 1.5	< 1.3	< 1.5	< 1.3	< 1.5	< 1.4	< 1.5
DBENZOFU	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
2MeNAPH	< 0.76	< 6.6	< 0.68	< 0.68	< 0.72	< 0.73	< 0.66	< 0.77	< 0.66	< 0.75	< 0.72	< 0.73
2NANIL	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
3NANIL	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6
4NANIL	< 3.8	< 33	< 3.4	< 3.4	< 3.6	< 3.6	< 3.3	< 3.8	< 3.3	< 3.8	< 3.6	< 3.6

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .11 McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Summary of semivolatile organic analytes (EPA Method 8270) found in soil analysis. Semivolatile analytes also found in method blanks are not included. A (J) is indicated after the compound name where the analyte was detected at concentrations below the statistical quantation limits.

Boring 1
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)

Boring 1A
Diethyl Phthalate (J)
N-Nitrosodiphenyl Amine (J)
Dibutylphthalate
Bis(2-Ethylhexyl)Phthalate (J)
2,4-Dinitrotoluene
2,6-Dinitrotoluene (J)

Boring 2
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)
2-Methylnaphthalene (J)

Boring 3
Diethyl Phthalate (J)
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)
Di-N-Octylphthalate (J)

Boring 5
Diethyl Phthalate (J)
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)

Boring 6
Diethyl Phthalate (J)
Butylbenzylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)
Di-N-Octylphthalate (J)

Boring 7
Diethyl Phthalate (J)
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)
Di-N-Octylphthalate (J)

Boring 8
Diethyl Phthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)

Boring 9
Diethyl Phthalate (J)
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)
Di-N-Octylphthalate (J)

Boring 10
Diethyl Phthalate (J)
Dibutylphthalate (J)
Bis(2-Ethylhexyl)Phthalate (J)

Borings with No Detectable Semivolatile Analytes
Boring 4

TABLE 4.12 (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) analysis of method blanks associated with soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

METHOD BLANK	MB1	MB1	MB2	MB3	MB1	MB2	MB1	MB1
ANALYTE/BORING#	1,2	1A,3	1A,3	1A,3	6,8,9,10	6,8,9,10	5,7	4
PHENOL	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
2ClPHEN	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
2NIPHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
24DMePHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
24DClPHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
4Cl3MePH	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
246TClPH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
24DNPH	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
4NPHE	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
2M46DNPH	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
PClPHE	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
BENZOAC	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
2MEPHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
4MEPHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
245TClPH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BZLAL	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
NNDMeAM	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BClIPrE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
NNDNPAM	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
NITROBEN	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
ISOPHOR	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BClEtoME	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
26DNTOL	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
24DNTOL	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
12DPHYD	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BENZIDI	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
33DClBEZ	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
BClEtE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
13DClB	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
14DClB	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
12DClB	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
HClETA	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
124TClB	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67

Notes : Method Blank ID is as follows - MB1 1,2 - method blank 1 associated with analysis of soils from borings 1 and 2.

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE 12 (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) analysis of method blanks associated with soil analysis. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

METHOD BLANK	MB1	MB1	MB2	MB3	MB1	MB2	MB1	MB
ANALYTE/BORING#	1,2	1A,3	1A,3	1A,3	6,8,9,10	6,8,9,10	5,7	4
NAPHTH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
HCIBU	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
HCICYPD	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
2CINAPH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
ACENAY	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
DMePHTH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
ACENAP	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
FLUORE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
DEtPHTH	< 0.67	< 0.67	0.074 J	< 0.67	0.074 J	0.057 J	0.057 J	< 0.67
4ClPHPHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
NNDPHAM	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
4BrPHET	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
HCIBEN	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
PHENAN	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
ANTRAC	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
DBuPHTH	0.028 J	0.028 J	0.13 J	0.12 J	0.13 J	0.14 J	0.14 J	< 0.67
FLANTHE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
PYRENE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BuBePHTH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
CHRYSE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BAANTHR	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
B2EHPH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	0.061 J	0.061 J	0.31 J
DNOcPHT	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BBFLANT	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BKFLANT	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
BAPYRE	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
I123PYR	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
DBAHANT	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
B-GHI-PY	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
ANILINE	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
4CIANIL	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
DBENZOFU	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
2MeNAPH	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67	< 0.67
2NANIL	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
3NANIL	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3
4NANIL	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3

Notes : Method Blank ID is as follows - MB1 1,2 - method blank 1 associated with analysis of soils from borings 1 and 2.

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .13 (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) analysis of sampling equipment rinses and associated method blanks. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

SAMPLE ID	RINSE	MB	RINSE	MB1	MB2	RINSE	MB	RINSE	MB	RINSE	MB
ANALYTE/BORING#	1,2	1,2	1A,3	1A,3	1A,3	6,8,9,10	6,8,9,10	5,7	5,7	4	4
PHENOL	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
2CIPHEN	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
2NIPHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
24DMePHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
24DCIPHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
4Cl3MePH	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02
246TCIPH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
24DNPH	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
4NPHE	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
2M46DNPH	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
PCIPHE	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
BENZOAC	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
2MEPHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
4MEPHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
245TCIPH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
BZLAL	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02
NNDMeAM	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
BCIIPrE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
NNDNPAM	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
NITROBEN	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
ISOPHOR	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
BCIEtoME	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
26DNTOL	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
24DNTOL	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
12DPHYD	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.05	< 0.05	< 0.011	< 0.01	< 0.01	< 0.01
BENZIDI	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05
33DCIBEZ	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02
BCIEtE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
13DCIB	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
14DCIB	0.001 BJ	0.001 J	0.001 BJ	0.001 J	0.001 J	0.001 BJ	0.001 J	< 0.011	< 0.01	< 0.01	< 0.01
12DCIB	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
HCIETA	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01
124TCIB	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01

Notes :

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

TABLE .13 (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of EPA Method 8270 * (Semivolatile organics) analysis of sampling equipment rinses and associated method blanks. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of organic analyte are shown boxed. Analytes are given as abbreviations; see Appendix A for full compound names.

METHOD BLANK	RINSE	MB	RINSE	MB1	MB2	RINSE	MB	RINSE	MB	RINSE	MB
ANALYTE/BORING#	1,2	1,2	1A,3	1A,3	1A,3	6,8,9,10	6,8,9,10	5,7	5,7	4	4
NAPHTH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
HCIBU	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
HCICYPD	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
2CINAPH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
ACENAY	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
DMePHTH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
ACENAP	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
FLUORE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
DEtPHTH	0.001 BJ	0.002 J	< 0.011	0.002 J	0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
4ClPHPHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
NNDPHAM	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
4BrPHET	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
HCIBEN	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
PHENAN	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
ANTRAC	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
DBuPHTH	0.001 BJ	0.001 J	0.001 BJ	0.001 J	0.001 J	< 0.01	0.001 J	0.011	< 0.01	< 0.01	< 0.01
FLANTHE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
PYRENE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
BuBePHTH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
CHRYSE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
BAANTHR	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
B2EHPH	0.001 BJ	0.002 J	< 0.011	0.002 J	0.002 J	0.005 BJ	0.002 J	0.001 BJ	0.001 J	< 0.01	0.001 J
DNOcPHT	0.002 BJ	0.001 J	< 0.011	0.001 J	< 0.001	< 0.01	0.001 J	0.002 J	< 0.01	0.002 J	< 0.01
BBFLANT	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
BKFLANT	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
BAPYRE	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
I123PYR	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
DBAHANT	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
B-GHI-PY	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
ANILINE	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02	0.02	< 0.022	< 0.02	< 0.02	< 0.02
4CIANIL	< 0.02	< 0.02	< 0.022	< 0.02	< 0.02	< 0.02	0.02	< 0.022	< 0.02	< 0.02	< 0.02
DBENZOFU	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
2MeNAPH	< 0.01	< 0.01	< 0.011	< 0.01	< 0.01	< 0.01	0.01	< 0.011	< 0.01	< 0.01	< 0.01
2NANIL	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	0.05	< 0.055	< 0.05	< 0.05	< 0.05
3NANIL	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	0.05	< 0.055	< 0.05	< 0.05	< 0.05
4NANIL	< 0.05	< 0.05	< 0.055	< 0.05	< 0.05	< 0.05	0.05	< 0.055	< 0.05	< 0.05	< 0.05

Notes :

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

* - EPA Method 8270 - In TEST FOR EVALUATING ORGANIC AND INORGANIC WASTE, PHYSICAL/CHEMICAL METHODS, SW846, Third Edition, November 1986, with December 1988 revisions.

Table .14 McComish Gorge - NWSC Crane, Indiana, SWMU#04/02. Results of soil samples for explosive compounds. Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations are shown boxed.

ANALYTE / SAMPLE	01/#1	1A/#1	02/#1	03/#1	04/#1	05/#1	06/#1	07/#1	08/#1	09/#1	10/#1
HMX	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2
RDX	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1
TNB	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25
DNB	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25
TETRYL	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65
TNT	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25
2,4-DNT	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25

ANALYTE / SAMPLE	01/#2	1A/#2	02/#2	03/#2	04/#2	05/#2	06/#2	07/#2	09/#2
HMX	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U	<2.2U
RDX	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
TNB	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U
DNB	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U
TETRYL	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U	<0.65U
TNT	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U
2,4-DNT	<0.25U	**0.178 J**	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U	<0.25U

Note:

J - Estimated value below statistical quantitation limits.

U - Compound was analyzed for but not detected. Detection limits are given after the < symbol

Table .15 McComish Gorge - NWSC Crane, Indiana, SWMU#04/02. Results of analysis of method blanks associated with analysis of soils for explosive compounds. No detectable concentrations of indicated explosive analytes were found. Detection limits are given after the < symbol and are in mg/kg (ppm) dry weight.

Sample	MB		MB		MB		MB		MB	
Analyte/Boring #	1,2		3,1A		6,8,9,10		5,7		4	
HMX	< 2.2	U	< 2.2	U	< 2.2	U	< 2.2	U	< 2.2	U
RDX	< 1	U	< 1	U	< 1	U	< 1	U	< 1	U
TNB	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U
DNB	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U
TETRYL	< 0.65	U	< 0.65	U	< 0.65	U	< 0.65	U	< 0.65	U
TNT	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U
2,4-DNT	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U	< 0.25	U

Note :

Sample ID is as follows - MB - method blank for analysis of samples from the borings indicated.

U - Compound was analyzed for but not detected. Detection limits are given after the < symbol.

Table .16 McComish Gorge - NWSC Crane, Indiana, SWMU#04/02. Results of analysis for explosives for water collected from final equipment rinses. Results are in mg/l (ppm). No detectable concentrations of indicated explosive analytes were found. Detection limits are given after the < symbol and are in mg/kg (ppm) dry weight.

Sample ID	Rinse		Rinse		Rinse		Rinse		Rinse	
Analyte/Boring	1,2		1A,3		6,8,9,10		5,7		4	
HMX	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U
RDX	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U
TNB	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U
DNB	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U
TETRYL	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U	< 0.05	U
TNT	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U
2,4-DNT	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U	< 0.02	U

Note :

U - Compound was analyzed for but not detected. Detection limits are given after the < symbol.

TABLE 17 (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of soil analysis for pesticides, herbicides, and PCBS.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE/SAMPLE	01#1	01#2	1A#1	1A#2	02#1	02#2	03#1	03#2	04#1	04#2	05#1
ALDRIN	< 0.0027	< 0.0029	< 0.0029	< 0.003	< 0.0037	< 0.0031	< 0.0029	< 0.0031	< 0.003	< 0.003	< 0.0027
A-BHC	< 0.002	< 0.0022	< 0.0022	< 0.0023	< 0.0028	< 0.0023	< 0.0022	< 0.0023	< 0.0023	< 0.0023	< 0.002
B-BHC	< 0.004	< 0.0043	< 0.0043	< 0.0045	< 0.0055	< 0.0046	< 0.0043	< 0.0046	< 0.0046	< 0.0046	< 0.004
G-BHC	< 0.0027	< 0.0029	< 0.0029	< 0.003	< 0.0037	< 0.0031	< 0.0029	< 0.0031	< 0.003	< 0.003	< 0.0027
D-BHC	< 0.006	< 0.0065	< 0.0065	< 0.0068	< 0.0083	< 0.0069	< 0.0065	< 0.0069	< 0.0068	< 0.0069	< 0.006
PPDDD	< 0.0074	< 0.0031	< 0.0079	< 0.0083	< 0.01	< 0.0084	< 0.0079	< 0.0084	< 0.0084	< 0.0084	< 0.0074
PPDDE	< 0.0027	< 0.0029	< 0.0029	< 0.003	< 0.0037	< 0.0031	< 0.0029	< 0.0031	< 0.003	< 0.003	[0.0018] J
PPDDT	< 0.008	< 0.0086	< 0.0086	< 0.009	< 0.011	< 0.0092	< 0.0086	< 0.0092	< 0.0091	< 0.0091	< 0.008
HPTCL	[0.0004] BJ	< 0.0022	< 0.0022	< 0.0023	< 0.0028	< 0.0023	< 0.0022	[0.0002] BJ	< 0.0023	< 0.0023	< 0.002
DIELDRIN	< 0.0013	< 0.0014	< 0.0014	< 0.0015	< 0.0018	< 0.0015	< 0.0014	< 0.0015	< 0.0015	< 0.0015	< 0.0013
ENDOI	< 0.0094	< 0.01	< 0.01	< 0.011	< 0.013	< 0.0011	< 0.01	< 0.011	< 0.011	< 0.011	< 0.0094
ENDOII	< 0.0027	< 0.0029	< 0.0029	< 0.003	< 0.0037	< 0.0031	< 0.0029	< 0.0031	< 0.003	< 0.003	< 0.0027
ENDOSU	< 0.044	< 0.047	< 0.047	< 0.05	< 0.061	< 0.05	< 0.047	< 0.051	< 0.05	< 0.05	< 0.044
ENDRIN	< 0.004	< 0.0043	< 0.0043	< 0.0045	< 0.0055	< 0.0046	< 0.0043	< 0.0046	< 0.0046	< 0.0046	< 0.004
ENDALD	< 0.015	< 0.017	< 0.017	< 0.017	< 0.021	< 0.018	< 0.016	< 0.018	< 0.017	< 0.018	< 0.015
HPTCLE	< 0.056	< 0.06	< 0.06	< 0.062	< 0.076	< 0.063	< 0.06	< 0.06	< 0.063	< 0.063	< 0.055
METOXYCL	< 0.12	< 0.13	< 0.13	< 0.13	< 0.16	< 0.13	< 0.13	< 0.14	< 0.13	< 0.13	< 0.12
TOXAPHEN	< 0.16	< 0.17	< 0.17	< 0.18	< 0.22	< 0.18	< 0.17	< 0.18	< 0.18	< 0.18	< 0.16
PCB-1016	< 0.044	< 0.047	< 0.047	< 0.049	< 0.06	< 0.05	< 0.047	< 0.05	< 0.049	< 0.05	< 0.043
PCB-1221	< 0.044	< 0.047	< 0.047	< 0.049	< 0.06	< 0.05	< 0.047	< 0.05	< 0.049	< 0.05	< 0.043
PCB-1232	< 0.044	< 0.047	< 0.047	< 0.049	< 0.06	< 0.05	< 0.047	< 0.05	< 0.049	< 0.05	< 0.043
PCB-1242	< 0.044	< 0.047	< 0.047	< 0.049	< 0.06	< 0.05	< 0.047	< 0.05	< 0.049	< 0.05	< 0.043
PCB-1248	< 0.044	< 0.047	< 0.047	< 0.049	< 0.06	< 0.05	< 0.047	< 0.05	< 0.049	< 0.05	< 0.043
PCB-1254	< 0.087	< 0.094	< 0.093	< 0.098	< 0.12	< 0.099	< 0.093	< 0.1	< 0.099	< 0.099	< 0.087
PCB-1260	< 0.087	< 0.094	< 0.093	< 0.098	< 0.12	< 0.099	< 0.093	< 0.1	< 0.099	< 0.099	< 0.087
DIAZINON	< 0.1	< 0.11	< 0.11	< 0.11	< 0.14	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.1
ETPATH	< 0.03	< 0.032	< 0.032	< 0.034	< 0.041	< 0.034	< 0.032	< 0.034	< 0.034	< 0.034	< 0.03
ETTRITH	< 0.032	< 0.034	< 0.034	< 0.036	< 0.044	< 0.036	< 0.034	< 0.037	< 0.036	< 0.036	< 0.032
ETHION	< 0.026	< 0.028	< 0.028	< 0.029	< 0.036	< 0.03	< 0.028	< 0.03	< 0.03	< 0.03	< 0.026
MALATH	< 0.055	< 0.059	< 0.059	< 0.062	< 0.076	< 0.062	< 0.059	< 0.063	< 0.062	< 0.062	< 0.055
METPATH	< 0.06	< 0.064	< 0.064	< 0.067	< 0.082	< 0.068	< 0.064	< 0.069	< 0.068	< 0.068	< 0.06
2,4-D	< 0.44	< 0.45	< 0.43	< 0.44	< 0.56	< 0.48	< 0.46	< 0.46	< 0.44	< 0.45	< 0.45
2,4-DP	< 0.24	< 0.24	< 0.23	< 0.24	< 0.3	< 0.26	< 0.25	< 0.25	< 0.24	< 0.25	< 0.24
2,4,5-T	< 0.073	< 0.075	< 0.072	< 0.073	< 0.093	< 0.08	< 0.076	< 0.077	< 0.074	< 0.076	< 0.052
2,4,5-TP	< 0.062	< 0.064	< 0.061	< 0.062	< 0.079	< 0.068	< 0.065	< 0.065	< 0.063	< 0.064	< 0.064
a-CHLRDN	[0.0004] BJ	< 0.0038	[0.0002] J	< 0.0038	< 0.0046	[0.0002] BJ	[0.0002] J	[0.0004] J	< 0.0038	[0.0004] J	< 0.0033
g-CHLRDN	< 0.0034	< 0.0036	< 0.0036	< 0.0038	< 0.0046	< 0.0038	< 0.0036	< 0.0038	< 0.0038	< 0.0038	< 0.0033

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

TABLE ..17 (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of soil analysis for pesticides, herbicides, and PCBS.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE/SAMPLE	05#2	06#1	06#2	07#1	07#1DUP	07#2	07#2DUP	08#1	09#1	09#2	10#1
ALDRIN	< 0.0027	< 0.0029	< 0.0032	< 0.0027	< 0.0027	< 0.0027	< 0.0027	< 0.0031	< 0.0031	< 0.003	< 0.0029
A-BHC	< 0.002	< 0.0022	< 0.0024	< 0.002	< 0.002	< 0.002	< 0.002	< 0.0023	< 0.0023	< 0.0023	< 0.0022
B-BHC	< 0.004	< 0.0044	< 0.0048	< 0.004	< 0.004	< 0.004	< 0.004	< 0.0046	< 0.0046	< 0.0045	< 0.0044
G-BHC	< 0.0027	< 0.0029	< 0.0032	< 0.0027	< 0.0027	< 0.0027	< 0.0027	< 0.0031	< 0.0031	< 0.003	< 0.0029
D-BHC	< 0.006	< 0.0065	< 0.0071	< 0.006	< 0.006	< 0.006	< 0.006	< 0.0069	< 0.007	< 0.0068	< 0.0066
PPDDD	< 0.0073	< 0.0079	< 0.0032	< 0.0073	< 0.0074	< 0.0073	< 0.0074	< 0.0085	< 0.0085	< 0.0083	< 0.008
PPDDE	< 0.0027	< 0.0029	< 0.0032	< 0.0027	< 0.0027	< 0.0027	< 0.0027	< 0.0031	< 0.0031	< 0.003	0.029 J
PPDDT	< 0.008	< 0.0086	< 0.0095	< 0.008	< 0.008	< 0.008	< 0.008	< 0.0092	< 0.0093	< 0.009	< 0.1
HPTCL	< 0.002	0.0002 BJ	0.0002 BJ	< 0.002	0.0003 J	< 0.002	0.0002 J	0.0028 BJ	< 0.0023	< 0.0023	< 0.0022
DIELDRIN	< 0.0013	< 0.0014	< 0.0016	< 0.0013	< 0.0013	< 0.0013	< 0.0013	< 0.0015	< 0.0015	< 0.0015	< 0.0015
ENDOI	< 0.0093	< 0.01	< 0.011	< 0.0093	< 0.0094	< 0.0093	< 0.0094	< 0.011	< 0.011	< 0.011	< 0.01
ENDOII	< 0.0027	< 0.0029	< 0.0032	< 0.0027	< 0.0027	< 0.0027	< 0.0027	< 0.0031	< 0.0031	< 0.003	< 0.0029
ENDOSU	< 0.044	< 0.047	< 0.052	< 0.044	< 0.044	< 0.044	< 0.044	< 0.051	< 0.051	< 0.05	< 0.048
ENDRIN	< 0.004	0.0016 J	< 0.0048	< 0.004	< 0.004	< 0.004	< 0.004	0.0004 J	< 0.0046	< 0.0045	< 0.0044
ENDALD	< 0.015	< 0.017	< 0.018	< 0.015	< 0.015	< 0.015	< 0.015	< 0.018	< 0.018	< 0.017	< 0.017
HPTCLE	< 0.055	< 0.06	< 0.066	< 0.055	< 0.056	< 0.055	< 0.055	< 0.064	< 0.064	< 0.062	< 0.06
METOXYCL	< 0.12	< 0.13	< 0.14	< 0.12	< 0.12	< 0.12	< 0.12	< 0.14	< 0.14	< 0.13	< 0.13
TOXAPHEN	< 0.16	< 0.17	< 0.19	< 0.16	< 0.16	< 0.16	< 0.16	< 0.18	< 0.19	< 0.18	< 0.17
PCB-1016	< 0.043	< 0.047	< 0.052	< 0.043	< 0.044	< 0.043	< 0.043	< 0.05	< 0.05	< 0.049	< 0.047
PCB-1221	< 0.043	< 0.047	< 0.052	< 0.043	< 0.044	< 0.043	< 0.043	< 0.05	< 0.05	< 0.049	< 0.047
PCB-1232	< 0.043	< 0.047	< 0.052	< 0.043	< 0.044	< 0.043	< 0.043	< 0.05	< 0.05	< 0.049	< 0.047
PCB-1242	< 0.043	< 0.047	< 0.052	< 0.043	< 0.044	< 0.043	< 0.043	< 0.05	< 0.05	< 0.049	< 0.047
PCB-1248	< 0.043	< 0.047	< 0.052	< 0.043	< 0.044	< 0.043	< 0.043	< 0.05	< 0.05	< 0.049	< 0.047
PCB-1254	< 0.087	< 0.094	< 0.1	< 0.086	< 0.087	< 0.087	< 0.087	< 0.1	< 0.1	< 0.098	< 0.095
PCB-1260	< 0.087	< 0.094	< 0.1	< 0.086	< 0.087	< 0.087	< 0.087	< 0.1	< 0.1	< 0.098	< 0.095
DIAZINON	0.016 J	< 0.11	< 0.12	< 0.099	< 0.1	< 0.099	< 0.1	< 0.12	< 0.12	< 0.11	< 0.11
ETPATH	< 0.03	< 0.032	< 0.036	< 0.03	< 0.03	< 0.03	< 0.03	< 0.034	< 0.035	< 0.034	< 0.033
ETTRITH	< 0.032	< 0.034	< 0.038	< 0.032	< 0.032	< 0.032	< 0.032	< 0.037	< 0.037	< 0.036	< 0.035
ETHION	< 0.026	< 0.028	< 0.031	< 0.026	< 0.026	< 0.026	< 0.026	< 0.03	< 0.03	< 0.029	< 0.028
MALATH	< 0.055	< 0.059	< 0.065	< 0.055	< 0.055	< 0.055	< 0.055	< 0.063	< 0.064	< 0.062	< 0.06
METPATH	< 0.06	< 0.064	< 0.071	< 0.06	< 0.06	< 0.06	< 0.06	< 0.069	< 0.067	< 0.069	< 0.065
2,4-D	< 0.46	< 0.42	0.0015 J	< 0.44	< 0.43	< 0.45	< 0.46	< 0.45	< 0.46	< 0.44	< 0.43
2,4-DP	< 0.25	< 0.23	< 0.25	< 0.24	< 0.23	< 0.24	< 0.25	< 0.25	< 0.25	< 0.24	< 0.25
2,4,5-T	< 0.076	< 0.07	< 0.077	< 0.073	< 0.065	< 0.067	< 0.077	< 0.75	< 0.76	< 0.73	< 0.72
2,4,5-TP	< 0.065	< 0.06	< 0.065	< 0.062	< 0.061	< 0.064	< 0.065	< 0.064	< 0.065	< 0.062	< 0.061
a-CHLRDN	< 0.0033	0.0024 BJ	< 0.004	< 0.0033	< 0.0033	< 0.0033	< 0.0033	0.0004 BJ	< 0.0039	< 0.0038	< 0.0036
g-CHLRDN	< 0.0033	< 0.0036	< 0.004	< 0.0033	< 0.0033	< 0.0033	< 0.0033	< 0.0038	< 0.0039	< 0.0038	< 0.0038

Notes: Sample ID is as follows - 01#1, boring 1/sample 1. See figure ****

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

TABLE .18 (Page 1 of 1) McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana.
Results of analysis of method blanks associated with analysis of soils for pesticides, herbicides, and PCBs.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

METHOD BLANK	MB	MB	MB	MB	MB
ANALYTE / BORING	1,2	1A,3	6,8,9,10	5,7	4
ALDRIN	< 0.002	< 0.002	< 0.006	< 0.003	< 0.003
A-BHC	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
B-BHC	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
G-BHC	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
D-BHC	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
PPDDD	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
PPDDE	7E-04 J	7E-04 J	7E-04 J	< 0.003	< 0.003
PPDDT	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
HPTCL	2E-04 J	2E-04 J	4E-04 J	< 0.002	8E-04 J
DIELDRIN	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDOI	< 0.009	< 0.009	< 0.009	< 0.009	< 0.009
ENDOII	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
ENDOSU	0.002 J	0.002 J	< 0.044	< 0.044	< 0.044
ENDRIN	8E-04 J	8E-04 J	< 0.004	< 0.004	< 0.004
ENDALD	< 0.015	< 0.015	< 0.015	7E-04 J	6E-04 J
HPTCLE	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056
METOXYCL	< 0.12	< 0.12	< 0.12	7E-04 J	0.007 J
TOXAPHEN	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
PCB-1016	< 0.044	< 0.044	< 0.044	< 0.044	< 0.044
PCB-1221	< 0.044	< 0.044	< 0.044	< 0.044	< 0.044
PCB-1232	< 0.044	< 0.044	< 0.044	< 0.044	< 0.044
PCB-1242	< 0.044	< 0.044	< 0.044	< 0.044	< 0.044
PCB-1248	< 0.044	< 0.044	< 0.044	< 0.044	< 0.044
PCB-1254	< 0.087	< 0.087	< 0.087	< 0.087	< 0.087
PCB-1260	< 0.087	< 0.087	< 0.087	< 0.087	< 0.087
DIAZINON	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1
ETPATH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
ETTRITH	< 0.032	< 0.032	< 0.032	< 0.032	< 0.032
ETHION	< 0.026	< 0.026	< 0.026	< 0.026	< 0.026
MALATH	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055
METPATH	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
2,4-D	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24
2,4-DP	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13
2,4,5-T	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
2,4,5-TP	< 0.034	< 0.034	< 0.034	< 0.034	< 0.034
a-CHLRDN	0.001 J	0.001 J	0.001 J	< 0.003	< 0.003
g-CHLRDN	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003

Notes : Method Blank ID is as follows - MB 1,2 - method blank 1 associated with analysis of soils from borings 1 and 2.
J - Estimated value below the statistical limits.
< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

TABLE .19 (Page 1 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of analysis of sampling equipment rinses and associated method blanks for pesticides, herbicides, and PCBs.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / BORING	RINSE 1,2	MB 1,2	RINSE 1A,3	MB 1A,3	RINSE 6,8,9,10	MB 6,8,9,10
ALDRIN	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004
A-BHC	< 0.00003	< 0.00003	< 0.00003	< 0.00003	< 0.00003	< 0.00003
B-BHC	< 0.00006	0.00009	< 0.00006	0.00009	< 0.00006	< 0.00006
G-BHC	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004
D-BHC	< 0.00009	0.00001 J	< 0.00009	0.00001 J	< 0.00009	< 0.00009
PPDDD	< 0.0001	0.00003 J	< 0.0001	0.00003 J	< 0.0001	0.00008 J
PPDDE	< 0.00004	0.00001 J	< 0.00004	0.00001 J	< 0.00004	0.00002 J
PPDDT	< 0.00011	< 0.00012	< 0.00011	< 0.00012	0.00001 BJ	0.000009 J
HPTCL	< 0.00003	0.00002 J	< 0.00003	0.00002 J	< 0.00003	< 0.00003
DIELDRIN	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.000008 J	< 0.00002
ENDOI	< 0.00013	< 0.00014	< 0.00013	< 0.00014	< 0.00013	< 0.00014
ENDOII	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004	< 0.00004
ENDOSU	< 0.00063	0.00003 J	< 0.00063	0.00003 J	< 0.0006	0.00006 J
ENDRIN	< 0.00006	0.00002 J	< 0.00006	0.00002 J	< 0.00006	0.00002 J
ENDALD	< 0.00022	< 0.0002	< 0.00022	< 0.0002	< 0.0002	0.00003 J
HPTCLE	< 0.00029	< 0.0008	< 0.00079	< 0.0008	< 0.0008	< 0.0008
METOXYCL	< 0.0017	0.00009 J	< 0.0017	0.00009 J	< 0.0017	0.00019 J
TOXAPHEN	< 0.0023	< 0.0023	< 0.0023	< 0.0023	< 0.0023	< 0.0024
PCB-1016	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0007
PCB-1221	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0007
PCB-1232	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0007
PCB-1242	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0007
PCB-1248	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0007
PCB-1254	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0013
PCB-1260	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0013
DIAZINON	< 0.0019	< 0.002	< 0.0019	< 0.002	< 0.0019	< 0.002
ETPATH	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
ETTRITH	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
ETHION	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
MALATH	< 0.0011	< 0.0011	< 0.001	< 0.0011	< 0.001	< 0.0011
METPATH	< 0.0011	< 0.0012	< 0.0011	< 0.0012	< 0.0011	< 0.0012
a-CHLRDN	< 0.00005	0.00004 J	< 0.00005	0.00004 J	< 0.00005	0.00002 J
g-CHLRDN	< 0.00005	0.00002 J	< 0.00005	0.00002 J	< 0.00005	0.00002 J

Notes :

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

TABLE .19 (Page 2 of 2). McComish Gorge, SWMU 04/02 - NWSC Crane, Indiana. Results of analysis of sampling equipment rinses and associated method blanks for pesticides, herbicides, and PCBs.
Concentrations are mg/kg (ppm) dry weight. Samples with detectable concentrations of analyte are shown boxed.
Analytes are given as abbreviations; see Appendix A for full compound names.

ANALYTE / BORING	RINSE 5,7	MB 5,7	RINSE 4	MB 4
ALDRIN	< 0.00004	< 0.00004	< 0.00004	< 0.00004
A-BHC	< 0.00003	< 0.00003	< 0.00003	< 0.00003
B-BHC	< 0.00006	< 0.00006	< 0.00006	< 0.00006
G-BHC	< 0.00004	< 0.00004	< 0.00004	< 0.00004
D-BHC	< 0.00009	< 0.00008	< 0.00009	< 0.00009
PPDDD	< 0.0001	0.00008 J	< 0.0001	0.00008 J
PPDDE	< 0.00004	0.00002 J	< 0.00004	0.00002 J
PPDDT	< 0.00011	0.000009 J	< 0.00011	0.00001 J
HPTCL	< 0.00003	< 0.00003	0.000013 J	< 0.00003
DIELDRIN	< 0.00002	< 0.00002	< 0.00002	< 0.00002
ENDOI	< 0.00013	< 0.00014	0.00002 J	< 0.00014
ENDOII	< 0.00004	< 0.00004	< 0.00004	< 0.00004
ENDOSU	< 0.00063	< 0.00006	< 0.0006	< 0.0006
ENDRIN	< 0.00006	0.00002 J	< 0.00006	0.000024 J
ENDALD	< 0.0002	0.00003 J	< 0.0002	0.00003 J
HPTCLE	< 0.0008	< 0.0008	< 0.0008	< 0.0008
METOXYCL	< 0.0017	0.00019 J	< 0.0017	0.00019 J
TOXAPHEN	< 0.0023	< 0.0024	< 0.0023	< 0.0024
PCB-1016	< 0.0006	< 0.0007	< 0.0006	< 0.0007
PCB-1221	< 0.0006	< 0.0007	< 0.0006	< 0.0007
PCB-1232	< 0.0006	< 0.0007	< 0.0006	< 0.0007
PCB-1242	< 0.0006	< 0.0007	< 0.0006	< 0.0007
PCB-1248	< 0.0006	< 0.0007	< 0.0006	< 0.0007
PCB-1254	< 0.0012	< 0.0013	< 0.0012	< 0.0013
PCB-1260	< 0.0012	< 0.0013	< 0.0012	< 0.0013
DIAZINON	< 0.0019	< 0.002	< 0.0019	< 0.002
ETPATH	< 0.0006	< 0.0006	< 0.0006	< 0.0006
ETTRITH	< 0.0006	< 0.0006	< 0.0006	< 0.0006
ETHION	< 0.0005	< 0.0005	< 0.0005	< 0.0005
MALATH	< 0.001	< 0.0011	< 0.001	< 0.0011
METPATH	< 0.0011	< 0.0012	< 0.0011	< 0.0012
a-CHLRDN	0.000006 J	0.00002 J	0.00002 BJ	0.00002 J
g-CHLRDN	< 0.00005	0.00002 J	< 0.00005	0.00002 J

Notes :

J - Estimated value below the statistical limits.

< - Compound was analyzed for, but not detected. Detection limits are given after the < symbol.

B - Analyte is found in the associated blank as well as in the sample.

Appendix G
Figures 1 to 35

McComish Gorge, SWMU 04/02, NWSC Crane
Antimony (Sb) concentration in Soils

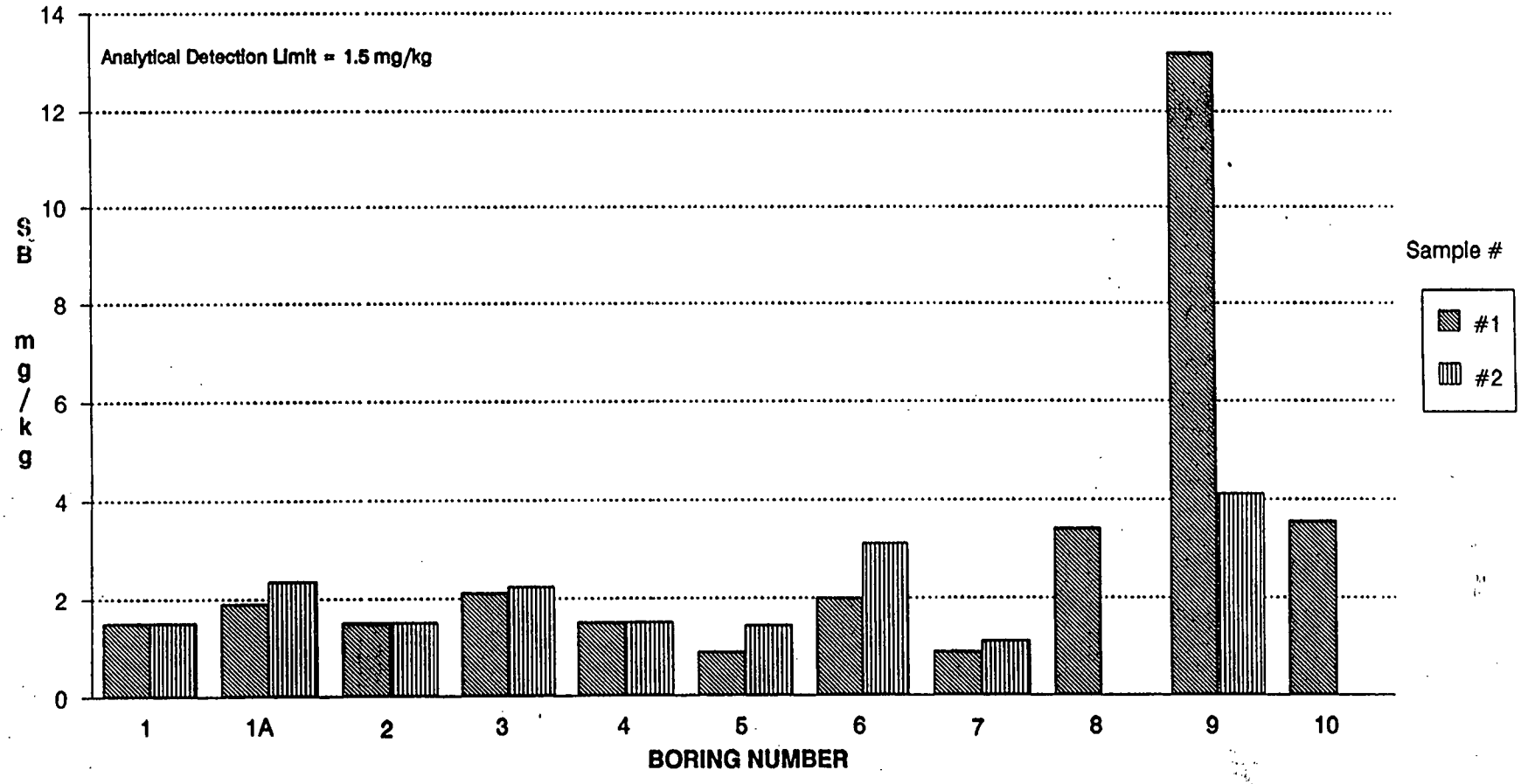


Figure 1

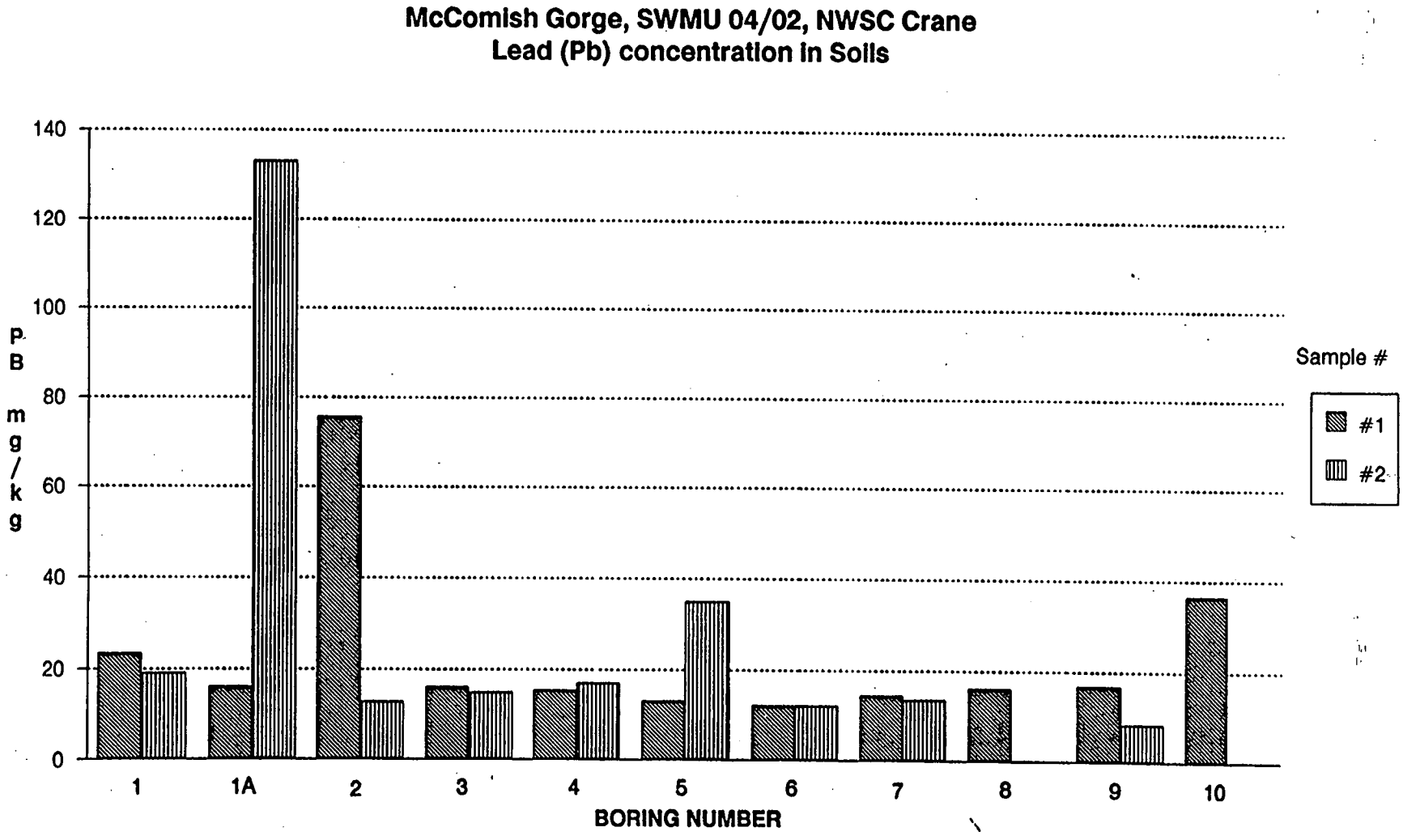

McComish Gorge, SWMU 04/02, NWSC Crane
Lead (Pb) concentration in Soils
140
120
100
80
60
40
20
0
PB mg/kg
1
1A
2
3
4
5
6
7
8
9
10
BORING NUMBER
Sample #
#1
#2

Figure 2

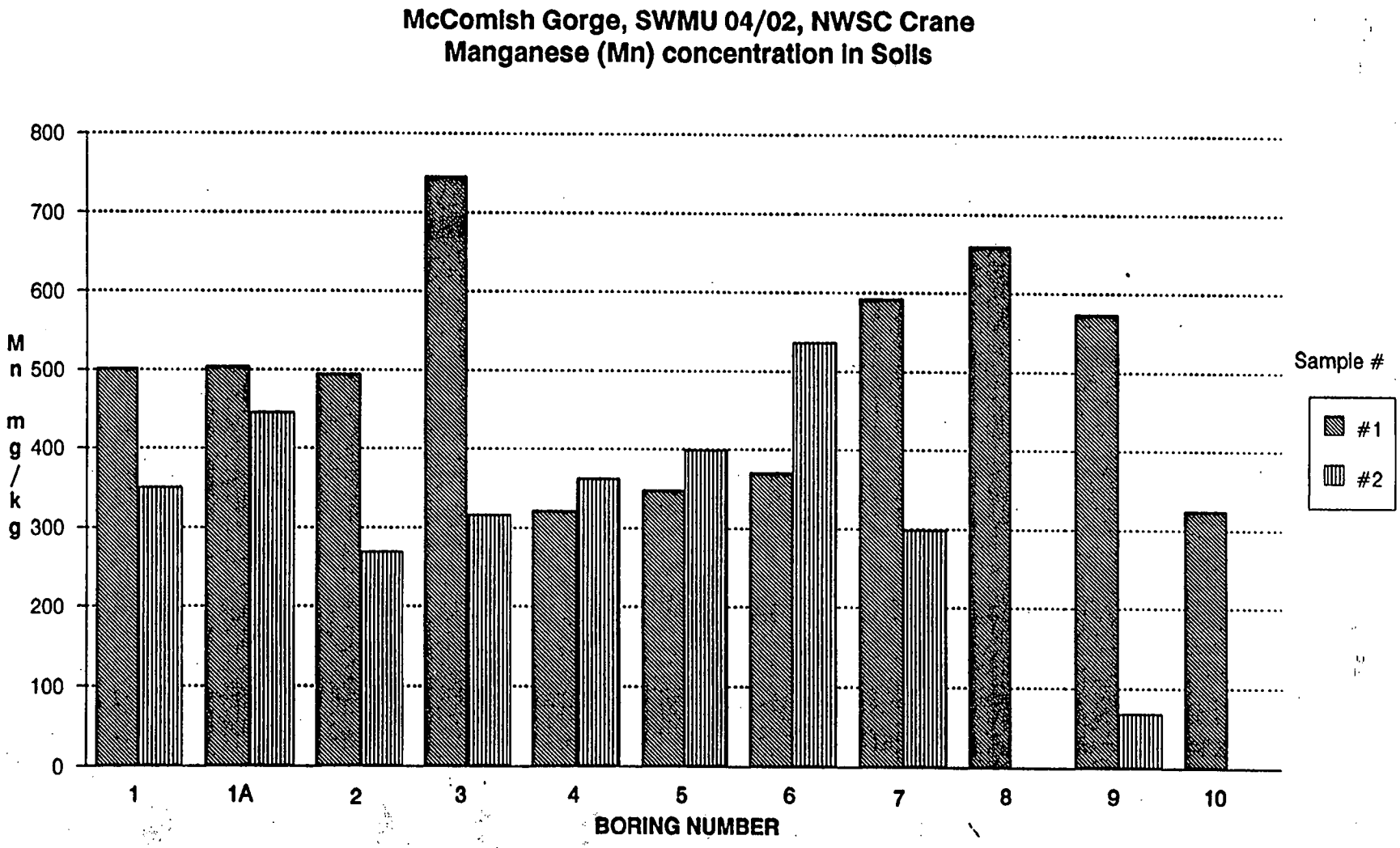

McComish Gorge, SWMU 04/02, NWSC Crane
Manganese (Mn) concentration in Soils
800
700
600
500
400
300
200
100
0
Mn mg/kg
1
1A
2
3
4
5
6
7
8
9
10
BORING NUMBER
Sample #
#1
#2

Figure 3

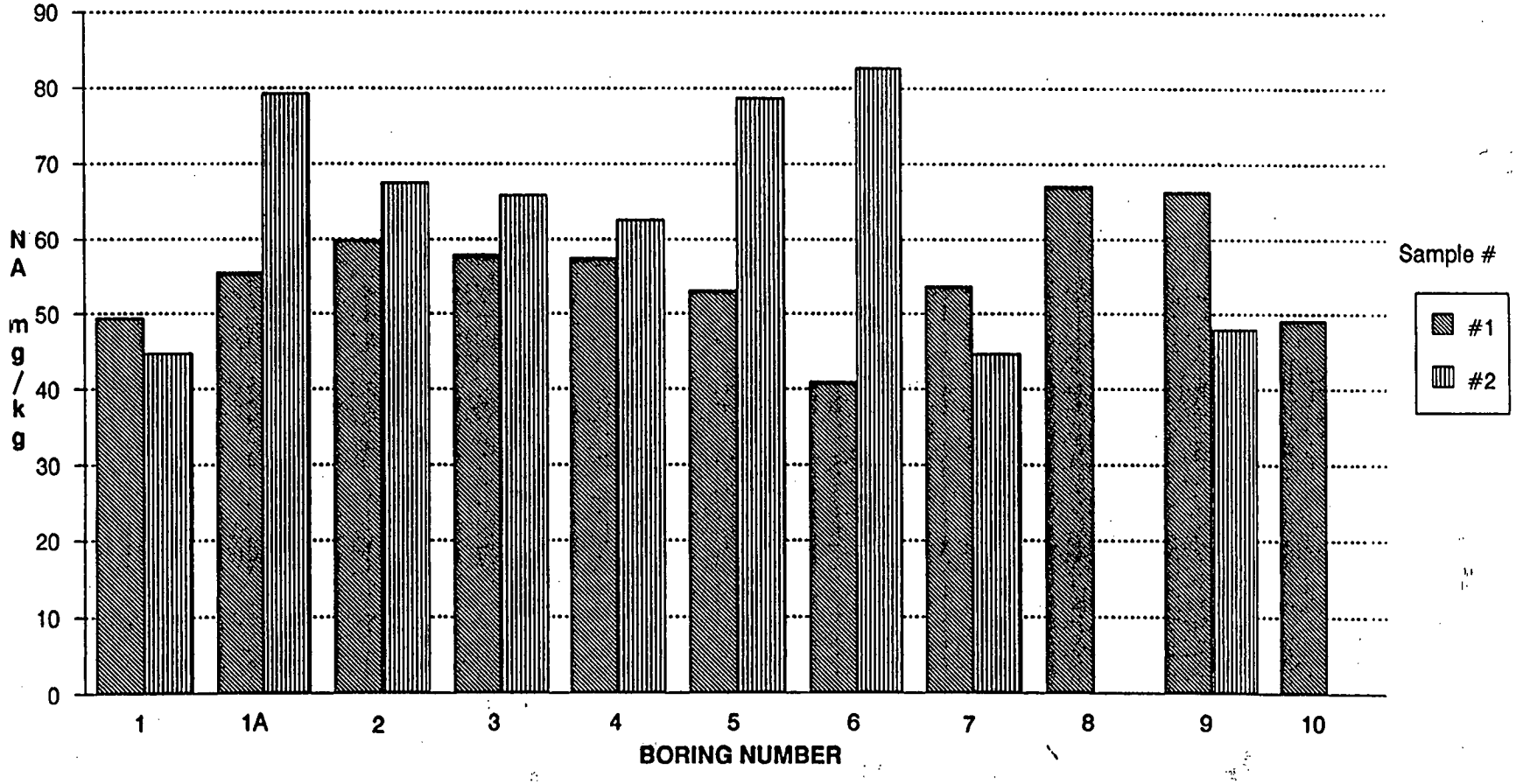

McComish Gorge, SWMU 04/02, NWSC Crane
Sodium (Na) concentration in Soils
NA mg/kg
90
80
70
60
50
40
30
20
10
0
1
1A
2
3
4
5
6
7
8
9
10
BORING NUMBER
Sample #
#1
#2

Figure 4

McComish Gorge, SWMU 04/02, NWSC Crane
Selenium (Se) concentration in Soils

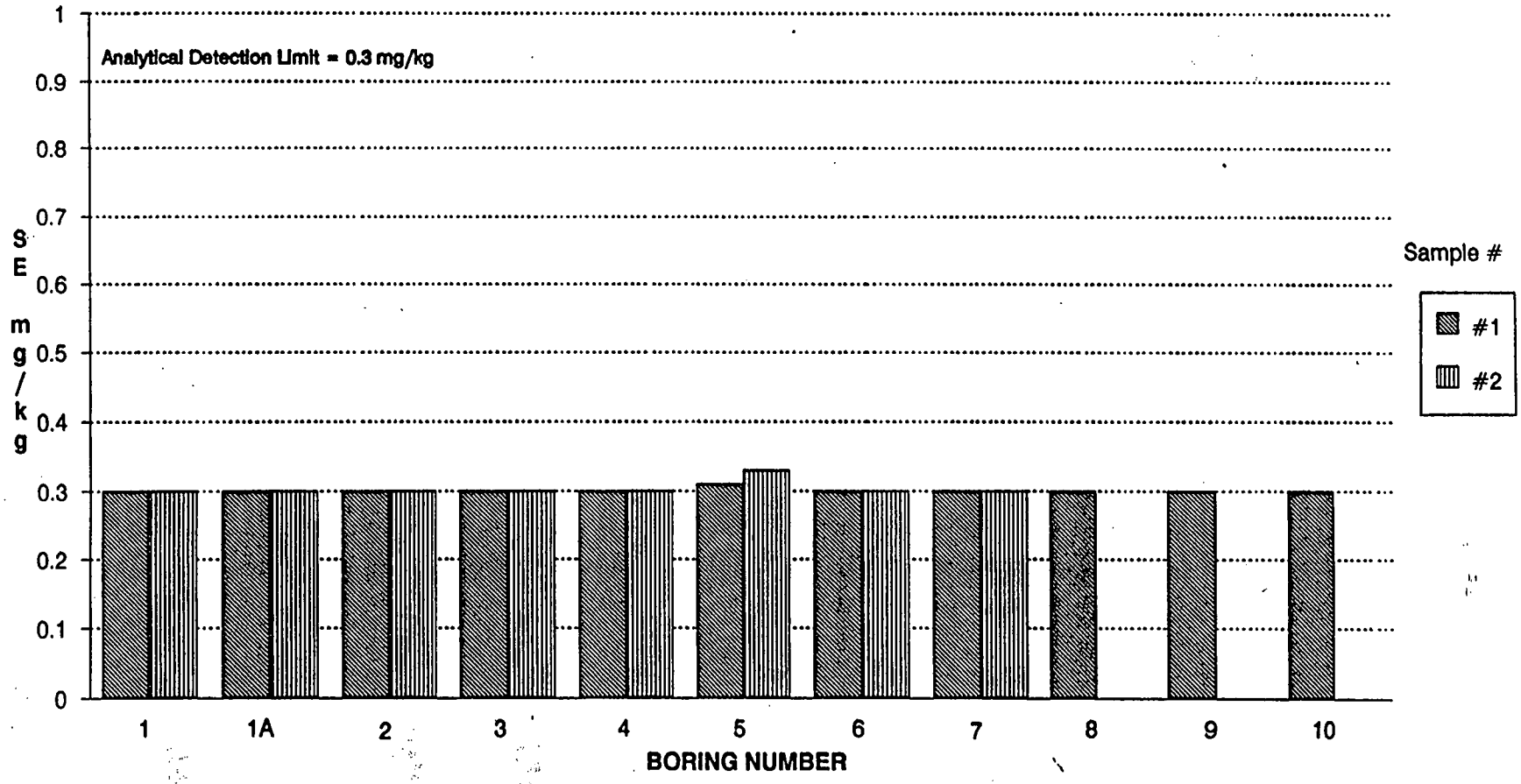


Figure 5

McComish Gorge, SWMU 04/02, NWSC Crane
Thallium (Tl) concentration in Soils

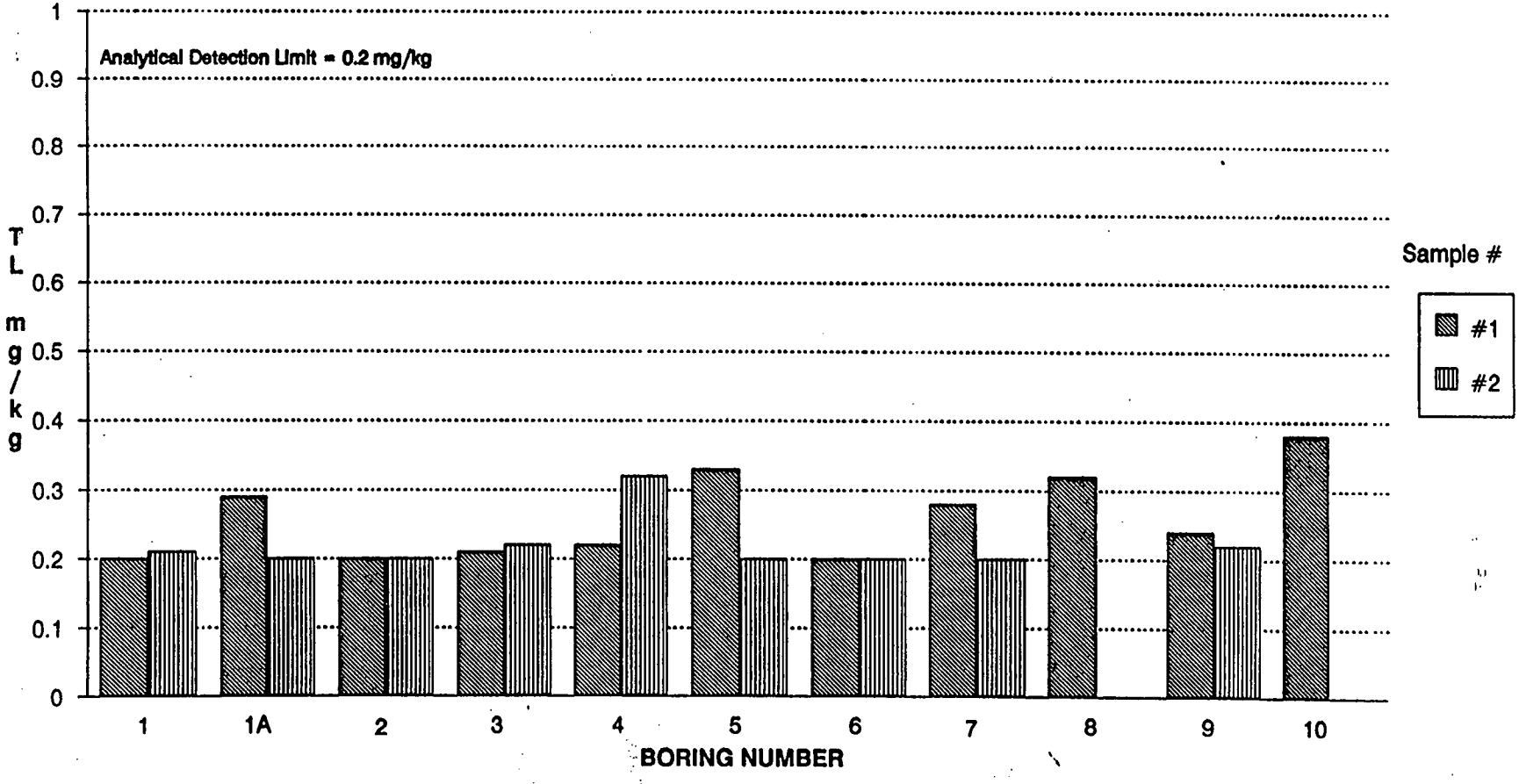


Figure 6

McComish Gorge, SWMU 04/02, NWSC Crane
Total Phosphorous (Tp) concentration in Soils

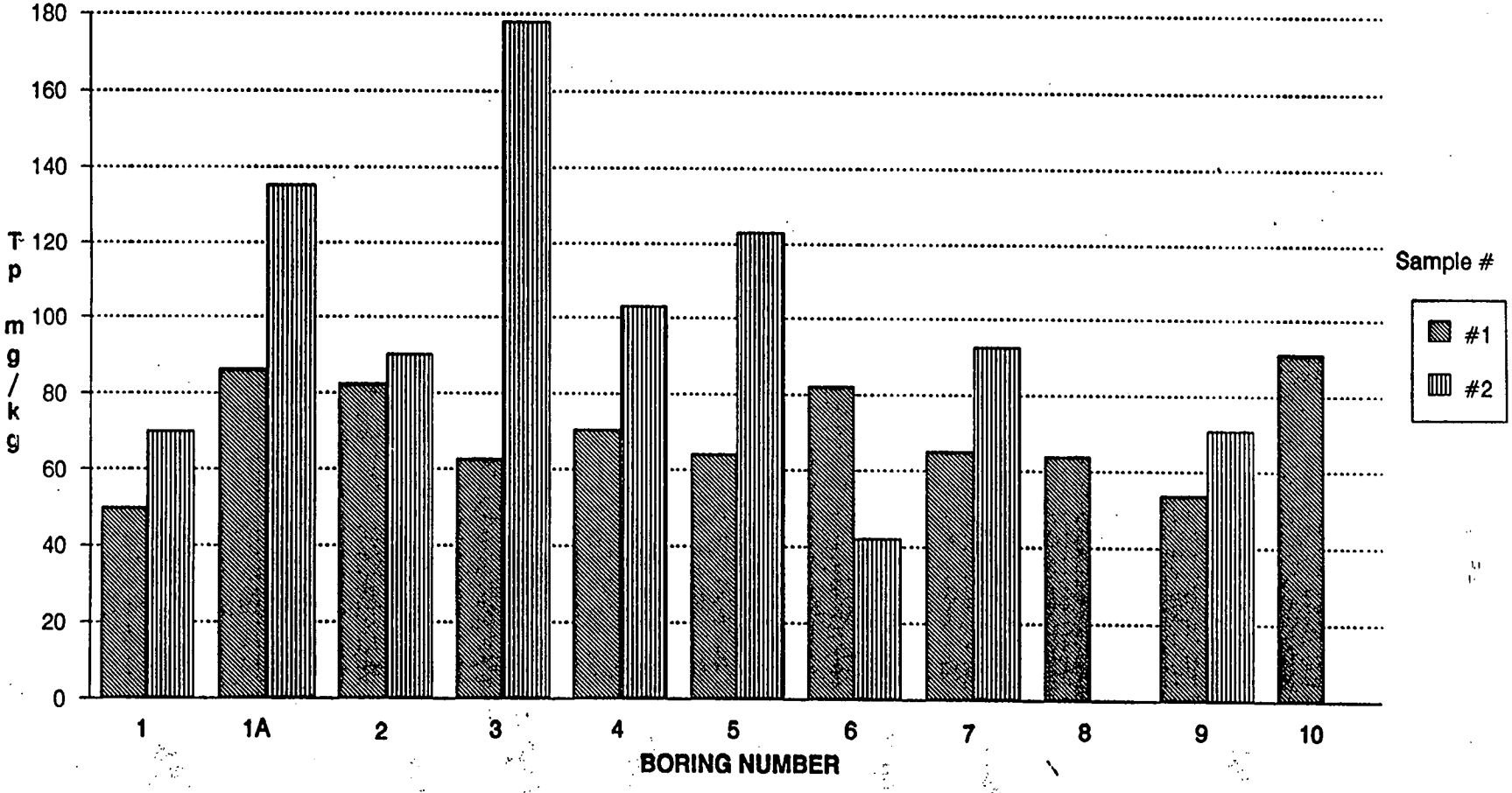
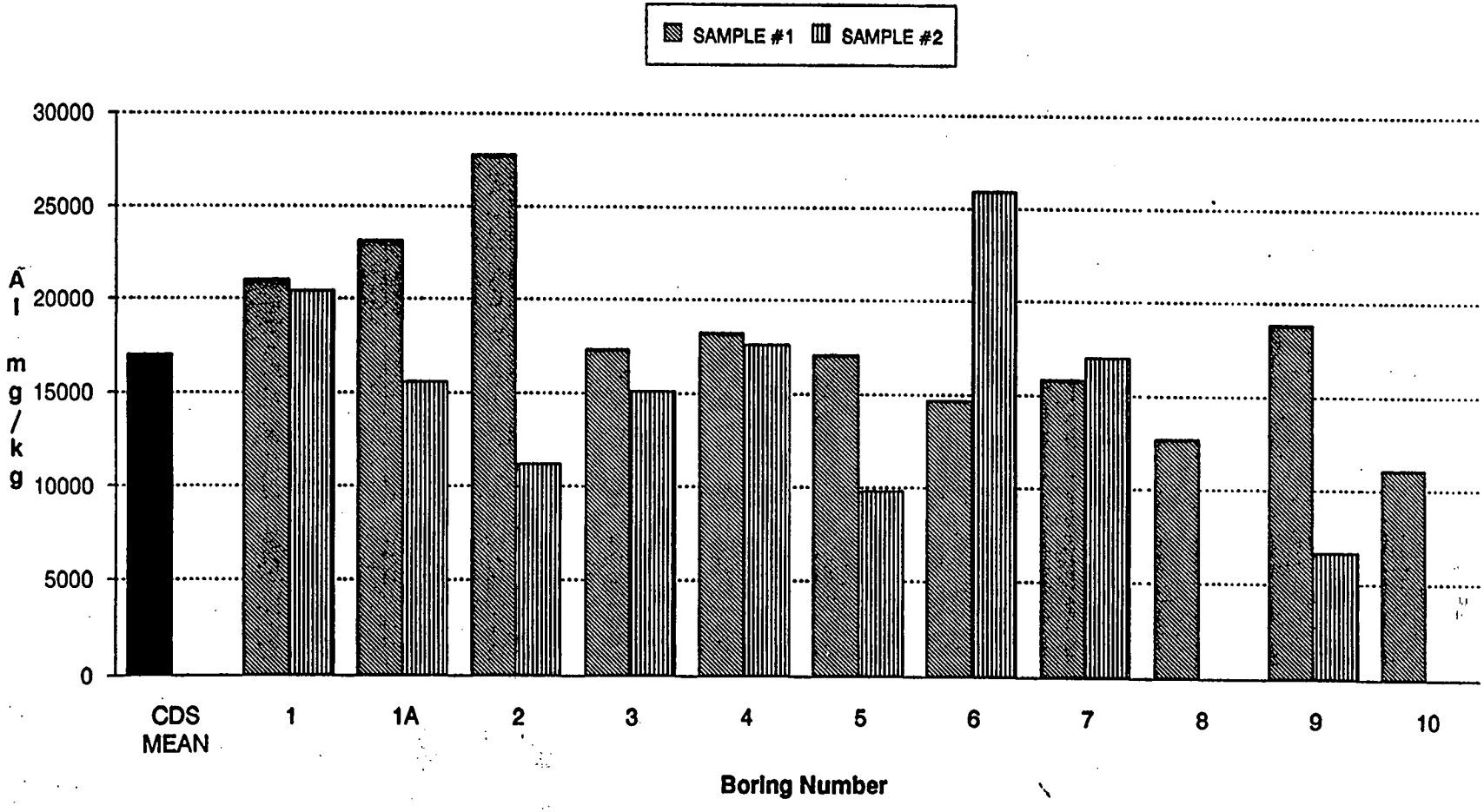


Figure 7

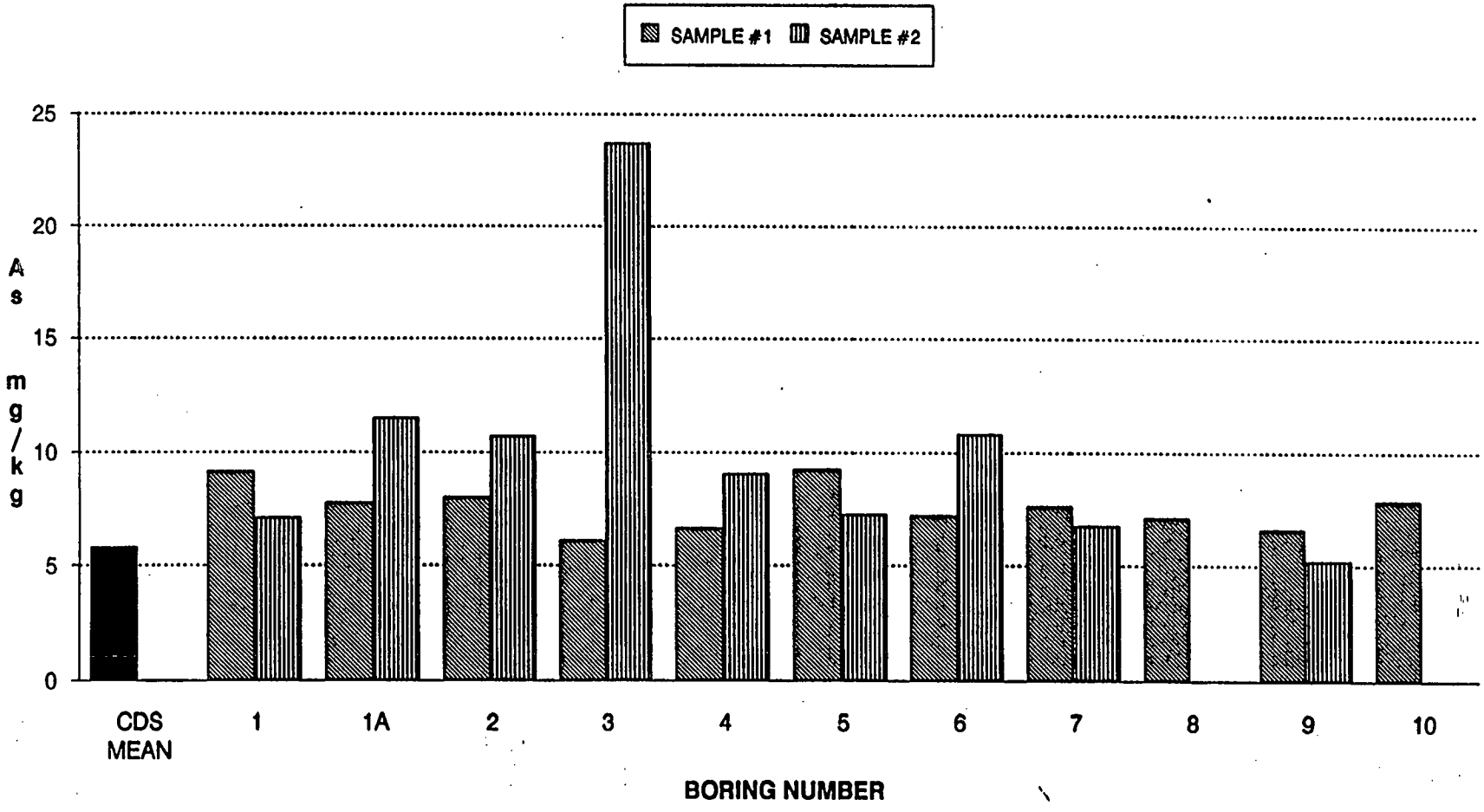
McComish Gorge, SWMU 04/02, NWSC Crane
Aluminum (Al) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 8

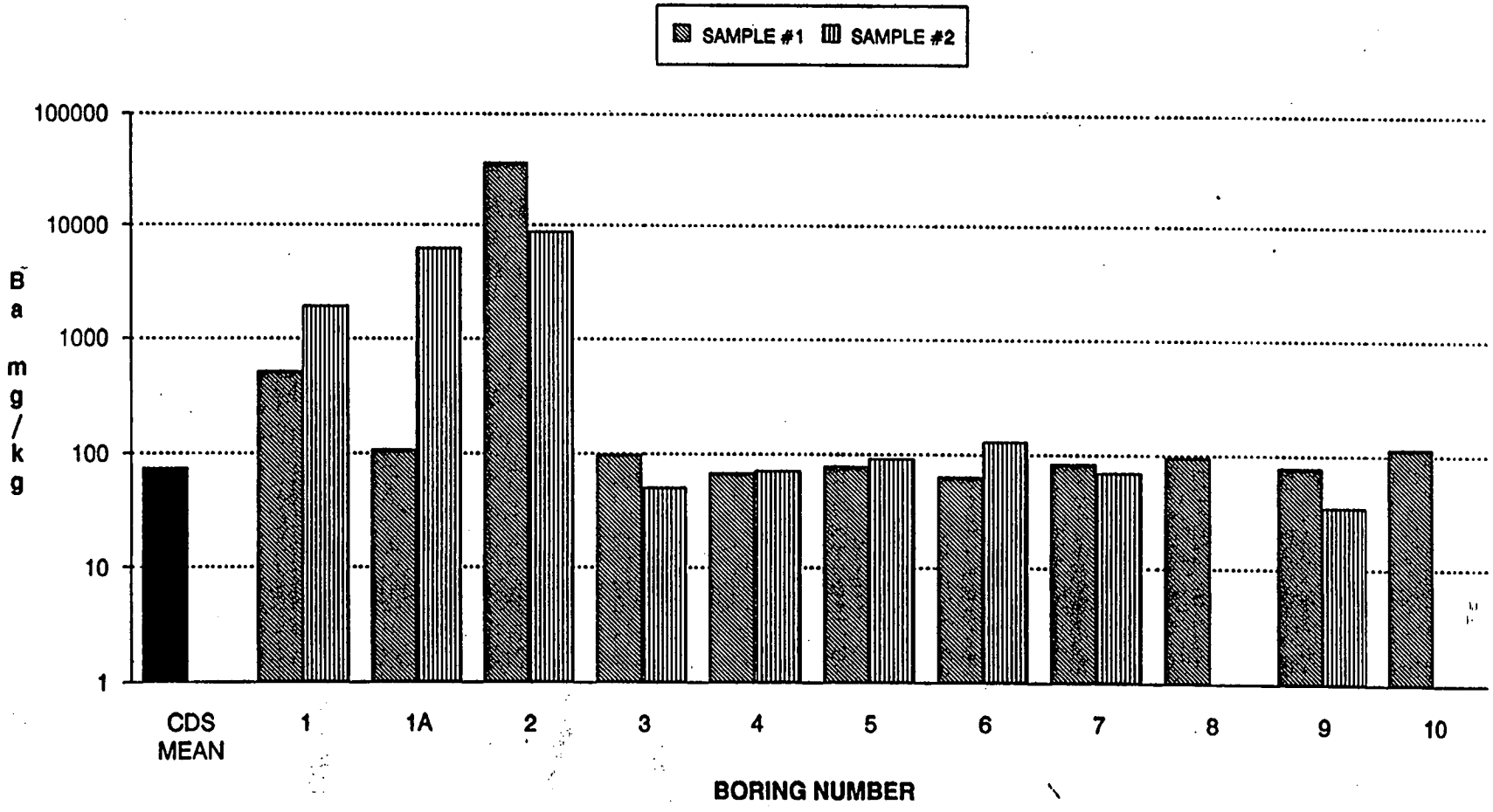
McComish Gorge, SWMU 04/02, NWSC Crane
Arsenic (As) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 9

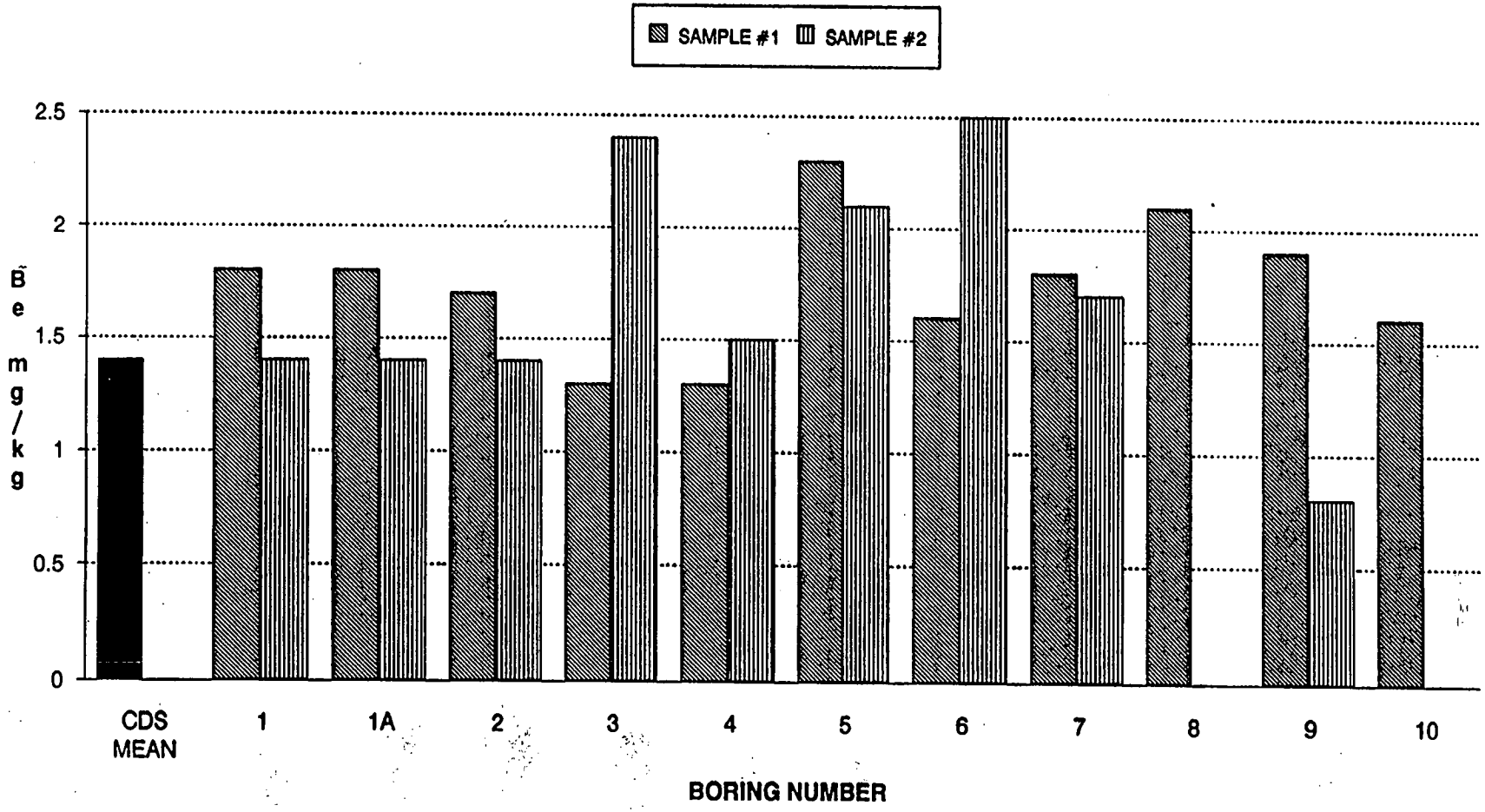
McComish Gorge, SWMU 04/02, NWSC Crane
Barium (Ba) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 10

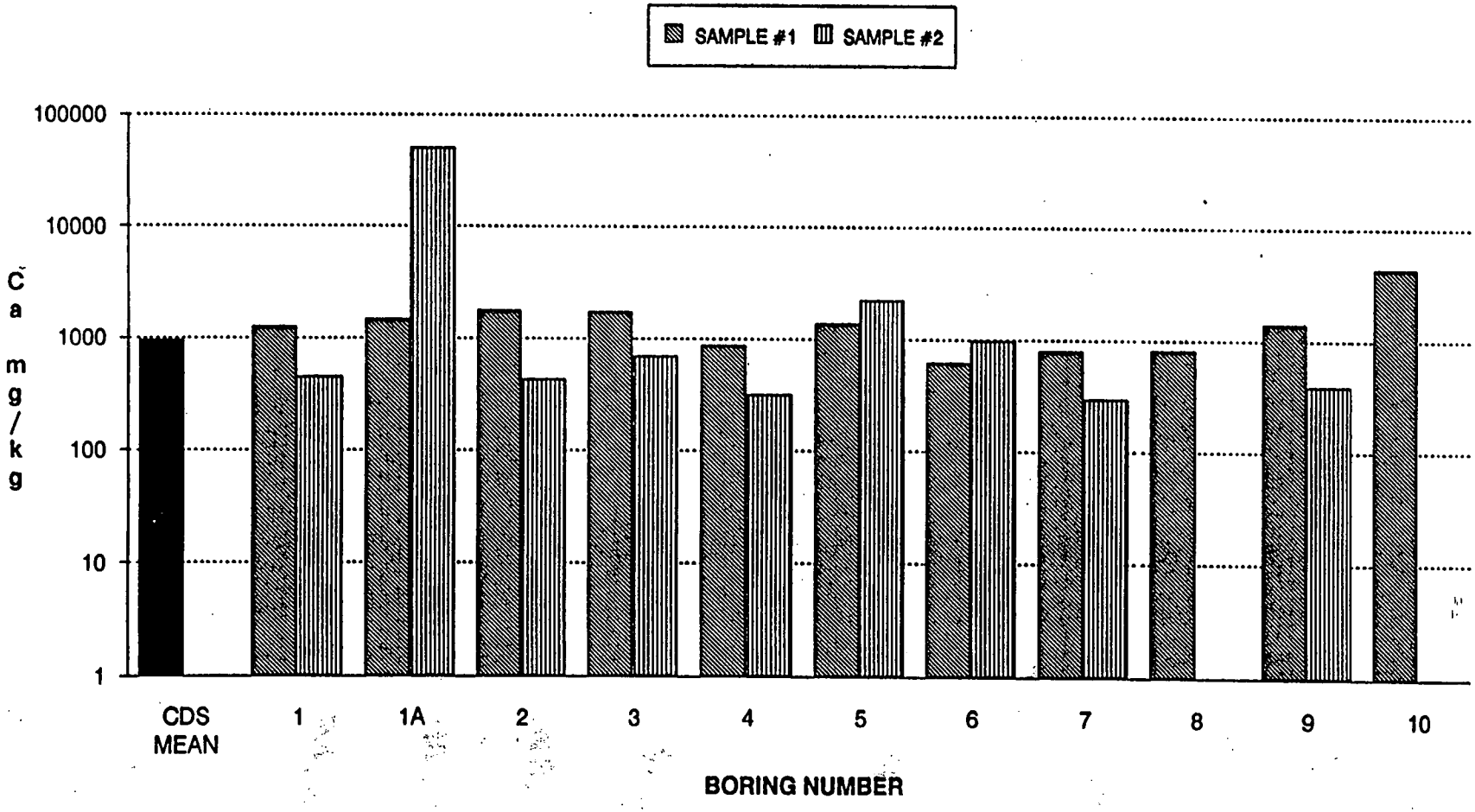
McComish Gorge, SWMU 04/02, NWSC Crane
Berillium (Be) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 11

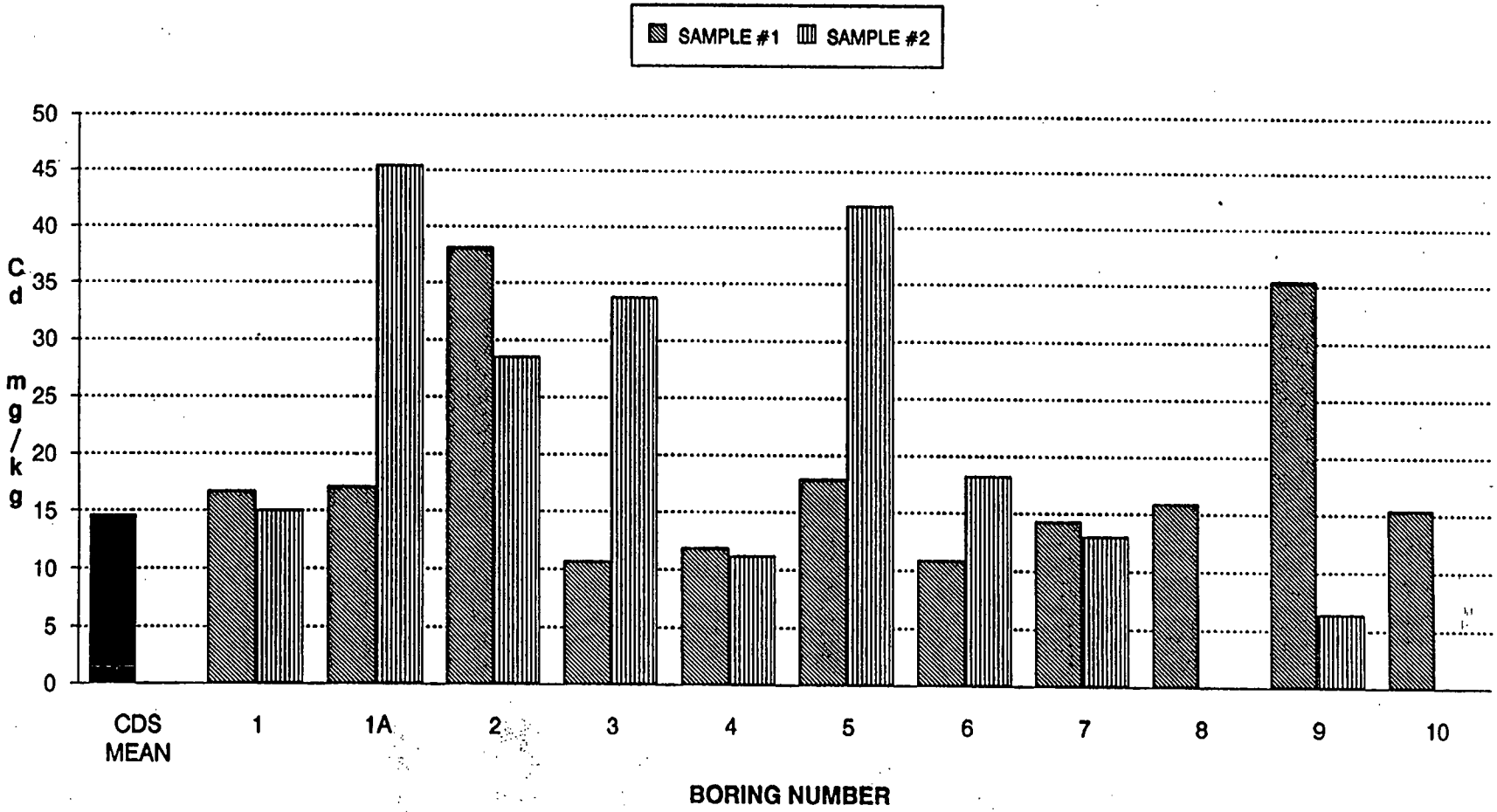
McComish Gorge, SWMU 04/02, NWSC Crane
Calcium (Ca) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 12

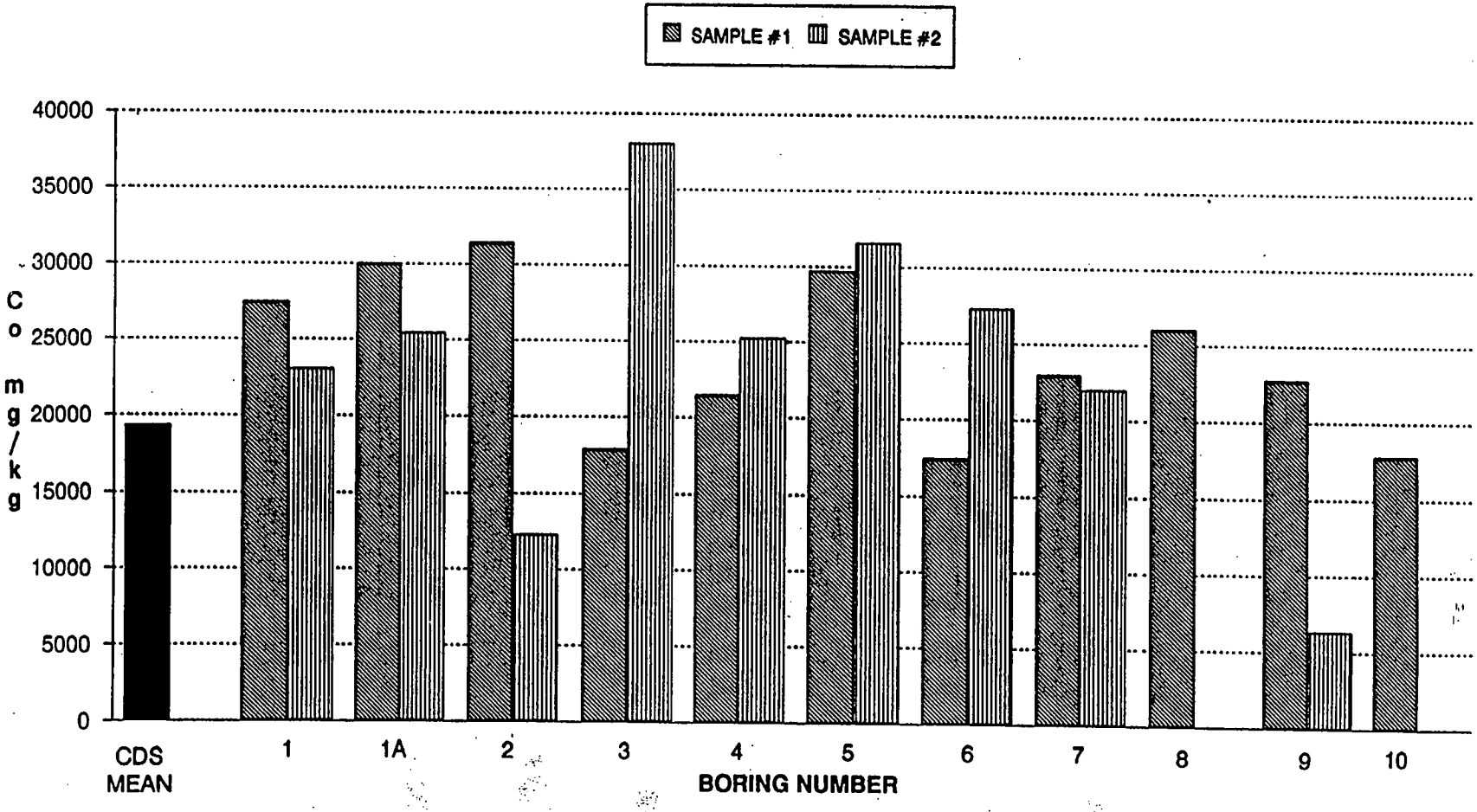
McComish Gorge, SWMU 04/02, NWSC Crane
Cadmium (Cd) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 13

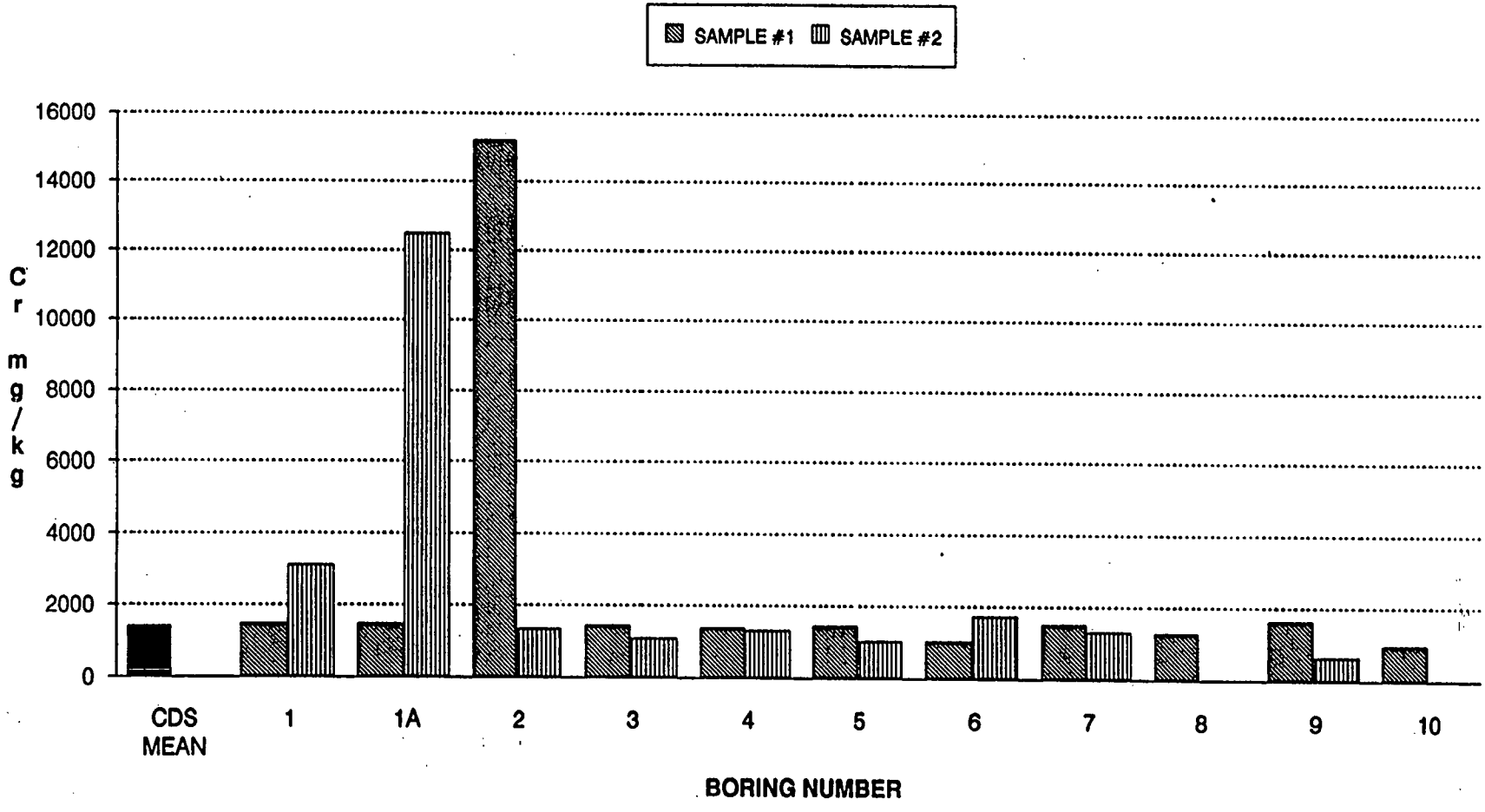
McComish Gorge, SWMU 04/02, NWSC Crane
Cobalt (Co) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 14

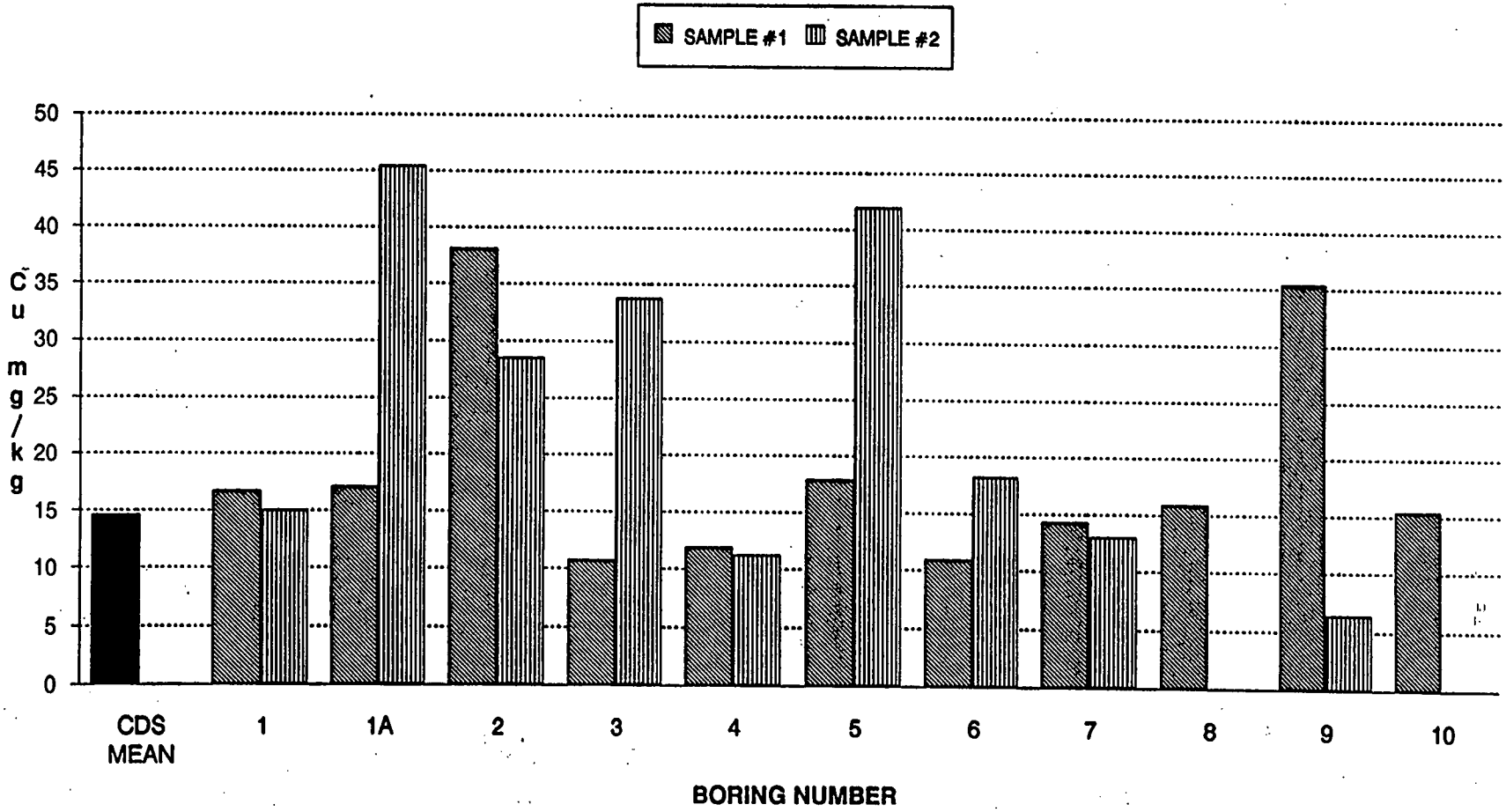
McComish Gorge, SWMU 04/02, NWSC Crane
Chromium (Cr) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 15

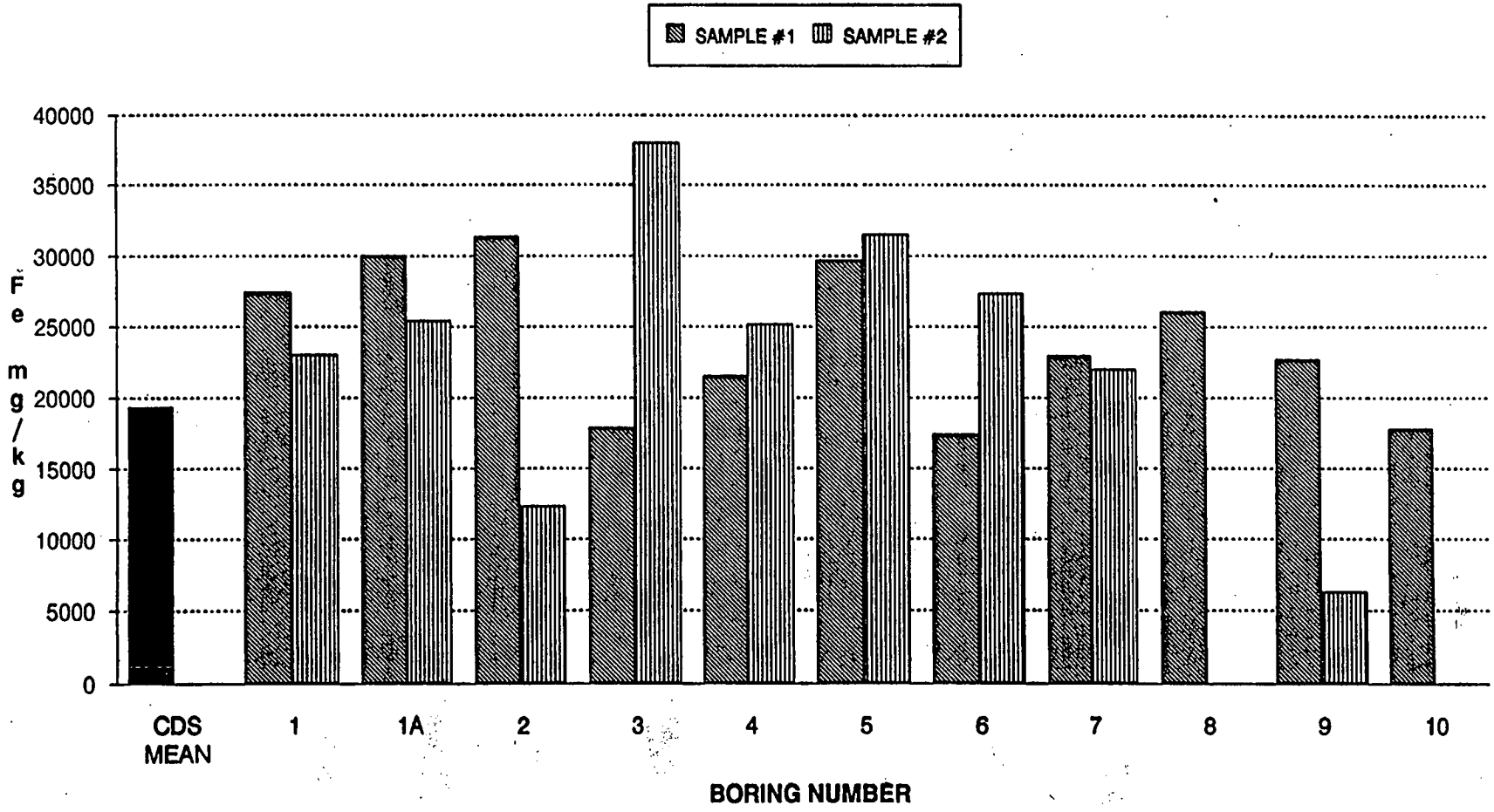
McComish Gorge, SWMU 04/02, NWSC Crane
Copper (Cu) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 16

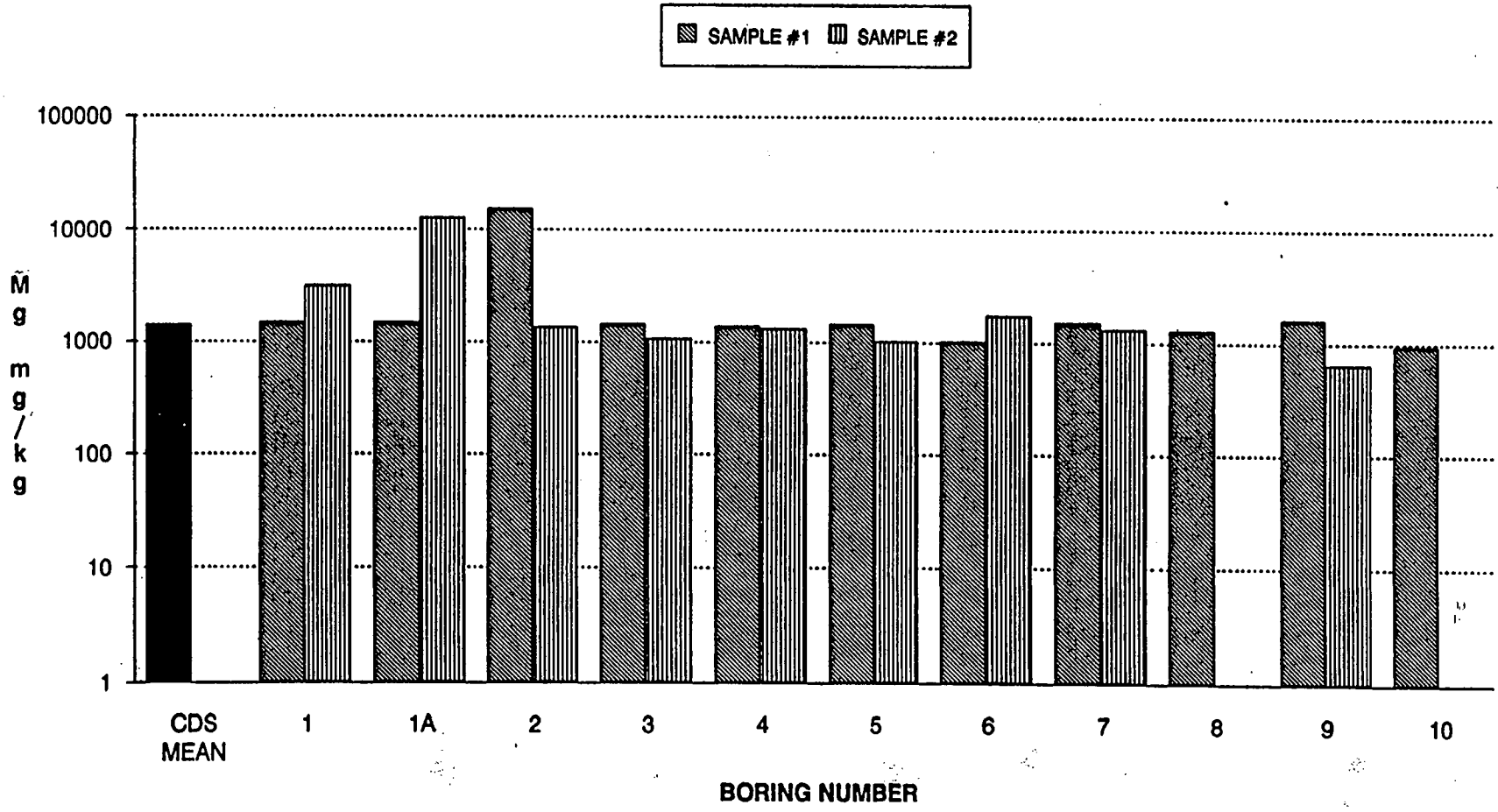
McComish Gorge, SWMU 04/02, NWSC Crane
Iron (Fe) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 17

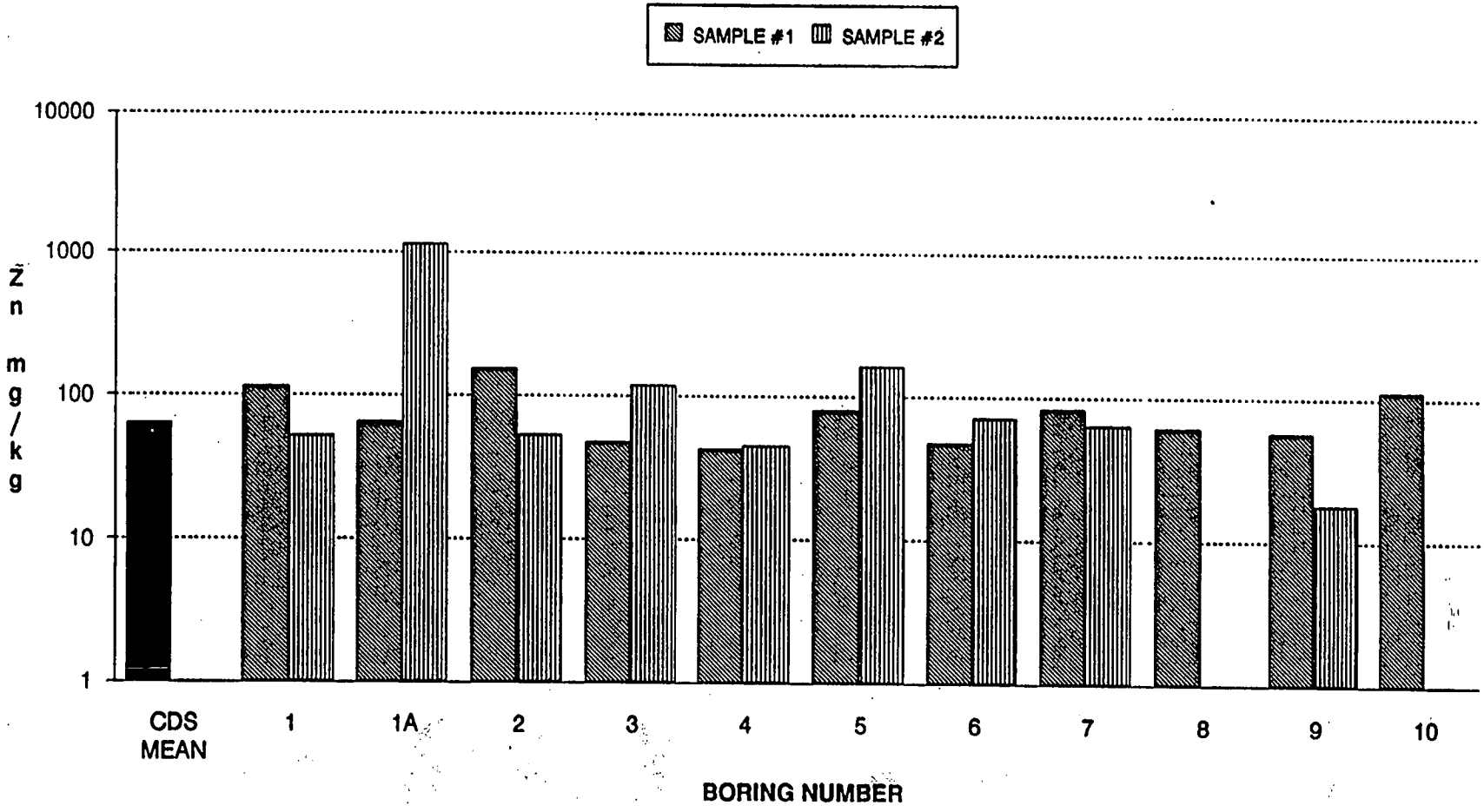
McComish Gorge, SWMU 04/02, NWSC Crane
Magnesium (Mg) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 18

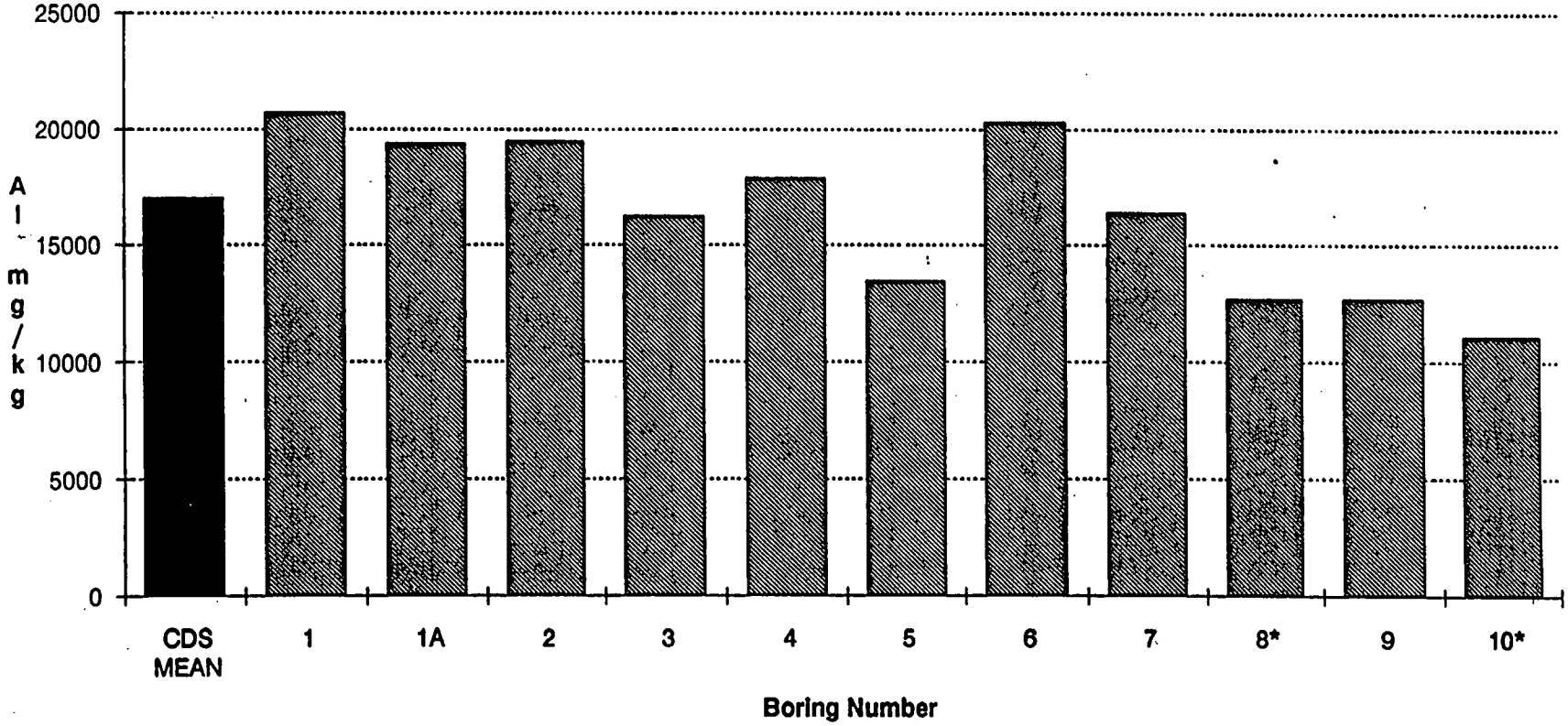
McComish Gorge, SWMU 04/02, NWSC Crane
Zinc (Zn) concentration in Soils



CDS Mean - Mean of the control data set (Borings 1,2,3 OBP).

Figure 19

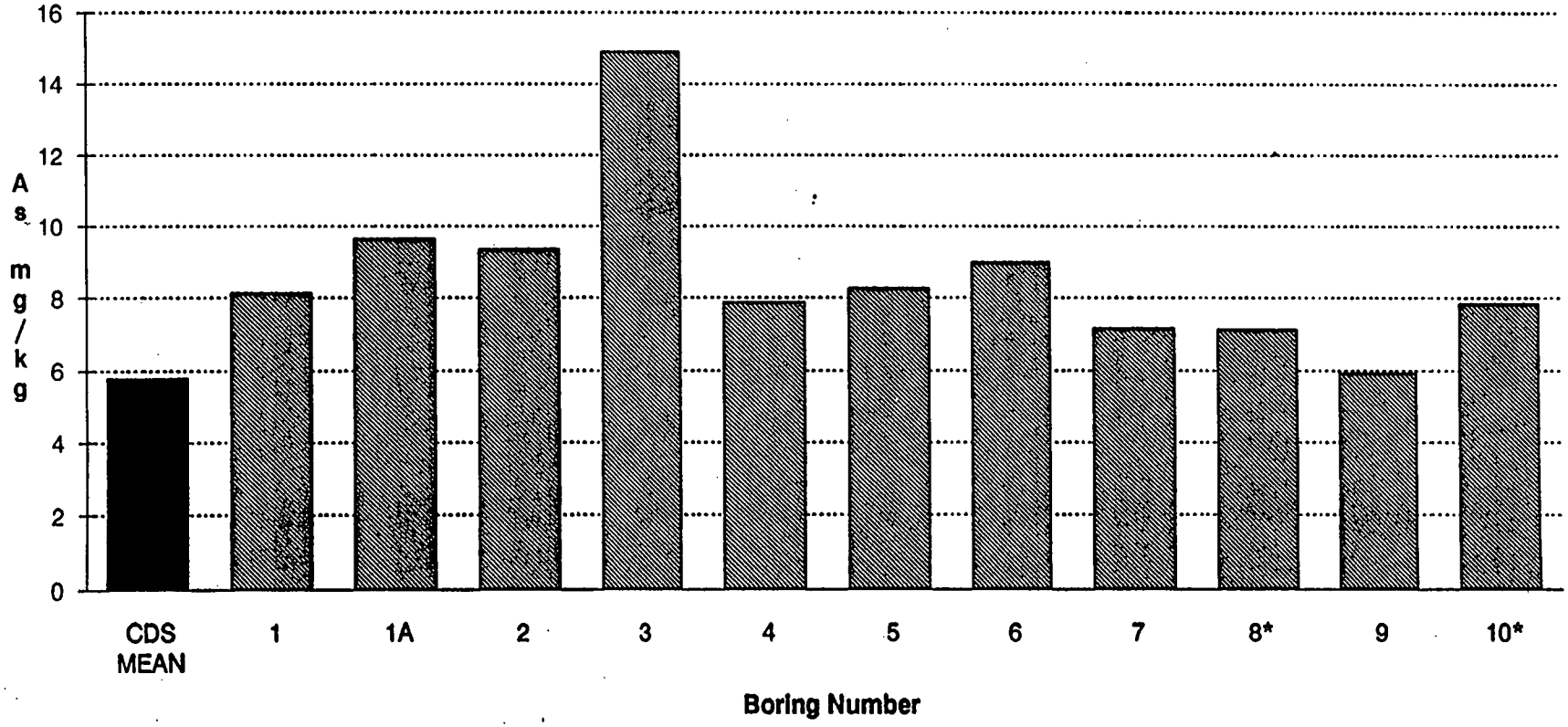
McComish Gorge, SWMU 04/02, NWSC Crane
Aluminum (Al) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 20

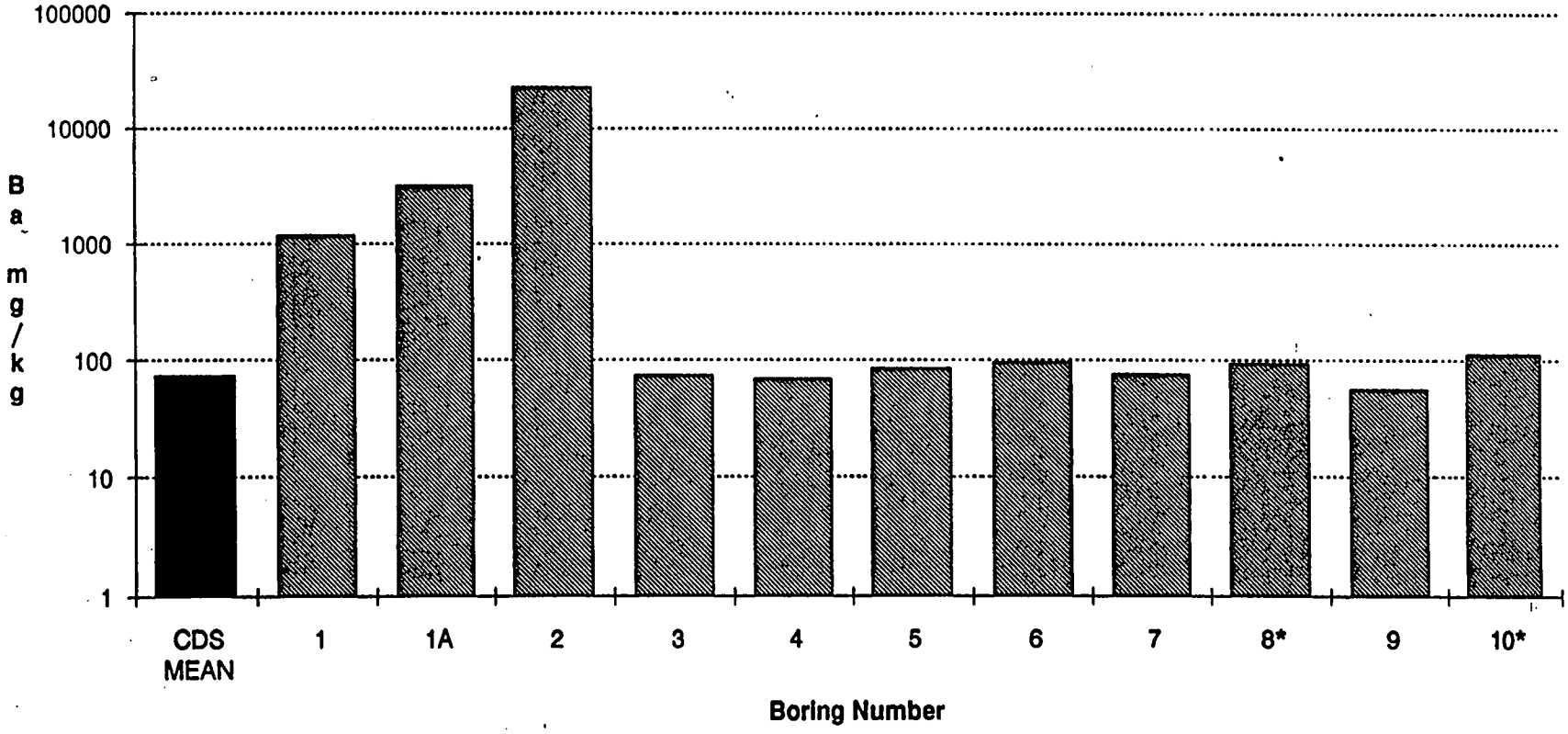
McComish Gorge, SWMU 04/02, NWSC Crane
Arsenic (As) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 21

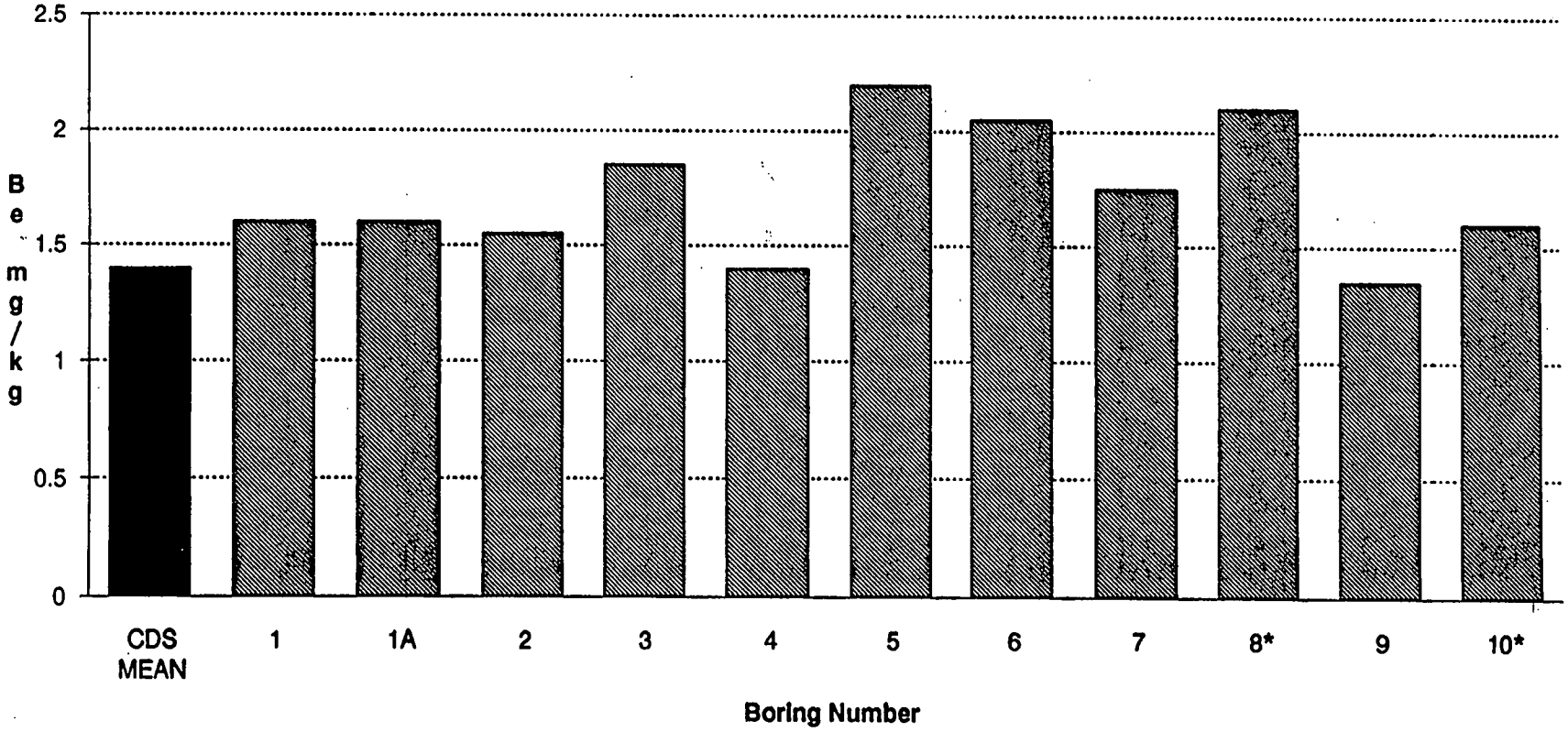
McComish Gorge, SWMU 04/02, NWSC Crane
Barium (Ba) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 22

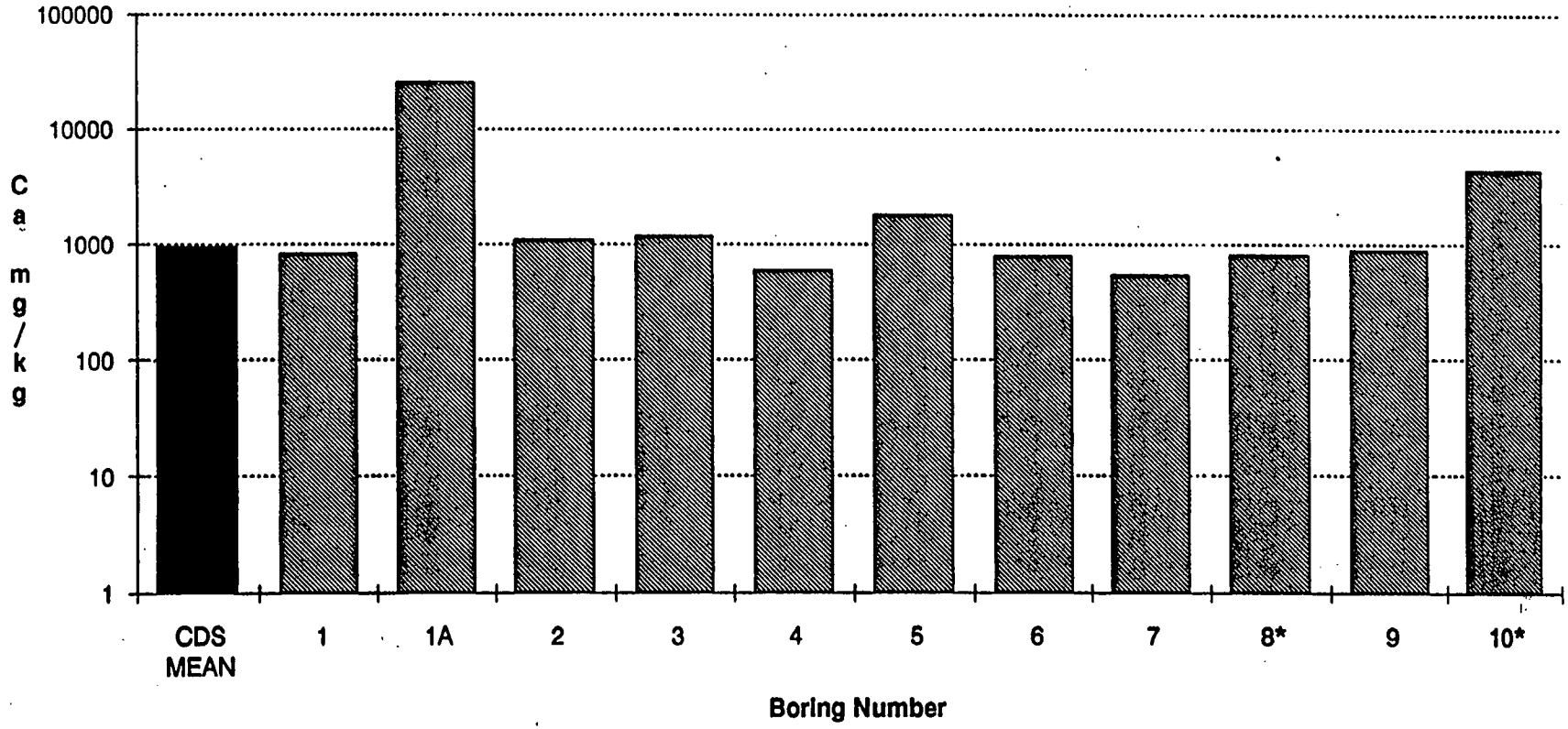
McComish Gorge, SWMU 04/02, NWSC Crane
Berillium (Be) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 23

McComish Gorge, SWMU 04/02, NWSC Crane
Calcium (Ca) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 24

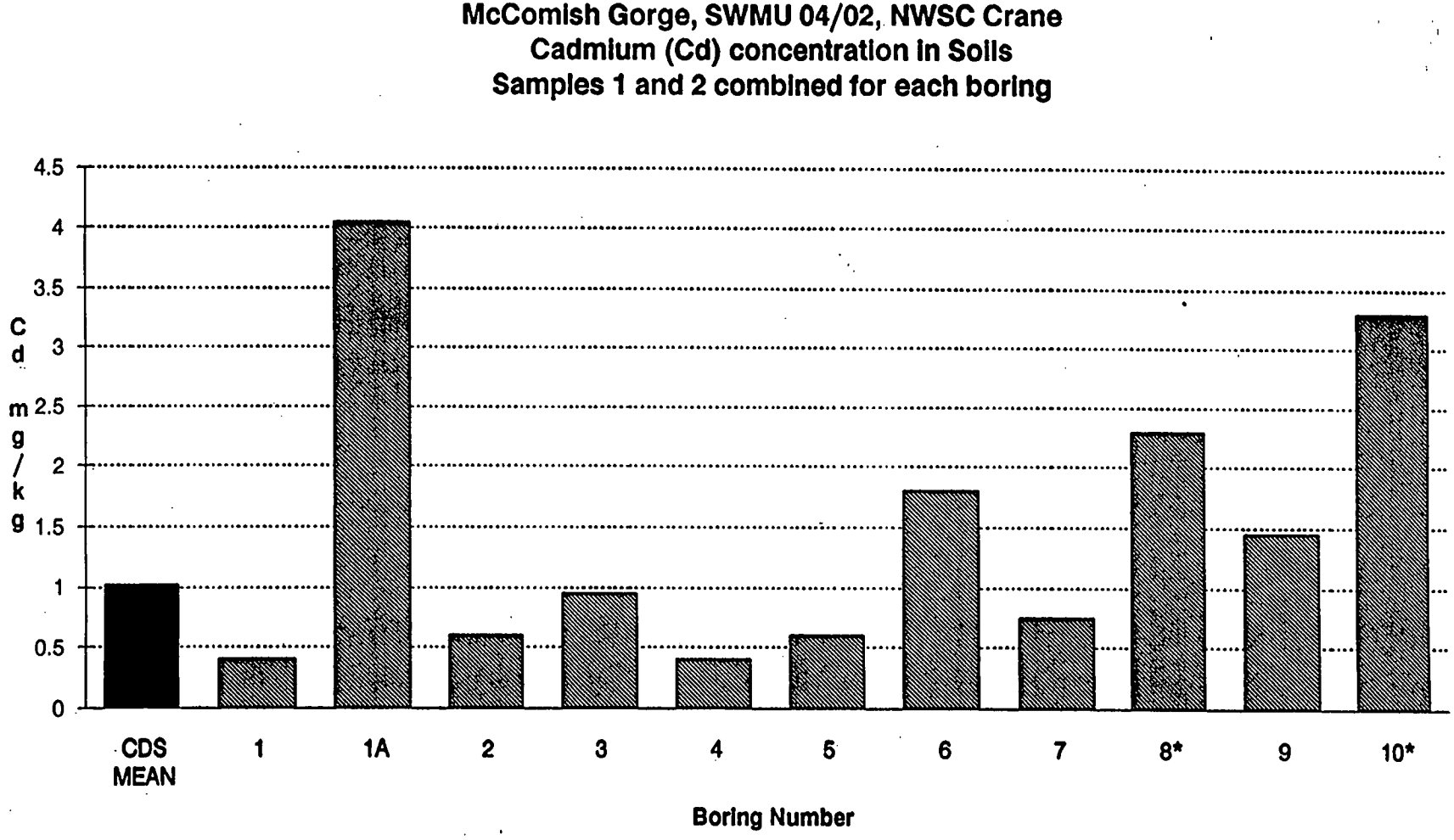
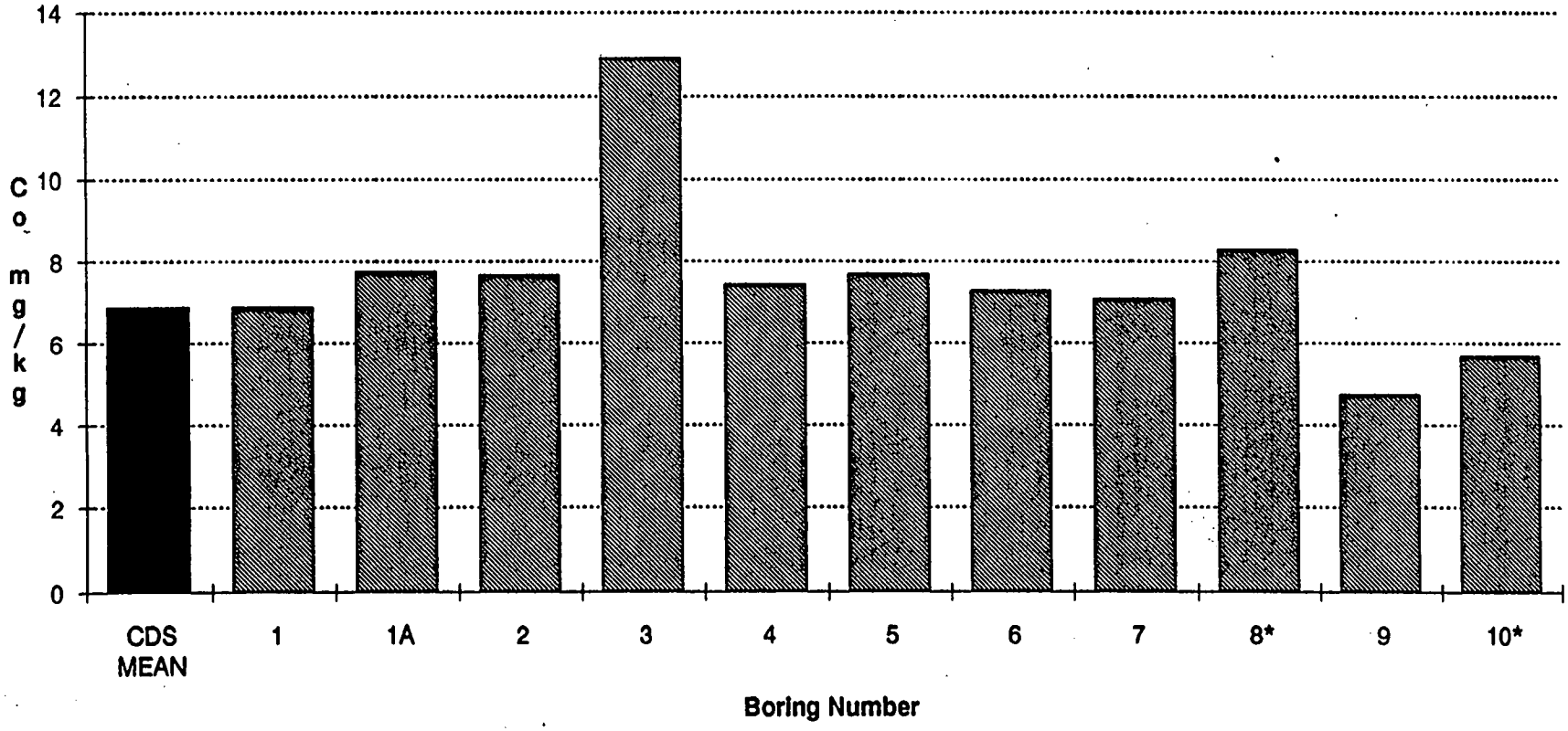

McComish Gorge, SWMU 04/02, NWSC Crane
Cadmium (Cd) concentration in Soils
Samples 1 and 2 combined for each boring
Cd mg/kg
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
CDS MEAN
1
1A
2
3
4
5
6
7
8*
9
10*
Boring Number
Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 25

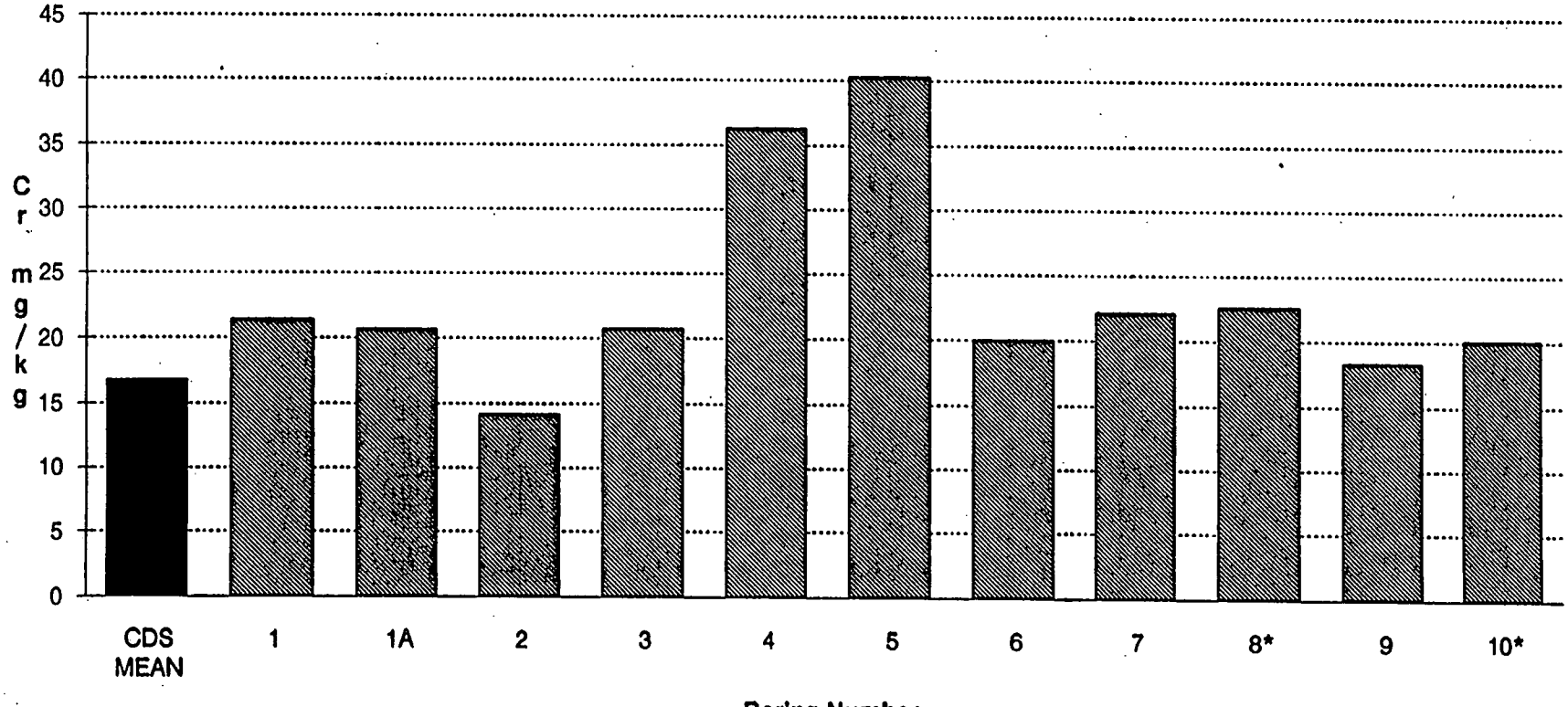
McComish Gorge, SWMU 04/02, NWSC Crane
Cobalt (Co) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 26

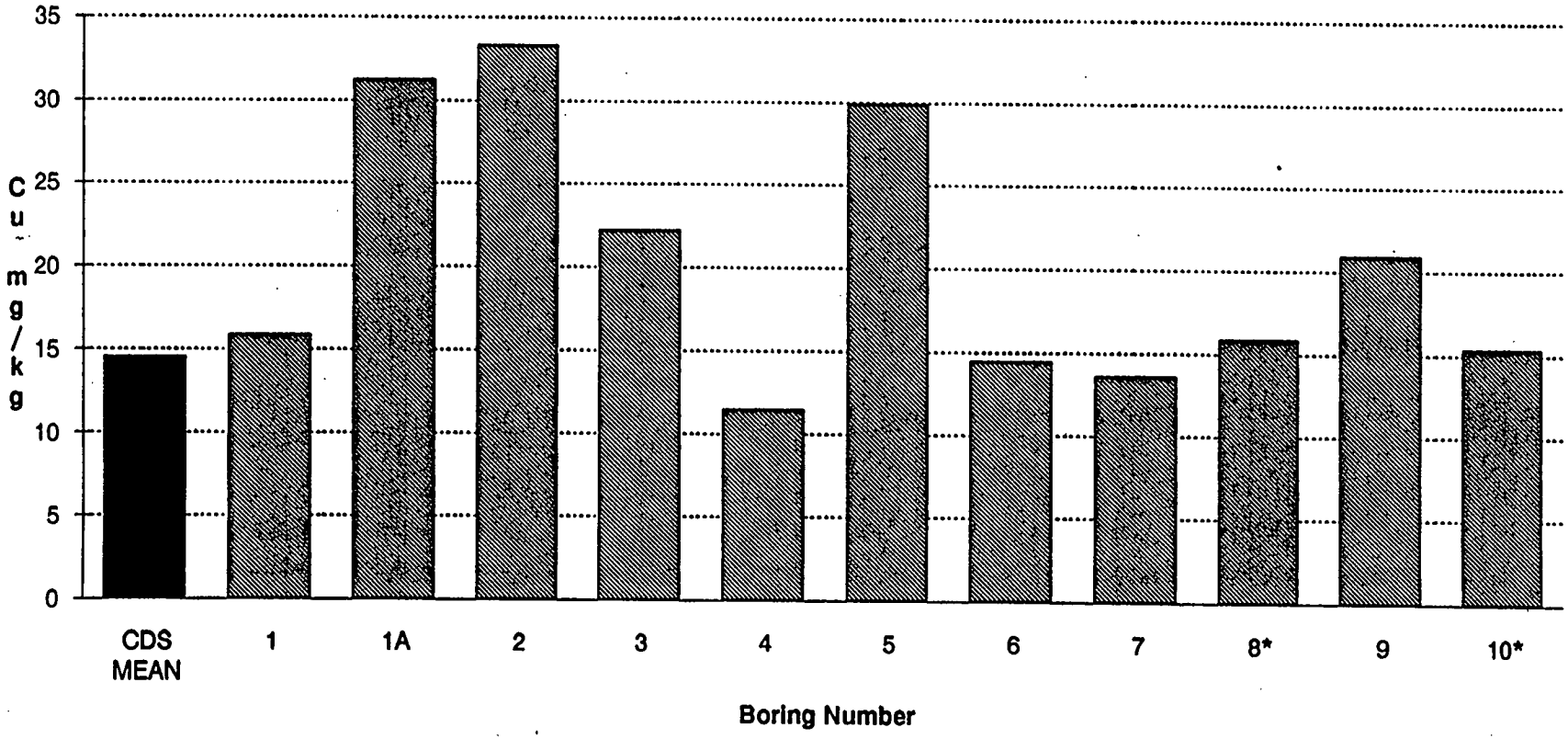
McComish Gorge, SWMU 04/02, NWSC Crane
Chromium (Cr) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 27

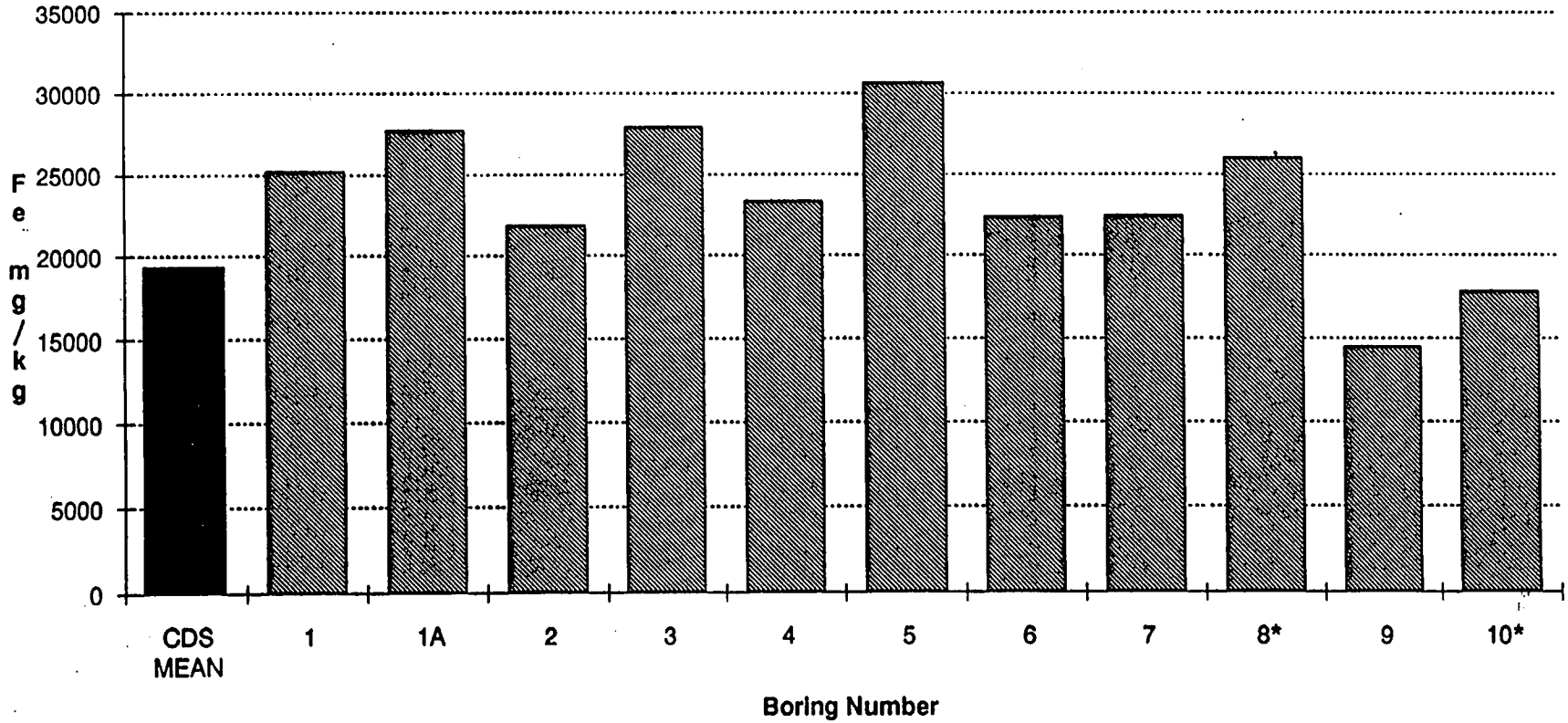
McComish Gorge, SWMU 04/02, NWSC Crane
Copper (Cu) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 28

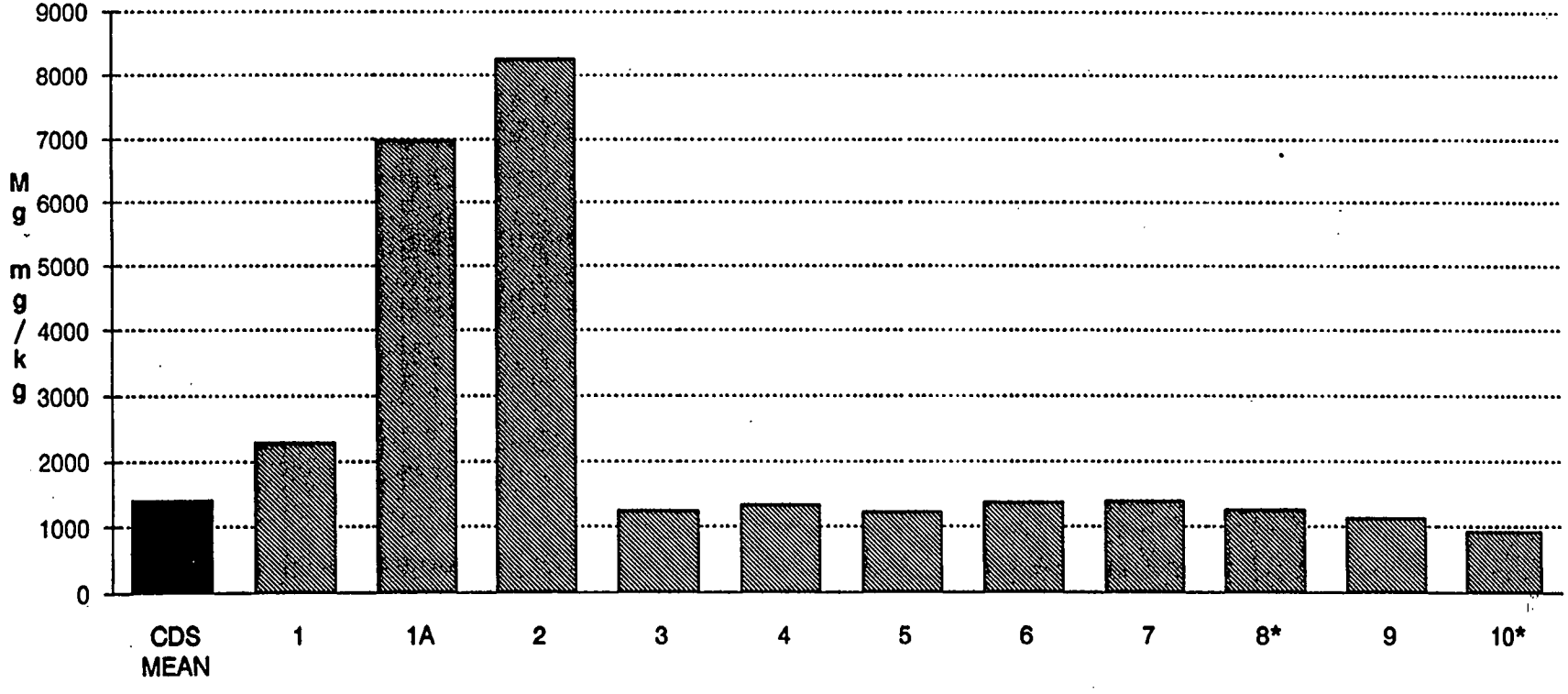
McComish Gorge, SWMU 04/02, NWSC Crane
Iron (Fe) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 29

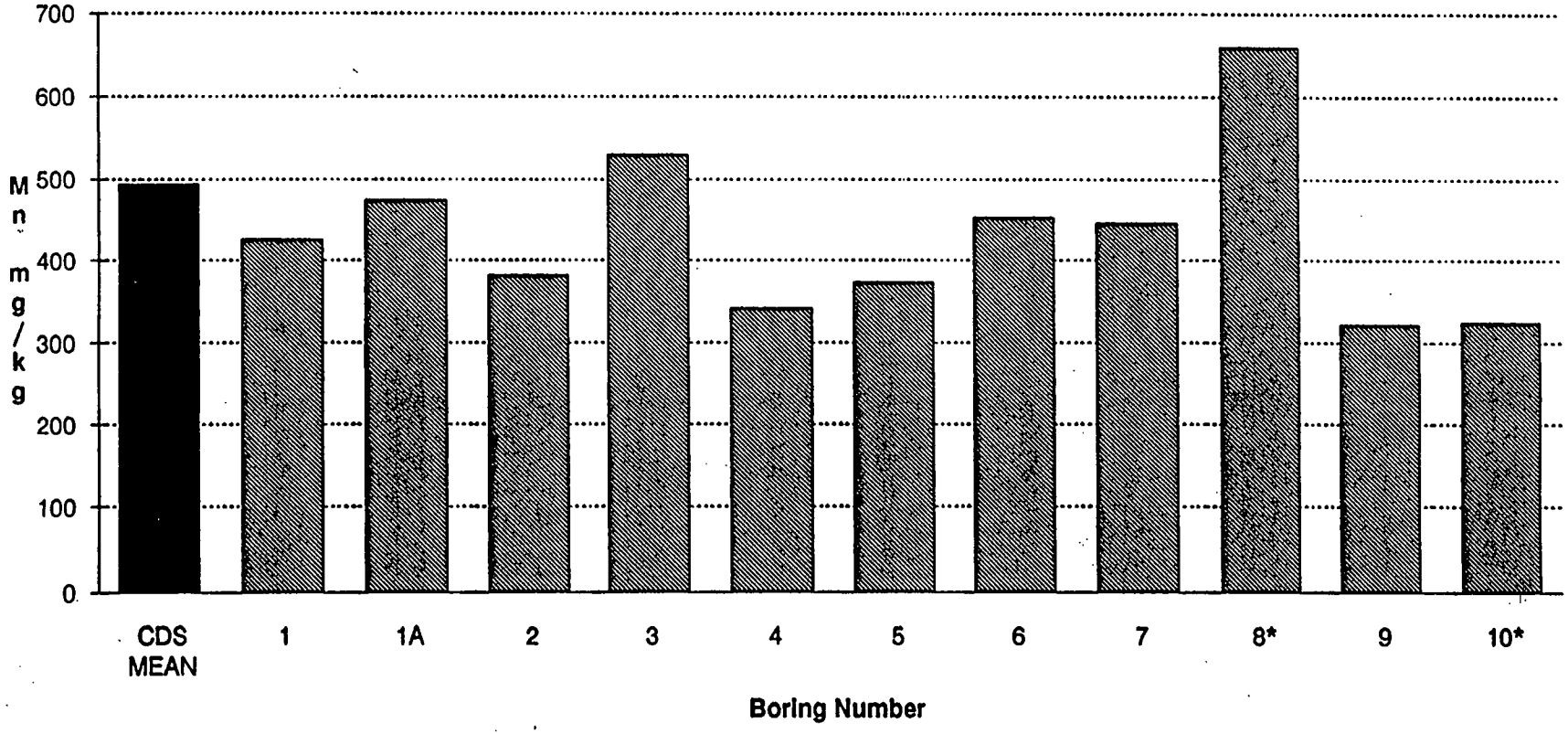
McComish Gorge, SWMU 04/02, NWSC Crane
Magnesium (Mg) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 30

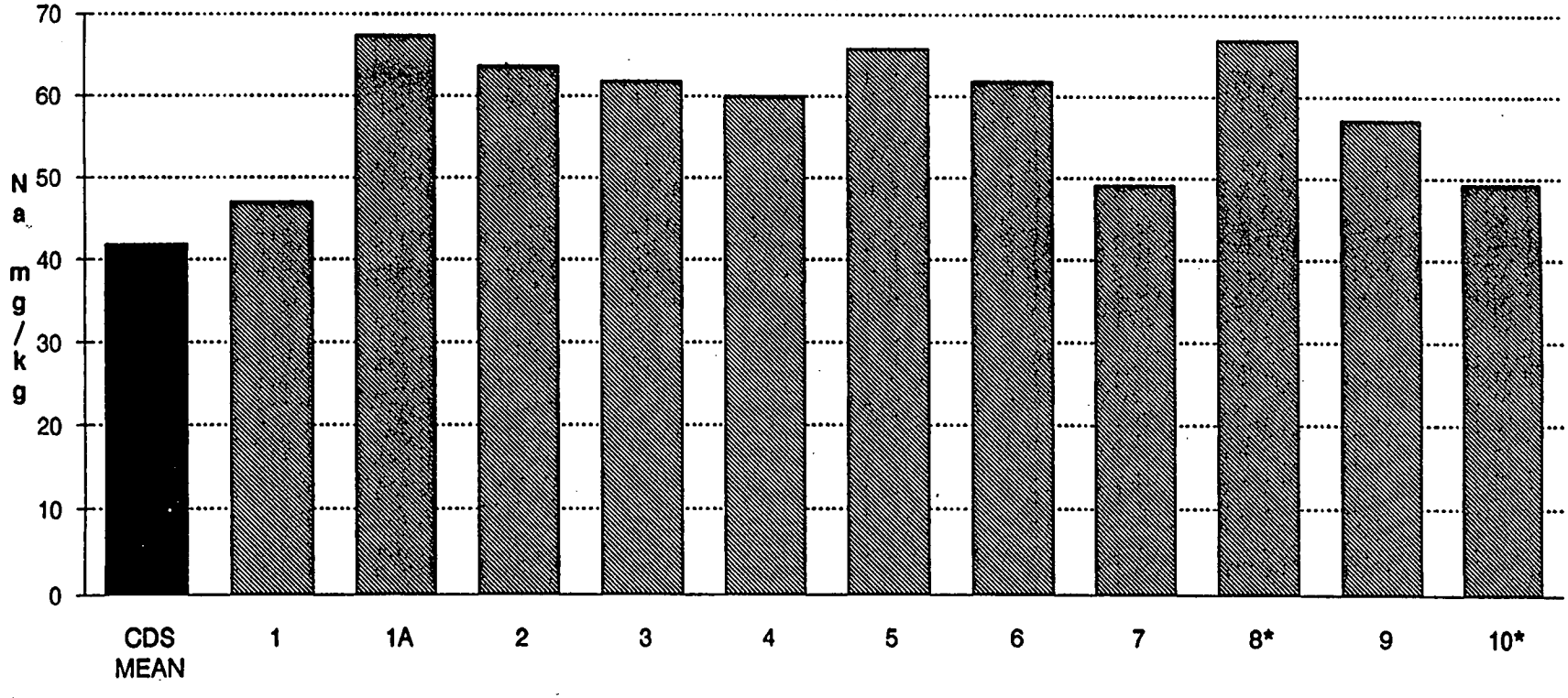
McComish Gorge, SWMU 04/02, NWSC Crane
Manganese (Mn) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 31

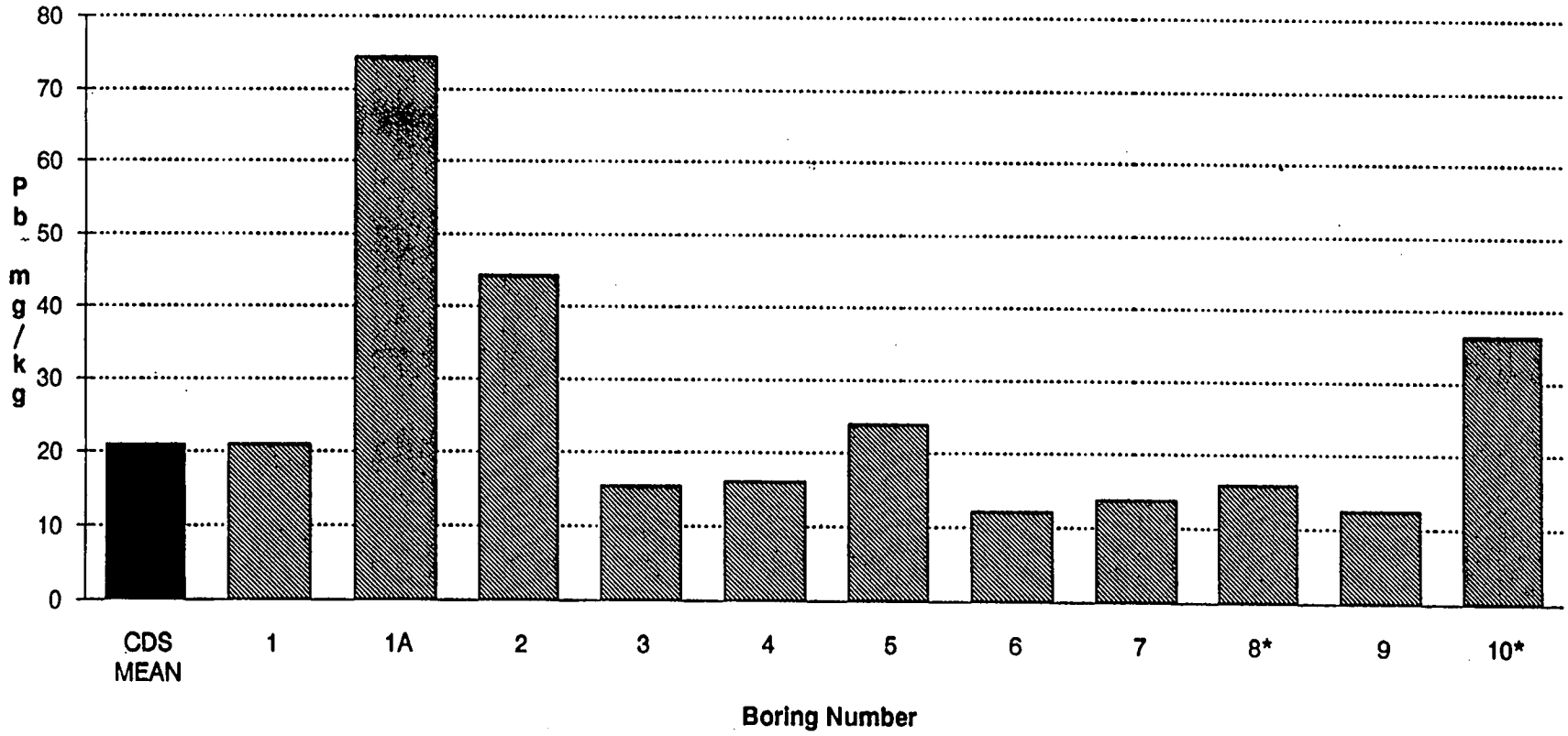
McComish Gorge, SWMU 04/02, NWSC Crane
Sodium (Na) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 32

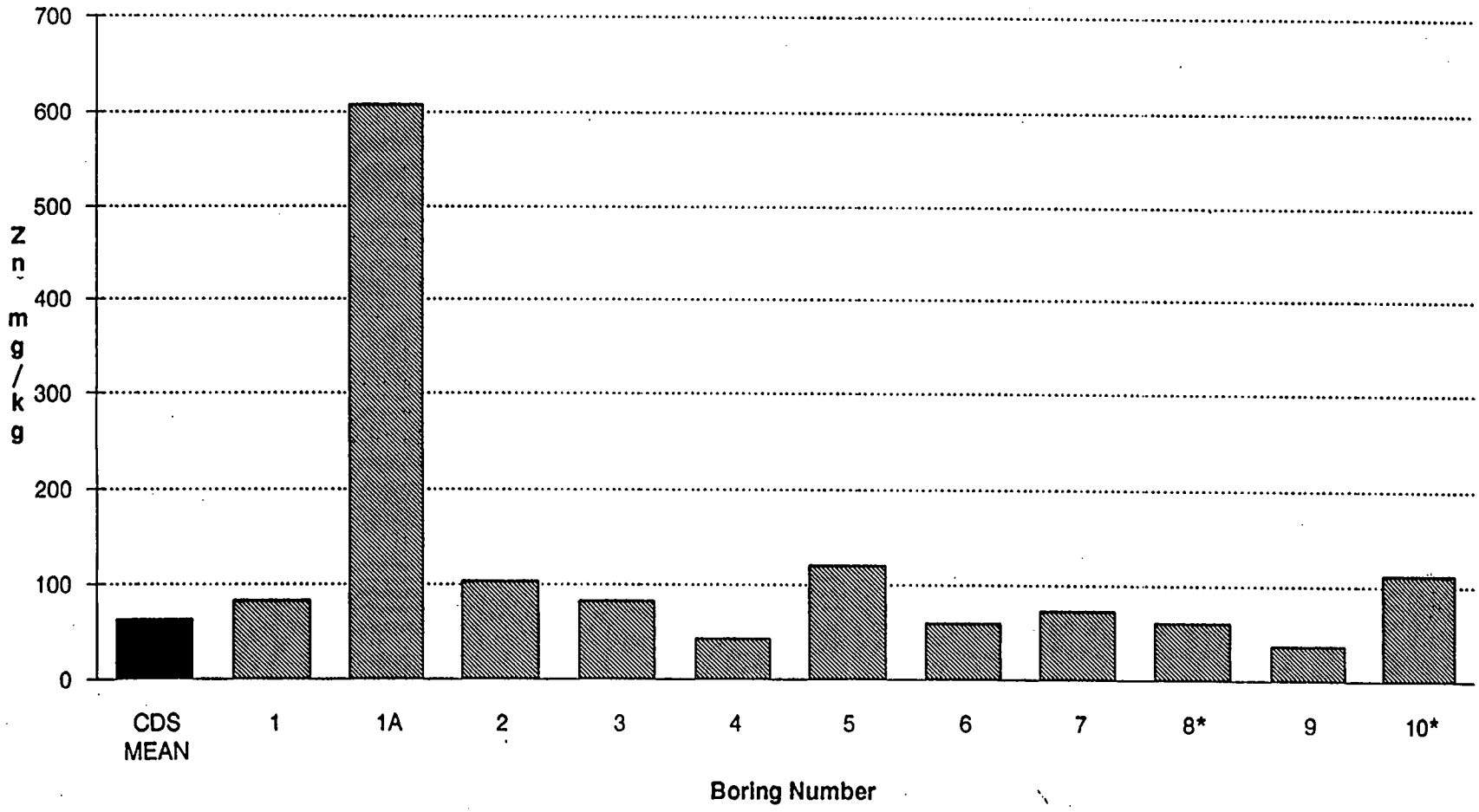
McComish Gorge, SWMU 04/02, NWSC Crane
Lead (Pb) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 33

McComish Gorge, SWMU 04/02, NWSC Crane
Zinc (Zn) concentration in Soils
Samples 1 and 2 combined for each boring



Note : CDS MEAN - Mean of the control data set (Borings 1, 2, 3 OBP) * - Only one sample in borings 8 and 10

Figure 35

REPORT DOCUMENTATION PAGE

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12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 words)***

An RCRA Facility Investigation Phase II Soils Study was conducted at McComish George Site at the Naval Surface Warfare Center Crane (NSWCC), Indiana, by personnel of the U.S. Army Engineer Waterways Experiment Station (WES) and Wilmington District (CESAW). The work was performed from October 1990 to August of 1991. Final revisions and report preparation were conducted in June through August of 1998. Explosive compounds 2,4-DNT and 2,6-DNT were detected in Boring 1A. A release of inorganic, semivolatile organic, and explosive waste to the soils at McComish Gorge is likely to have occurred.

14. SUBJECT TERMS

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Crane	Navy
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