Central Shops Burning/Rubble Pit 631-6G Additonal Sampling and Monitor Well Installation Report

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DISCLAIMER

CENTRAL SHOPS BURNING/RUBBLE PIT 631-6G ADDITIONAL SAMPLING AND MONITOR WELL INSTALLATION REPORT (U)

SAVANNAH RIVER SITE

FINAL

FEBRUARY 1995

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List of Acronyms/Abbreviations

%	percent
bls	below land surface
BOP	Bottom of Pit
BRP6G	Central Shops Burning/Rubble Pit 631-6G
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
COC	Chain of Custody
EEI	Environmental Exploration Inc.
EMS	Environmental Monitoring Section
EMTC	Environmental Monitoring and Testing Corporation
EPA	United States Environmental Protection Agency
EPD	Environmental Protection Department
ft	feet
g	gram
gal	gallon
GC/MS	Gas Chromatograph/Mass Spectrophotometer
GPR	Ground Penetrating Radar
HNu	trace gas analyzer
HP	WSRC Health Protection
HSA	Hollow Stem Auger
ID	Identification
in.	inch
K	hydraulic conductivity
km	kilometer
lbs	pounds
m	meter
mi	mile
MCL	Maximum Contaminant Level
mm	millimeter
msl	mean sea level
O.D.	outside diameter
OVA	Organic Vapor Analyzer

PAH	polycyclic hydrocarbons
PCBs	polychlorinated biphenyls
ppm	parts per million
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RUST E&I	RUST Environment & Infrastructure
SCDHEC	South Carolina Department of Health and Environmental Control
sec	second
SRS	Savannah River Site
STR	Subcontract Technical Representative
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TDS	Total Dissolved Solids
TIC	Tentatively Identified Compounds
TOC	Total Organic Carbon
TOH	Total Organic Halogens
TSS	Total Suspended Solids
USCS	Unified Soil Classification System
VOC	Volatile Organic Compound
WSRC	Westinghouse Savannah River Company

EXECUTIVE SUMMARY

The Central Shops Burning/Rubble Pit 631-6G (BRP6G) was constructed in 1951 as an unlined earthen pit in surficial sediments for disposal and incineration of potentially hazardous substances, such as metals and organic solvents. The BRP6G was removed from serv ice and backfilled in 1955. Some of the hazardous substances, if present, may have migrated into the surrounding soil and/or groundwater. Because of this possibility, the United States Environmental Protection Agency (EPA) has designated the BRP6G as a Solid Waste Management Unit (SWMU) subject to the Resource Conservation Recovery Act/ Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) process.

Preliminary results from the 1994 unit characterization indicate contamination is present in the RCRA Facility Investigation/Remedial Investigation (RFI/RI) unit soils. As stipulated in the Revision 1 RFI/RI Work Plan (1993a), a downgradient groundwater monitoring well will be installed in the water table aquifer because contamination was detected in the unit soils. To help determine the permanent location for this groundwater monitoring well, three temporary groundwater monitoring wells were installed (one to the west, one to the south, and one to the southeast). Water level data from these wells helped determine the hydraulic gradient of the groundwater. These wells were sampled for volatile organic compounds, and later, one or more of the wells will be chosen as the permanent groundwater monitoring well.

Historical aerial photographs implied that the waste unit was actually larger than previously marked and investigated, and indicated the need for further characterization. Based on this additional information from the historical aerial photographs, an additional sampling plan and monitor well installation plan was devised to incorporate the required groundwater monitoring well installation, surface water and sediment sampling, and further soil boring investigation.

As proposed in the Central Shops 631-6G RFI/RI Work Plan, Additional Sampling and Monitor Well Installation Plan, 12 soil borings and three temporary groundwater monitoring wells were installed and sampled. Surficial soil samples were collected at six locations within the ditch located along the railroad, south of the unit. Also, five surface water/sediment samples were collected from the ephemeral stream southeast of the unit. Slug tests were performed at each well and the data was reduced by the Bouwer-Rice method to calculate hydraulic conductivity. Field activities were performed from November 2, 1994 through December 28, 1994 under

Subcontract AA46326P, Task Order 72. Field activities were overseen by RUST Environment & Infrastructure (RUST E&I) personnel.

Data collected and compiled during the project include: soil and groundwater sample collection, surface water and sediment sampling, visual description and logging of soil samples collected via hand auger and split-spoon sampling, hydraulic slug testing and associated data reduction. Field daily activity logs, geologic logs, soil boring installation reports, well installation reports, well development, and monitoring data are presented in this report.

1.0 INTRODUCTION

The Central Shops Burning/Rubble Pit 631-6G (BRP6G) is located in the Central Shops Area near the center of the Savannah River Site (SRS) (Figure 1). The BRP6G Solid Waste Management Unit (SWMU) is on the southeastern side of a divide that separates the drainage basins of the Pen Branch Creek [approximately 1.6 km (1 mi) to the southeast] and Fourmile Branch [approximately 4 km (2.5 mi) to the northwest] (Figure 2). The ground elevation is approximately 88.4 m [290 feet (ft)] above mean sea level (msl) (Gordon et al., 1987). Surface drainage is southward to an unnamed tributary of Pen Branch.

The BRP6G was constructed as an unlined earthen pit, or pits, dug into surficial sediments that were then filled with various waste materials. The location of the BRP6G is shown in relation to major SRS facilities on Figure 1. The region around the BRP6G is shown on Figure 2 and a map of the BRP6G area is shown on Figure 3.

The BRP6G operated from 1951 through 1955 for disposal and burning of waste materials. The unit consisted of a shallow excavation, approximately 3 m (10 ft). Waste oils, rags, paper, cardboard, plastics, degreasers, wood, rubber, and drummed organic solvents were disposed of in the pit and periodically burned. The volume of waste disposed of at BRP6G was not reported. After disposal activities ceased, the area was covered with soil. The materials incinerated in the burning/rubble pit included potentially hazardous substances, such as organic solvents. Some of the hazardous substances, if present, may have migrated into the surrounding soil, and/or groundwater. Because of this possibility, the United States Environmental Protection Agency (EPA) has designated the BRP6G as a SWMU subject to the Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) process.

1.1 Previous Sampling/Screening Activities

Three groundwater monitoring wells (CBR-1D, CBR-2D, and CBR-3D) were installed at the BRP6G in January/February of 1990. The locations of these wells are shown on Figure 3. The analytical data available for the CBR-series wells indicate that sporadic occurrences of contaminants such as 2,4-dichlorophenoxyacetic acid, 1,1,2,2-tetrachloroethane, beryllium, bis(2-ethylhexyl)phthalate (a common laboratory contaminant), chromium, gross alpha, mercury, silver, tetrachloroethylene, toluene, and trichloroethylene were detected. These occurrences were not

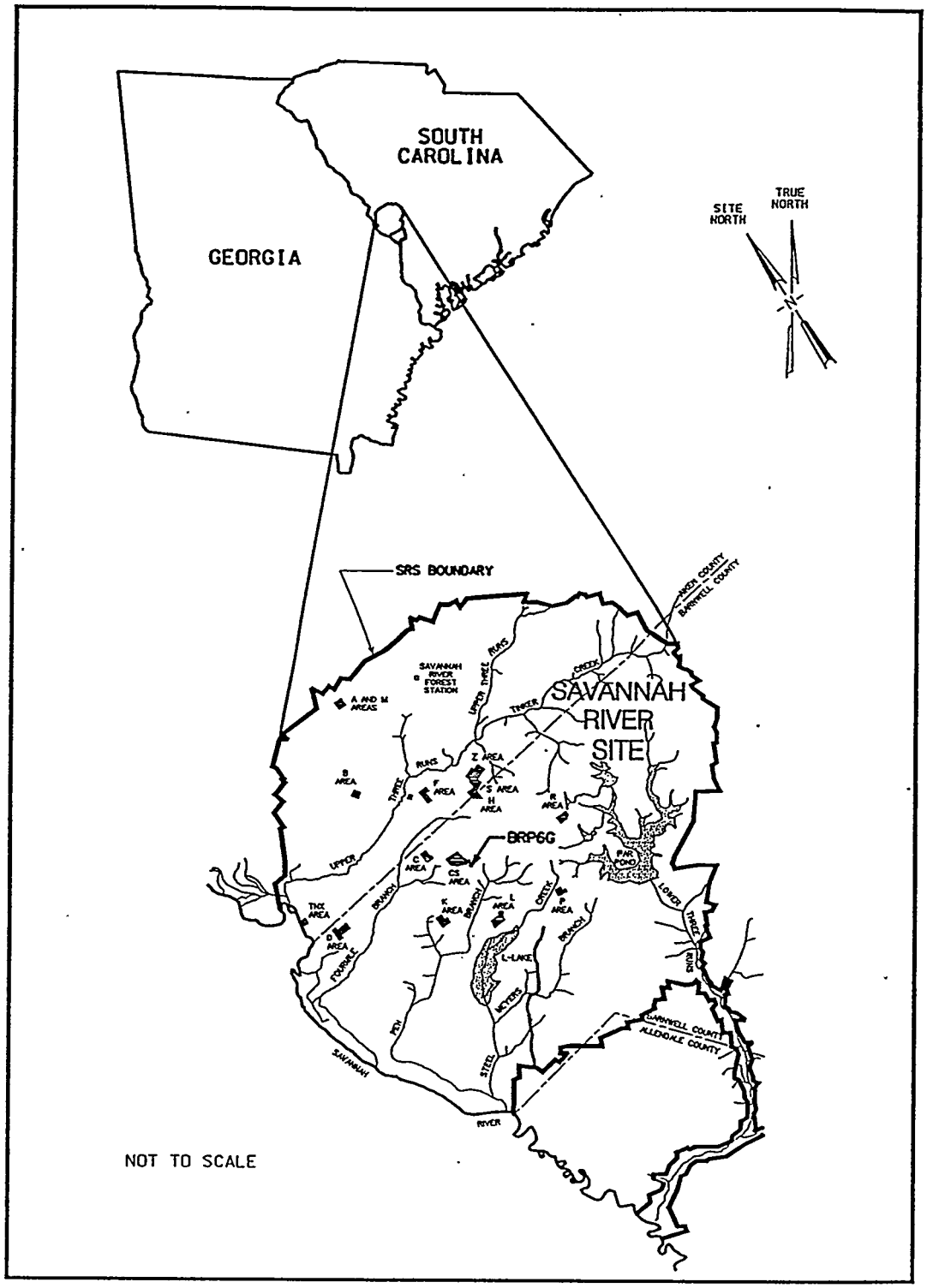

Figure 1. SRS Location Map

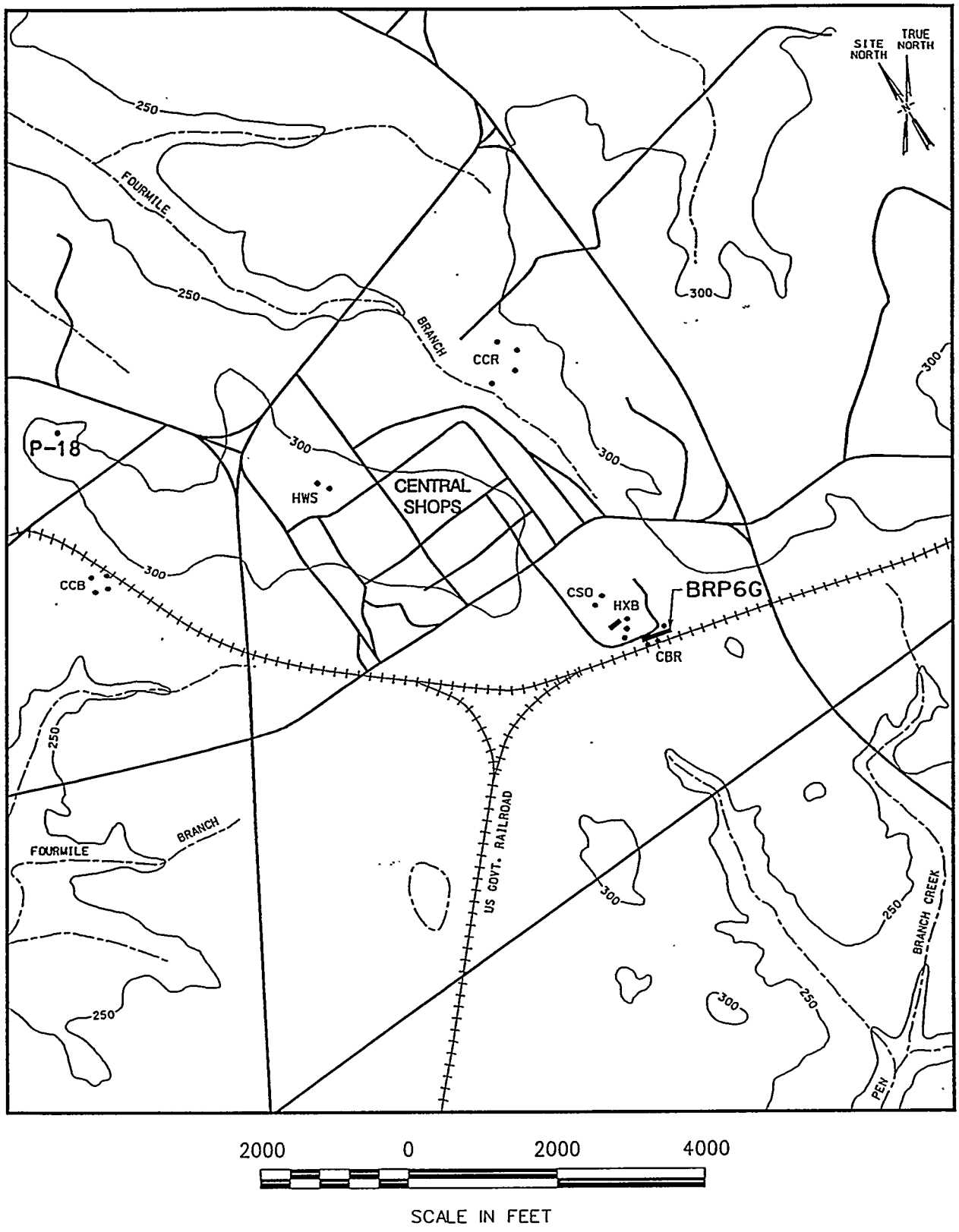

Figure 2. Location of the Burning/Rubble Pit (BRP6G) in the Central Shops Area of SRS

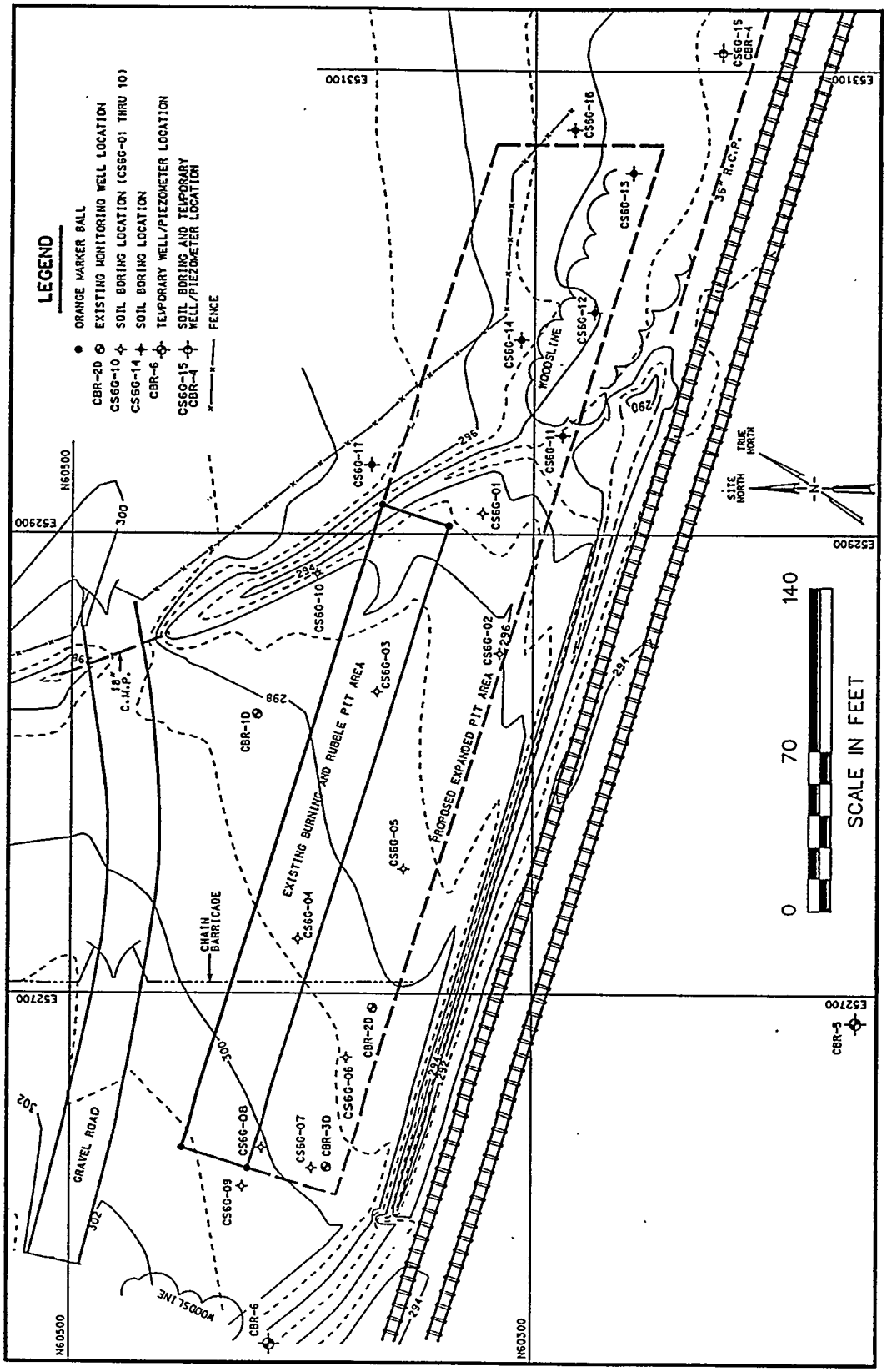

Figure 3. Waste Unit Topographical Map

confirmed by subsequent sampling and were often contradicted by duplicate sample results. The data suggest a potential increase in concentration from the upgradient to the downgradient wells for chloride, iron, magnesium, nitrate, potassium, and tritium.

Dichloromethane (methylene chloride), a common laboratory contaminant, was detected in 14 of 52 samples. Of the 14 results above the detection limit, only samples collected from CBR-2D during the first quarter of 1991 exceeded the Maximum Contaminant Level (MCL) for dichloromethane.

Ten shallow soil borings were installed in the BRP6G in March/April 1994. The locations of these borings (CS6G-01 through CS6G-10) are shown on Figure 3. The objective of the soil sampling investigation was: (1) to confirm the results of the soil gas survey, (2) to determine if hazardous substances such as metals, polychlorinated biphenyls (PCBs), pesticides, dioxins/furans, or radionuclides are present in the soils at the BRP6G, (3) to collect preliminary soil engineering parameters which will be used to screen potential remedial alternatives, and (4) to characterize any potential sources of contamination at the BRP6G and determine the locations of these sources. Review of the analytical data indicates minimal impact to the environment due to pit operations.

The draft report, "Historical Photographic Search of Central Shops Waste Unit 631-6G, Interim Report" (WSRC, 1994b) describes the search through aerial photographs of the Central Shops Area. These photographs provide representation of the changes in the waste unit over time. The photographic review of the area indicates that the waste unit is not accurately marked in the field, and the location is more likely to extend an additional 30.5 - 38.1 m (100 - 125 ft) further east of the waste unit markers (orange balls). In addition, the ditch immediately adjacent to the eastern most edge of the marked unit runs through what may have been the center of the original waste unit and part of the waste unit is more than likely being used currently (1994) as a laydown yard.

All of the details and documentation associated with the technical oversight of the geologic sampling, soil boring installation, temporary monitor well installation groundwater sampling, and field permeability testing of the project are included in this report.

1.2 Project Scope and Objectives

RUST Environment & Infrastructure (RUST E&I) was retained by Westinghouse Savannah River Company (WSRC) under Subcontract AA46326P to provide geologic and technical oversight for

the BRP6G RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan additional unit assessment activities (Appendix A). Additional sampling was proposed for the RCRA/CERLCA unit (Addendum to Chapter 4 of the RFI/RI Work Plan For Central Shops Burning/Rubble Pit, 631-6G). This proposed sampling was suggested based on information obtained during unit characterization sampling conducted in March and April 1994 (WSRC, 1994a) and recent observations in the historical aerial photography of the area.

The project scope included technical oversight of the installation of 11 soil borings using hollow stem auger (HSA) drilling techniques, one soil boring performed by hand auger, collection of six surficial soil samples within the ditch (downgradient from the pit), and installation of three temporary groundwater monitoring wells (see Figures 3 and 4). Five surface water and sediment samples were also obtained from the ephemeral stream, located approximately 60 m (200 ft) southeast of the pit (Figure 4). The data collected during this study included lithologic detail and soil samples from hand auger and split-spoon samples. Following development of the temporary groundwater monitoring wells, groundwater samples were collected. These wells were also slug tested to gain hydraulic conductivity information. The technical oversight also collected the required Quality Assurance/Quality Control (QA/QC) samples as specified in the proposed additional soil sampling and groundwater monitoring well installation for the BRP6G. The Environmental Protection Department/Environmental Monitoring Section (EPD/EMS) Soil Sample Logbooks and validation materials were used for all sampling documentation.

The RUST E&I technical oversight coordinated with WSRC and the drilling subcontractor to ensure that:

- the materials and equipment were decontaminated prior to use
- the drilling, sampling, and borehole abandonments were conducted in an efficient manner and in accordance with WSRC 3Q5 and the RFI/RI Program Plan (WSRC, 1993a)
- proper records were maintained
- composites of the soil samples taken were screened by WSRC Health Protection (HP) prior to offsite shipment of the analytical samples

The objectives of this field investigation were:

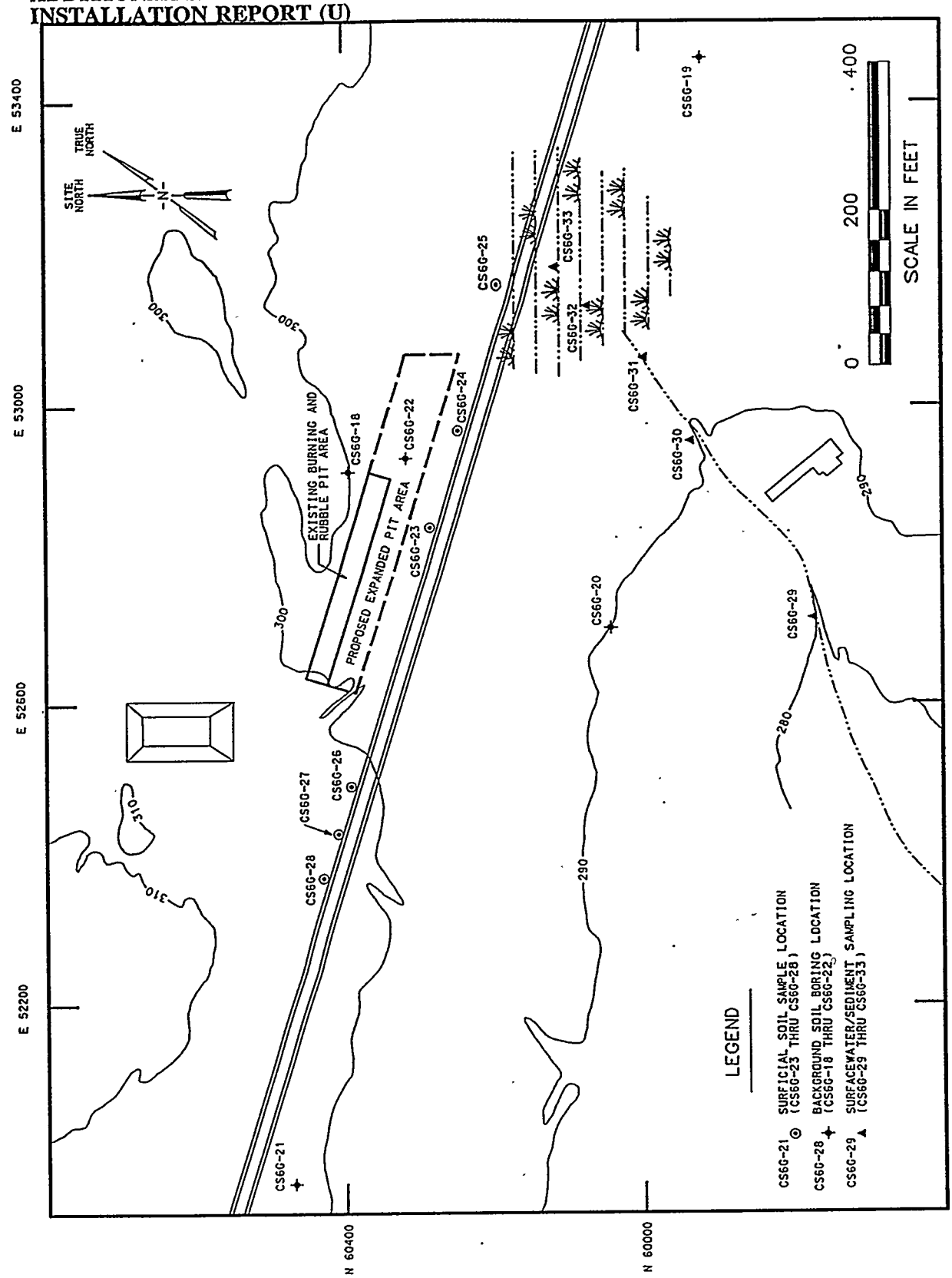

Figure 4 Surface Water/Sediment Sampling and Background Soil Sample Locations

- to obtain soil samples for laboratory analysis
- to install three temporary groundwater monitoring wells and collect groundwater samples for laboratory analyses
- to collect surficial soil samples at six locations within the ditch located along the railroad, south of the pit for laboratory analysis
- to collect at least five surface water/sediment samples along the ephemeral stream located approximately 61 m (200 ft) southeast of the pit for laboratory analysis
- to perform field permeability tests (slug tests) on the three temporary groundwater monitoring wells

The depths and analyses for this project are described in the proposed additional soil sampling and groundwater monitoring well installations for the BRP6G and in the RFI/RI Work Plan for the BRP6G and as directed by the subcontract technical representative (STR) for the project. This field investigation was designed to provide data that will:

- confirm the presence or absence of hazardous substances in soil within the unit as indicated by the preliminary results of the 1994 unit characterization
- define the pit boundaries in light of the new data provided by historical aerial photographs
- aid in determining hydraulic conductivity (via water levels and field permeability testing)
- identify if a potential source(s) of contamination is present at the BRP6G

1.3 Site Location

The BRP6G is located in the Central Shops Area. The surface drainage is southward to an unnamed tributary of Pen Branch.

Dothan Soil (soil group three of Looney et al., 1989) is at the surface at BRP6G. A review of the soil conservation service soil survey of the Savannah River Plant area indicates that the soils in the BRP6G SWMU are Udorthents (Rogers, 1990). Udorthents are soils comprising heterogeneous materials which are spoil or refuse from excavations and major construction (Rogers, 1990). Specific background soil sample locations were selected in cooperation with a soil taxonomist at the time the sampling is conducted.

Based on historical accounts, the disposal area at BRP6G was initially considered to be within a rectangular area approximately 83.8 m (275 ft) long and 9.1 to 13.7 m (30 to 45 ft) wide. This area is currently delineated by orange marker balls. Data from a ground penetrating radar (GPR) survey indicated that soil in most of the area defined by the RCRA/CERCLA unit marker balls is undisturbed. Therefore, the March/April 1994 unit characterization investigated the two zones that were represented to be disturbed soils on the GPR survey. The delineation of the waste unit was questionable. Historical aerial photographs indicated that the unit was even larger than anticipated. Additional sampling for the BRP6G was amended to investigate these new suggested boundaries.

An ephemeral stream is located approximately 61 m (200 ft) southeast of the pit (Figure 4). At the time of the unit reconnaissance, it appeared that the drain/ditch was hydrologically influenced solely by surface runoff.

An embankment separates BRP6G from a shallow dry ditch and railroad right-of-way. The top of the embankment is approximately 7.6 m (25 ft) south of the southern edge of the suspected rectangular pit. The embankment is approximately 1.5 m (5 ft) high. Soils exposed in the embankment are undisturbed. The shallow dry ditch, which serves to contain drainage from the railroad right-of-way, contains no obvious evidence of contamination. Water has not been observed in the ditch during any unit reconnaissance.

A second dry ditch which was thought to be located east of the BRP6G appears to cut through the unit on the historical aerial photographs. The ditch has eroded away fill material within the pit boundaries. Also, part of the laydown yard on the eastern side of the ditch appears to be part of the waste unit.

1.4 Geology And Hydrogeology

1.4.1 Geology

1.4.1.1 Geology of the SRS

The geology underlying the SRS includes crystalline basement rock and Triassic sediments overlain by Cretaceous and younger Coastal Plain sediments (Aadland and Bledsoe, 1990). The crystalline basement rock is composed of chlorite-hornblende schist, hornblende gneiss, and lesser amounts of other types of crystalline rock. This bedrock is buried beneath approximately 274 m

(900 ft) of sediment. The Triassic bedrock occurs in the southern portion of the SRS. Sediments of the Triassic bedrock are composed of poorly sorted conglomerate, sandstone and mud-rock, and are generally dark red in color.

The stratigraphic units of the Coastal Plain, from oldest to youngest, are the Cape Fear Formation, the Lumbee Group, the Black Mingo Group, the Orangeburg Group, the Barnwell Group, and the Upland Unit (Figure 5). The Cape Fear Formation is composed of Lower Cretaceous poorly sorted, silty to clayey quartz sands and interbedded clays. The Cape Fear thickens across the SRS, ranging from 9.2 m (30 ft) at the northwest Site boundary to more than 55 m (180 ft) at the southeast Site boundary.

The Lumbee Group (Upper Cretaceous) is subdivided into the Middendorf and the Black Creek Formations, and the Steel Creek Member of the Pee Dee Formation. The lower contact between the Middendorf and the Cape Fear is a sharp erosional unconformity. In general, the Lumbee Group is composed of variably colored quartz sands and clays which range in thickness from 116 m (380 ft) to more than 213 m (700 ft) from the northwestern Site boundary to the southeastern Site boundary, respectively.

The Black Mingo Group consists of the Ellenton Member of the Rhems Formation (Early Paleocene), the Snapp Member of the Williamsburg Formation (Late Paleocene), and the Four Mile Member of the Fishburne Formation (Late Paleocene to early Eocene). The Ellenton consists mostly of gray, poorly sorted, micaceous, lignitic, silty and clayey quartz sand interbedded with gray clays. The Ellenton is approximately 12.2 m (40 ft) thick at the northwestern boundary of the SRS and thickens to approximately 30.5 m (100 ft) at the southeastern boundary. The Williamsburg (Snapp Member) sediments are composed of silty quartz sand interbedded with clays. The Williamsburg thickens from 9.1 m (30 ft) at the northwestern boundary of SRS to 15.2 m (50 ft) at the southeastern boundary. The Fishburne (Four Mile Member) sediments are composed of fine to coarse grained, moderately to well sorted, loose sands with an interbedded clayey zone. The Fishburne has been traced in the subsurface into the northwestern area of SRS (Fallaw, 1991).

The Orangeburg Group is subdivided into the lower Middle Eocene Congaree Formation and the upper Middle Eocene Santee Limestone. The Congaree is composed of well sorted, fine-to-coarse quartz sands with thin clay laminae throughout. The Congaree is approximately 18.3 m (60 ft) thick at the northwestern boundary of the SRS and thickens to approximately 25.9 m (85 ft) near

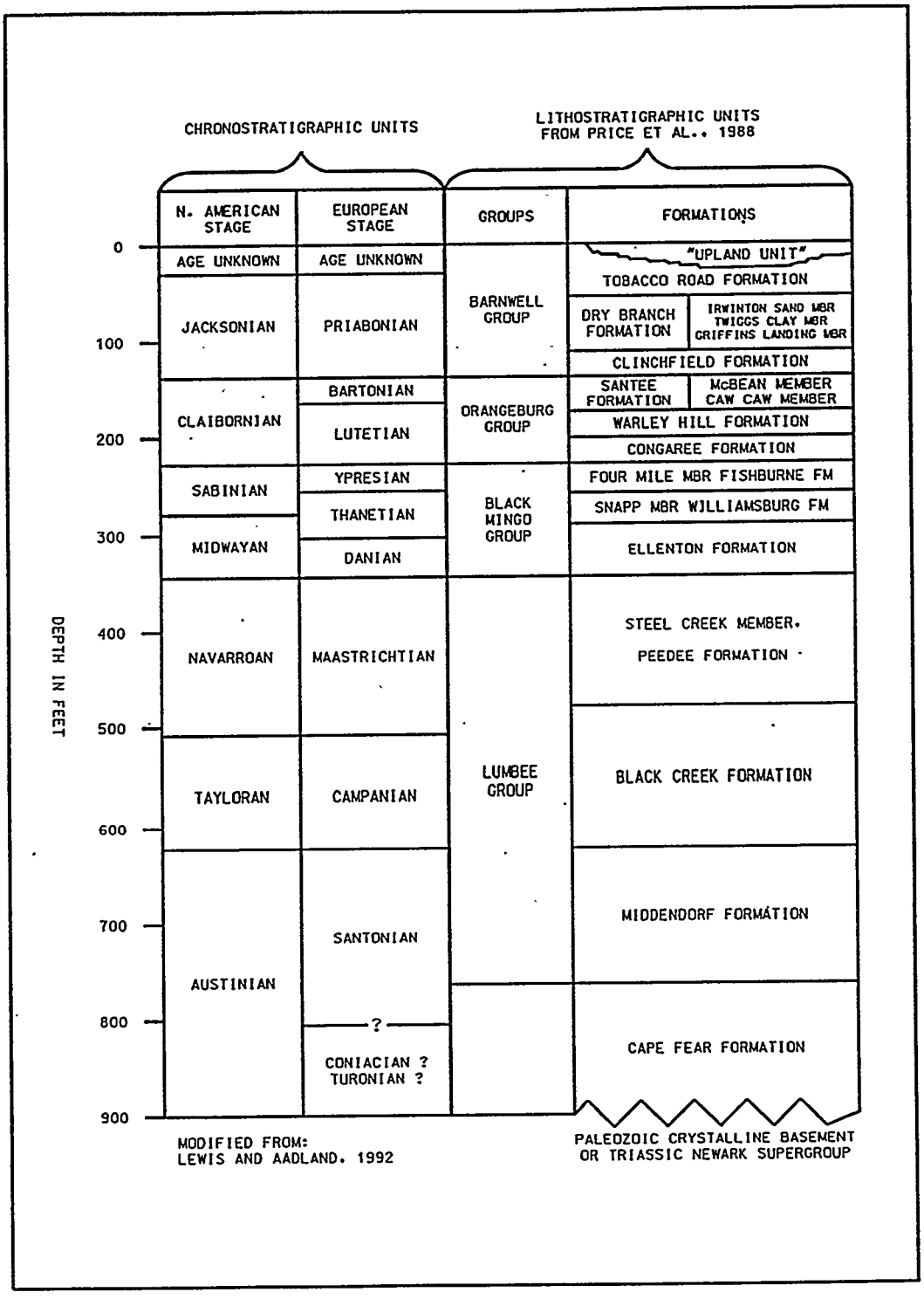

Figure 5. General Stratigraphic Column for Coastal Plain Sediments

the southeastern boundary. The Santee Formation is subdivided into the Warley Hill, the Caw Caw, and the McBean Members, and varies in lithology from carbonates and calcareous quartz sands to quartz and glauconitic sands and clays. The Warley Hill and the Caw Caw Members make up what has been referred to in many SRS reports as the "Green Clay". This unit is composed of glauconitic, silty and clayey quartz sands. The thickness of the formation ranges from 12.2 m (40 ft) to more than 24.4 m (80 ft) from the northwestern boundary of the SRS to the southeastern boundary.

The Barnwell Group (Late Eocene) is subdivided into the Clinchfield, Dry Branch, and Tobacco Road Formations. Quartz sand of the Clinchfield Formation has been distinguished only when contrasting carbonates of the Griffins Landing Member of the Dry Branch Formation and the McBean Member of the Santee Formation occur, with the sand sandwiched between them. This quartz sand was identified at three localities within the SRS, where it is up to 7.6 m (25 ft) thick, but is not generally mappable. The Dry Branch Formation is subdivided into the Griffins Landing, Twiggs Clay, and Irwinton Sand Members, and varies in lithology from carbonates, silty and clayey quartz sand, and interbedded clays. The carbonate portion of the Griffins Landing Member of the Dry Branch Formation is up to 13.9 m (45 ft).thick in the southeastern part of the SRS. The Griffins Landing carbonate occurs locally at the SRS and is not known to be present northwest of Tinker Creek and Upper Three Runs Creek within the SRS boundaries. The Twiggs Clay Member, which is tan, light gray, and brown, is up to 3.7 m (12 ft) thick in the SRS wells but is not laterally continuous. It was referred to as the "Tan Clay" in many SRS reports. The remainder of the Dry Branch Formation within the SRS is made up of the Irwinton Sand Member, which is composed of tan, yellow, and orange, moderately sorted quartz sand, with interlaminated, locally abundant clay. The formation ranges in thickness from 15.2 m (50 ft) to 24.4 m (80 ft) from the northwestern boundary of the SRS to the southeastern boundary. The Tobacco Road Formation consists of red, fine to coarse, moderately to poorly sorted quartz sand with minor clay laminae. The Tobacco Road outcrops at the surface at many locations throughout the Site and ranges in thickness from 6.1 to 9.1 m (20- to 30-ft).

The Upland Unit (previously mapped at SRS as the Hawthorn Formation) is composed of clays and poorly sorted, clayey, silty, pebbly, and cobbly quartz sands with extreme lateral and vertical variation. These sediments represent fluvial channel deposits. The presence of the Upland Unit in this area is inconsistent, occurring at higher elevations around the SRS.

1.4.1.2 Unit Geology

Three monitoring wells (CBR-1D, -2D, -3D) were installed in January and February 1990 at the BRP6G. These wells provide sampling sites for the shallow groundwater aquifer. Locations of these wells are shown on Figure 3. Pilot holes for wells CBR-2D and -3D were drilled at the edge of the large area of disturbed soil. No debris or waste materials were encountered in these boreholes. The wells are currently being used for determining water levels and for monitoring groundwater quality in the Water Table Aquifer. Figures 6 and 7 are lithologic and hydrostratigraphic cross-sections prepared from the monitoring well boring logs. These figures indicate that the wells are screened in the Water Table (Aquifer Zone IIB_2) below a 7.6 to 10.7 m (25- to 35-ft) thick sandy clay layer.

1.4.2 Hydrostratigraphy

1.4.2.1 Hydrostratigraphy of SRS

The SRS is located approximately 48.3 km (30 miles) southeast of the Fall Line, where sediments of the Coastal Plain Physiographic Province pinch-out, exposing crystalline rocks of the Piedmont Physiographic Province. The recharge zone for the SRS includes the surface area of the site as well as the upgradient land extending northwestward to the Fall Line. Normal annual rainfall for the SRS area is 121.2 cm (47.7 in.). The Savannah River and its tributaries, Upper Three Runs Creek, Four Mile Creek, Steel Creek, Pen Branch Creek, and Lower Three Runs Creek, provide the main surface water drainage system at the SRS.

A multilayer hydrologic system exists in the Coastal Plain sediments at the SRS. Confining units within the system are interspersed with more transmissive units. Aadland and Bledsoe (1990) developed an alpha numeric hydrostratigraphic nomenclature system for SRS (Figure 8). Within this nomenclature, the basement complex underlying the Coastal Plain deposits is referred to as the Paleozoic-Triassic Basement Hydrogeologic System. This system is overlain by three aquifer systems of Coastal Plain deposits, Aquifer Systems I and II, separated by the Confining System I-II. These Aquifer systems are separated from the lower Piedmont Hydrogeologic System by the Confining System I. Confining System I is composed of poorly sorted, clayey sediments of the Cape Fear Formation. Confining clay sediments of the middle Black Creek Formation make up Confining Unit IA-IB which separates the Aquifer Units IA and IB. Aquifer System I is composed of sands of the Middendorf Formation and the lower sands of the Black Creek and

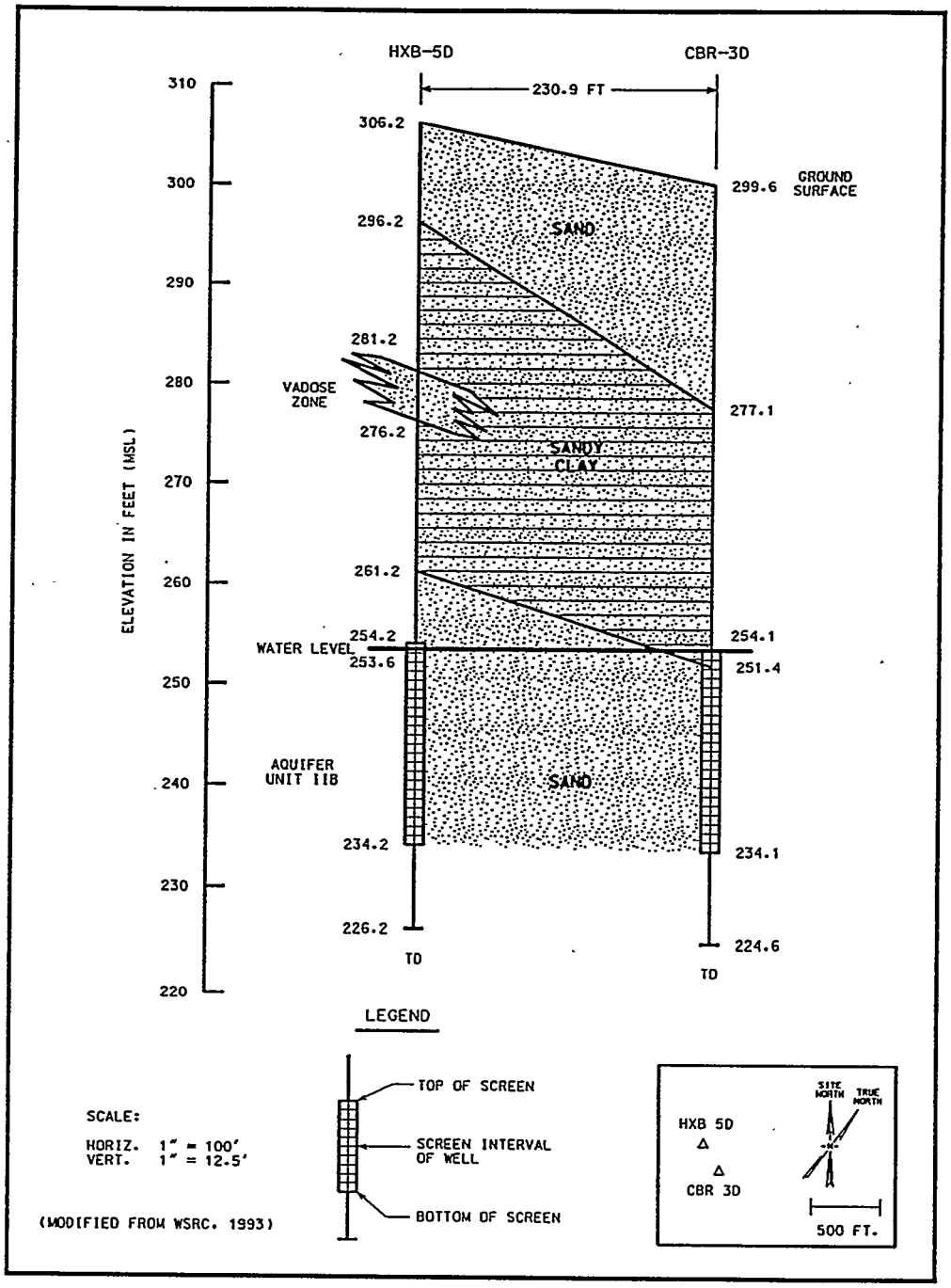

Figure 6. Lithologic and Hydrologic Cross Section HXB-5D to CBR-3D

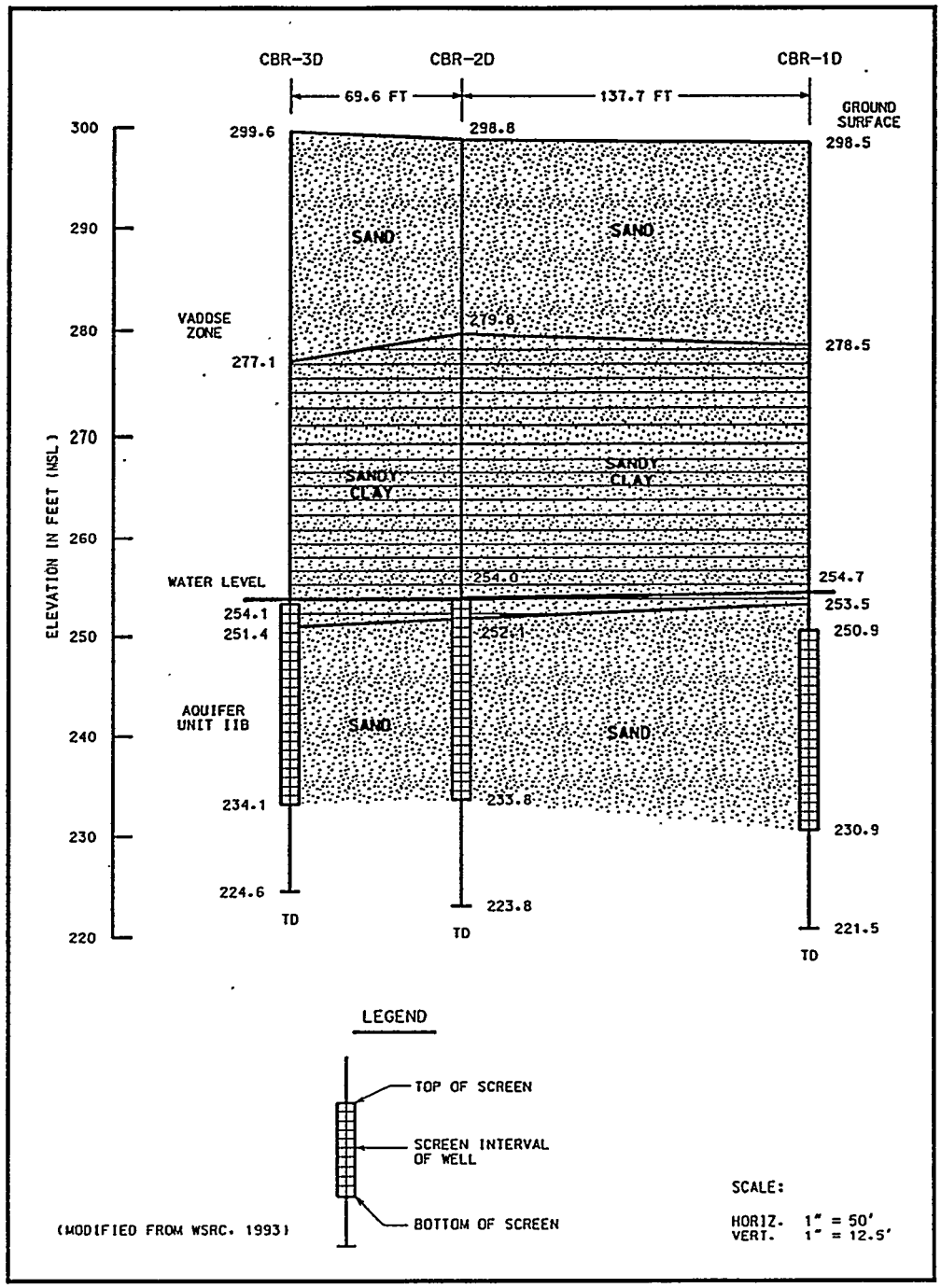

Figure 7. Lithologic and Hydrologic Cross Section CBR-3D, CBR-2D, and CBR-1D

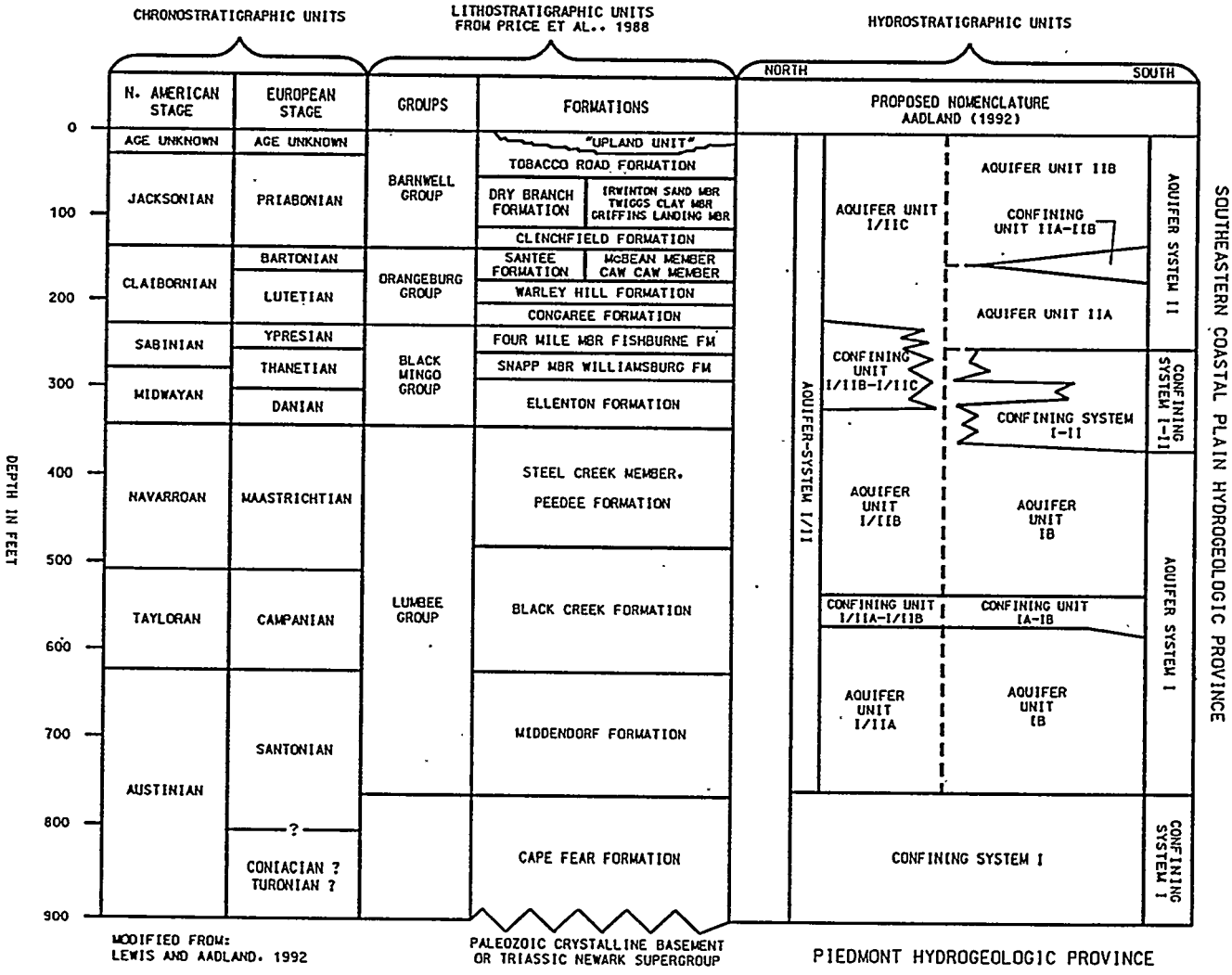

Figure 8. Stratigraphic Column of the SRS Area with Hydrologic Nomenclature

lower Peedee Formations. The reader is referred to Aadland and Bledsoe (1990) for the most recent description of SRS hydrogeology.

Aquifer Unit IIB includes the shallow Water Table Aquifer at the SRS, which is composed of sediments from the Tobacco Road, Dry Branch, and McBean Formations. The sediments of Aquifer Unit IIB typically exhibit a wide variation in lithologic composition both vertically and laterally. Local hydrostratigraphy of the shallow Water Table Aquifer is discussed in Section 1.4.2.2.

Below the Water Table Aquifer (Aquifer Unit IIB) is Confining Unit IIA-IIB. This confining unit is referred to as the "Green Clay". At well cluster P-18 (Figure 9), located approximately 2.4 km (1.5 mi) west of the BRP6G (Figure 2) the "Green Clay" is an orange clayey sand with clay seams (Bledsoe et al., 1990). A head difference of 15.6 m (51.1 ft) has been observed between wells P-18D and P-18B, screened above and below Confining Unit IIA-IIB. A downward vertical gradient of 1.1 m/m (0.35 ft/ft) is calculated using this head difference. Vertical flow through the clay is not estimated because lithologies in addition to the clay are present between the screened intervals.

Aquifer Unit IIA underlies Confining Unit IIA-IIB. At P-18, Aquifer Unit IIA consists of a very fine to fine, tan sand with a thickness of approximately 25.9 m (85 ft). The horizontal and vertical gradients within the aquifer are not known in the vicinity of the BRP6G. A regional calibrated flow model (Haselow and Taylor, 1989) used a horizontal hydraulic conductivity of 4.6m/day (15.1 ft/day) and a vertical hydraulic conductivity of 0.3 cm/day (0.01 ft/day) in Aquifer IIA (referred to as the Congaree Aquifer) for the regional SRS area. In the vicinity of the BRP6G, regional flow in the aquifer is to the southwest toward the Savannah River (Figure 10).

The Aquifer Unit IIA overlies Confining System I - II. The Confining System I-II is referred to as the Ellenton Confining Unit. As indicated by the P-18 well cluster, Confining System I-II is actually a sequence of interbedded silts, sands and clays. It is approximately 21.3 m (70 ft) thick in the vicinity of the BRP6G. Undisturbed samples of the Confining System I-II collected at the P-18 well cluster yielded a range of horizontal hydraulic conductivity values of 0.03 to 26.8 cm/day (0.0010 to 0.88 ft/day) and a range of vertical hydraulic conductivity values from 0.0267 to 12.2 cm/day (0.0009 to 0.40 ft/day) (Bledsoe et al., 1990). The downward vertical gradient across the Confining System I-II, as measured at the P-18 well cluster, is 0.013. Using an effective porosity of 0.10 for sandy clay (Todd, 1959), the vertical flow velocity of Confining

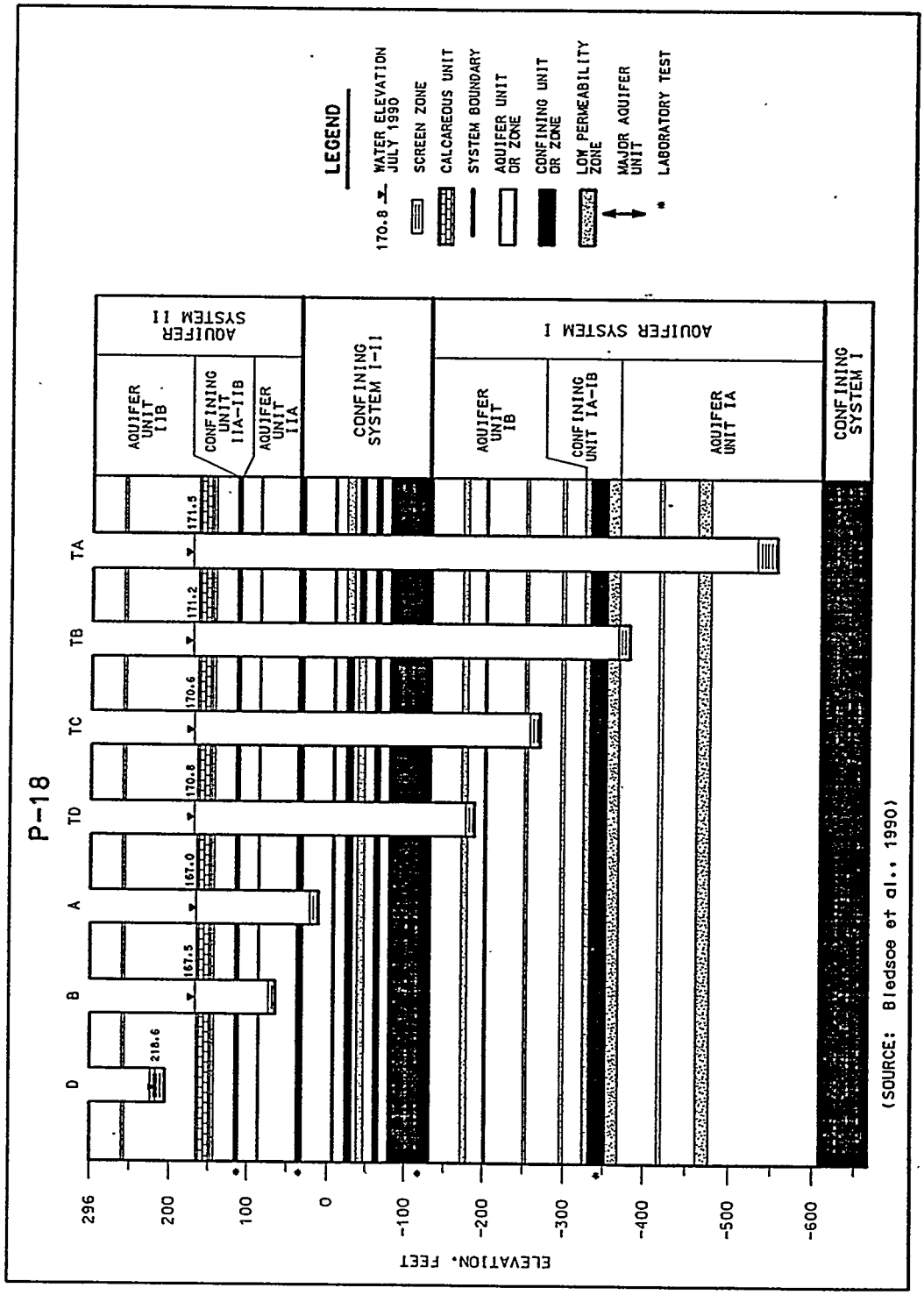

Figure 9. Profile of P-18 Well Cluster

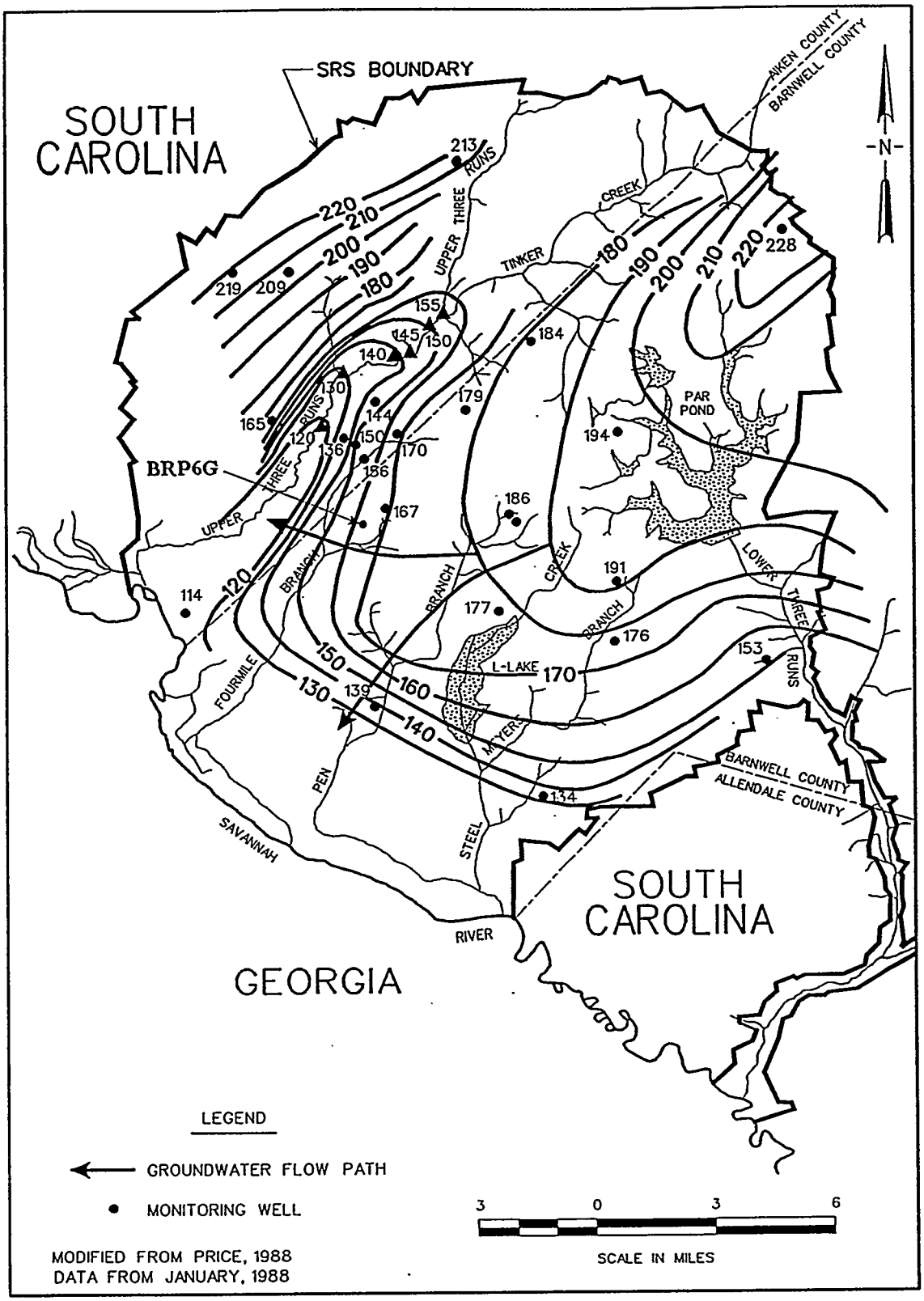

Figure 10. Regional Potentiometric Surface Map Aquifer Unit IIA

System I-II at C Area ranges from approximately 0.0037 to 1.58 cm/day (0.00012 to 0.052 ft/day) or 1.46 to 578.51 cm/year (0.043 to 18.98 ft/year).

Aquifer System I underlies Confining System I-II. Aquifer System I is divided into Aquifer Units IA and IB. Aquifer Unit IA includes the Pee Dee and upper Black Creek Formations. Figure 11 is a regional potentiometric map of Aquifer Unit IA. The map shows that groundwater flow in the aquifer is to the southwest toward the Savannah River.

Confining Unit IA-IB separates Aquifer Units IA and IB and includes the lower Black Creek Formation. Aquifer Unit IA is composed of the Middendorf Formation. Figures 12 and 13 are regional potentiometric surface maps for the upper and lower parts of the Aquifer Unit, respectively. These maps indicate that groundwater flow within the aquifer unit is to the southwest toward the Savannah River.

Aquifer System I supplies drinking water throughout the SRS. Two existing water supply wells in C Area, 905-90C and 905-91CC, are screened in the lower Pee Dee and upper Black Creek Formations of Aquifer System I. At C Area, four wells within the P-18 well cluster are screened in the Aquifer System I. Hydraulic heads measured in these screened zones during 1Q91 indicate the following:

- an upward vertical gradient of 0.019 from P-18A to P-18TD [Confining System I-II to Aquifer Unit IB]
- a downward vertical gradient of 0.003 from P-18TD to P-18TC [Upper Aquifer Unit IB to Lower Aquifer Unit IIB]
- an upward vertical gradient of 0.005 from P-18TC to P-18TB [Lower Aquifer Unit IB to Upper Aquifer Unit IA]
- An upward vertical gradient of 0.002 from P-18TB to P-18TA [Upper Aquifer Unit IA to Lower Aquifer IA]

In N Area, a reversal in the vertical hydraulic head between the overlying Aquifer Unit IB and the deeper Aquifer Unit IA is indicated at the P-18 well cluster. A reversal in hydraulic head also occurs between the overlying Confining System I-II and Aquifer Unit IIA. These head reversals inhibit vertical flow of groundwater from the Aquifer Unit IIA into Aquifer Unit IA, and from Aquifer Unit IB to Aquifer Unit IA, limiting the potential for downward migration of contaminants.

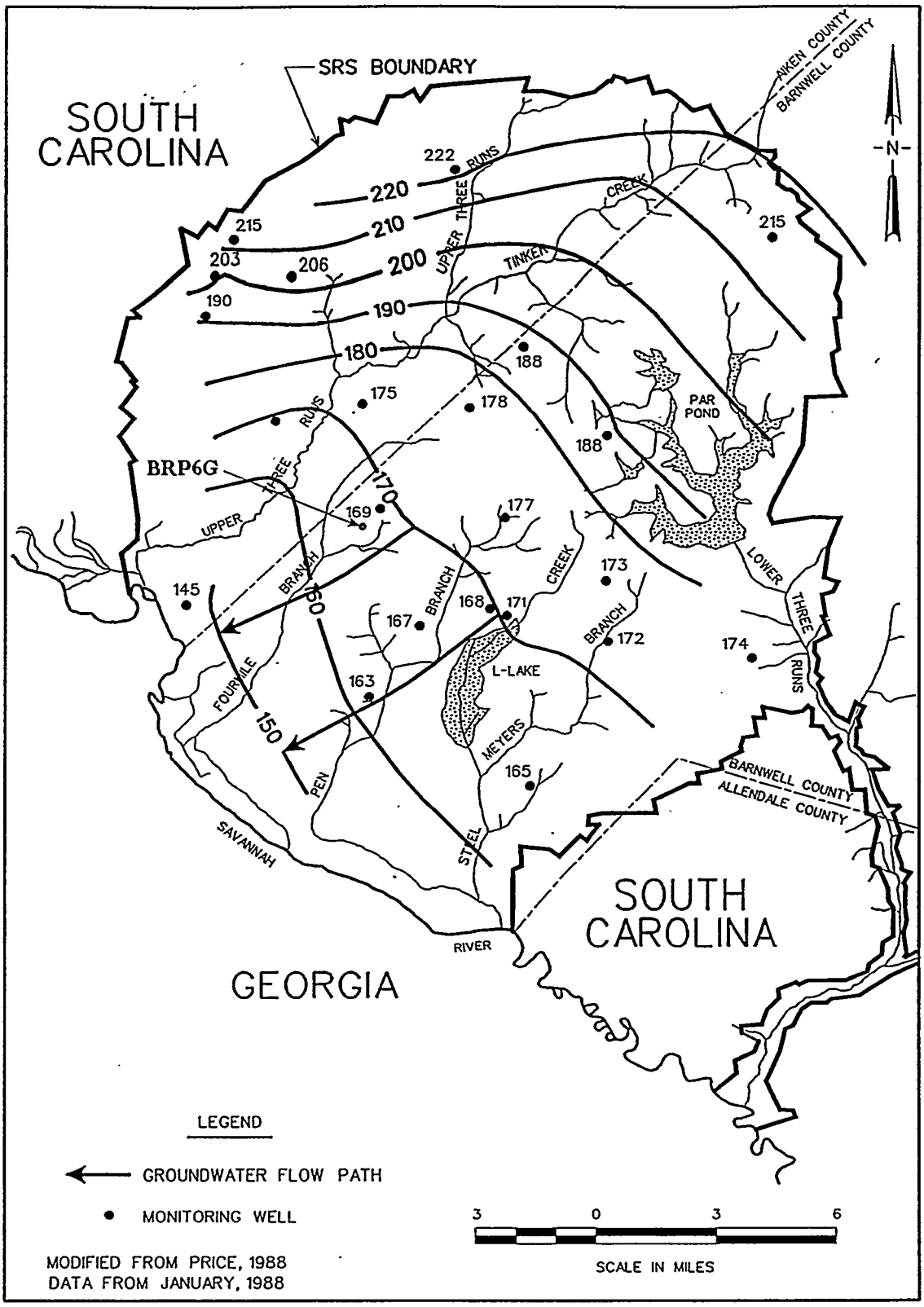

Figure 11. Regional Potentiometric Surface Map Aquifer Unit IB

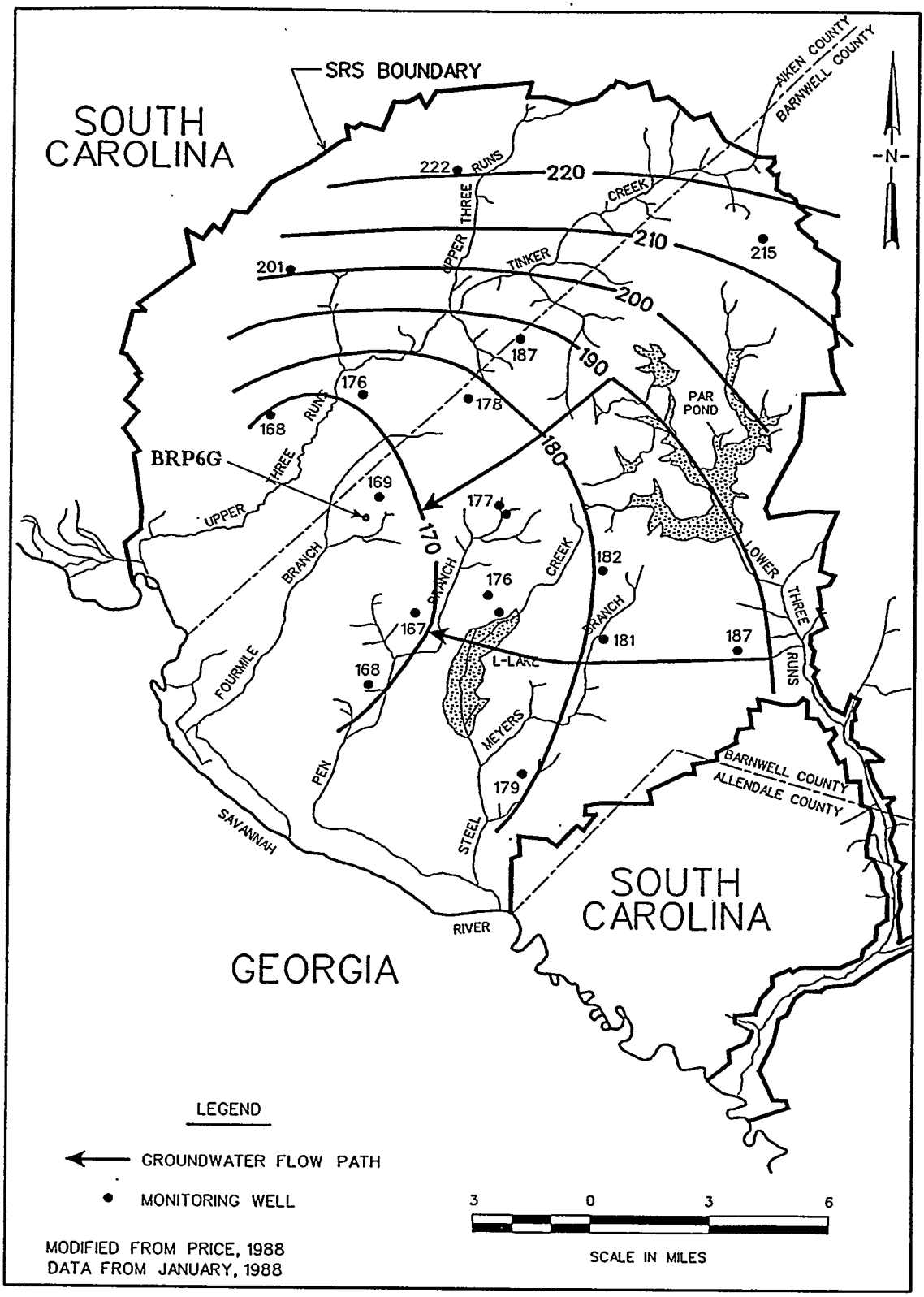

Figure 12. Regional Potentiometric Surface Map Upper Aquifer IA

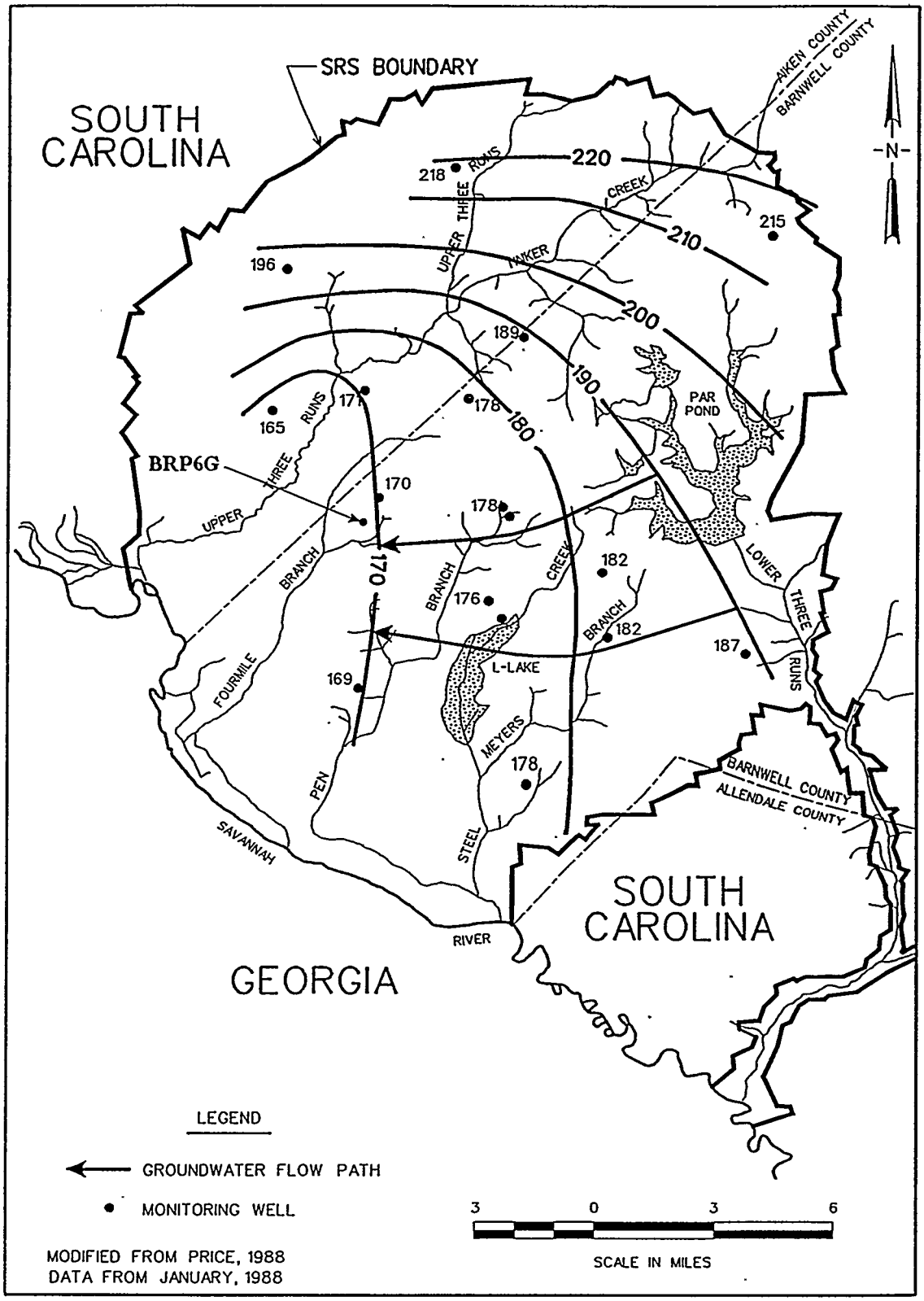

Figure 13. Regional Potentiometric Surface Map Lower Aquifer Unit IA

1.4.2.2 Local Hydrostratigraphy

Numerous groundwater monitoring wells exist in C Area, including the CBR, HXB, and CSD well clusters. The location of Water Table monitoring wells in the vicinity of BRP6G is illustrated in Figure 14. All of the depicted wells are screened in the shallow Water Table Aquifer [approximately 15.2 m (50 ft) below land surface (bls)]. The "Tan Clay" (Confining Zone IIB_1 - IIB_2) is not reported at well cluster P-18, and not evident at BRP6G also, which indicates that the shallow Water Table Aquifer and lower Water Table Aquifer (Aquifer Zone IIB_1 and IIB_2) are part of the Aquifer Unit IIB.

Water levels are recorded in each well on a quarterly basis. Using recently available groundwater data, the Water Table surface elevation was contoured (Figure 14). The map indicates that the direction of shallow groundwater flow is southward, with probable discharge into a tributary of Pen Branch ("Pen Branch Tributary") where the Water Table contours intersect the ground surface. Figure 15 is a potentiometric surface map of the Water Table (Aquifer Unit IIB) at the BRP6G using water level measurements (12/20/94) from the three temporary groundwater monitoring wells. In-situ measurements of hydraulic conductivity are not available for the Water Table Aquifer in N Area.

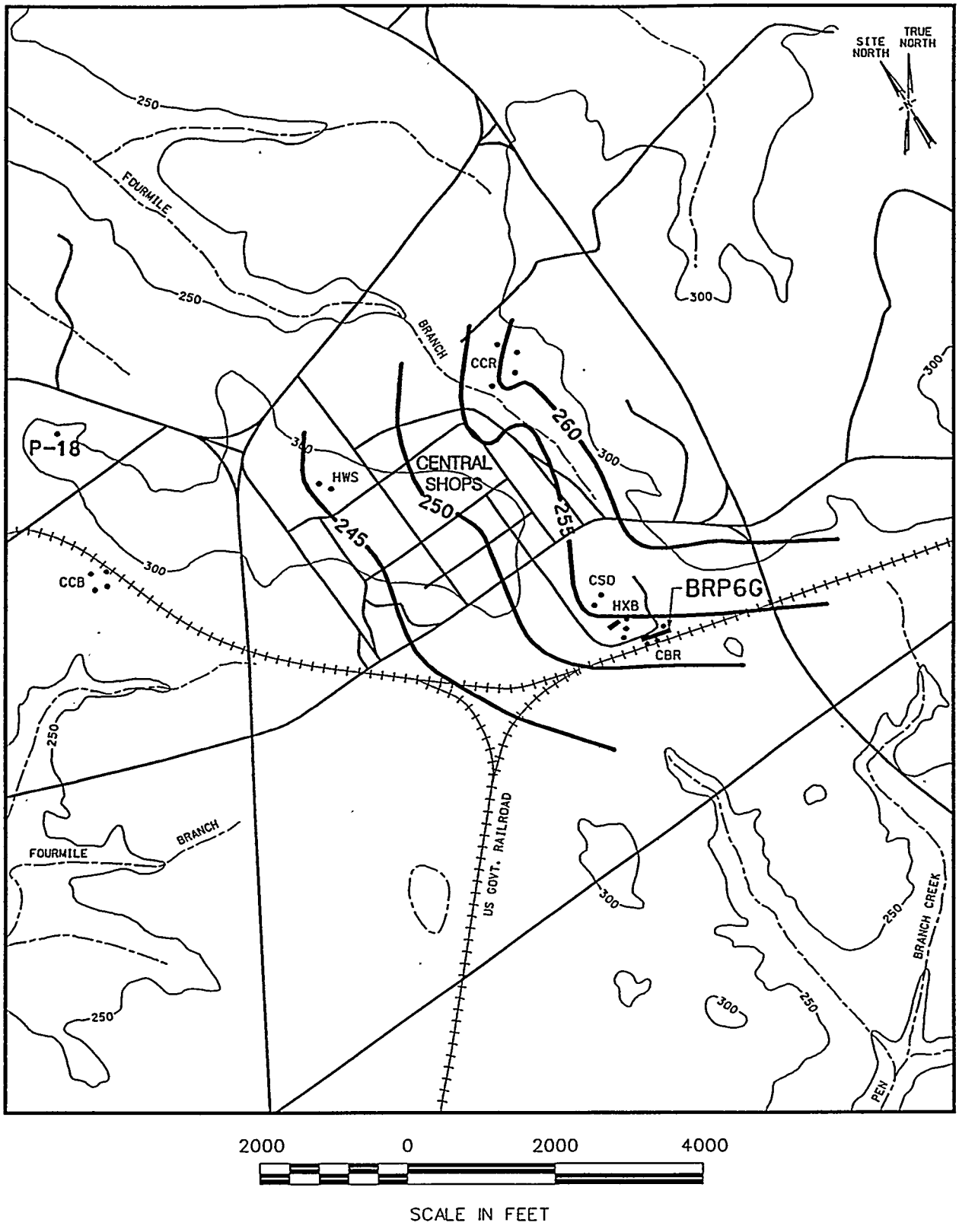

Figure 14. Potentiometric Surface of the Water Table (Aquifer Unit IIB) in the BRP6G Area

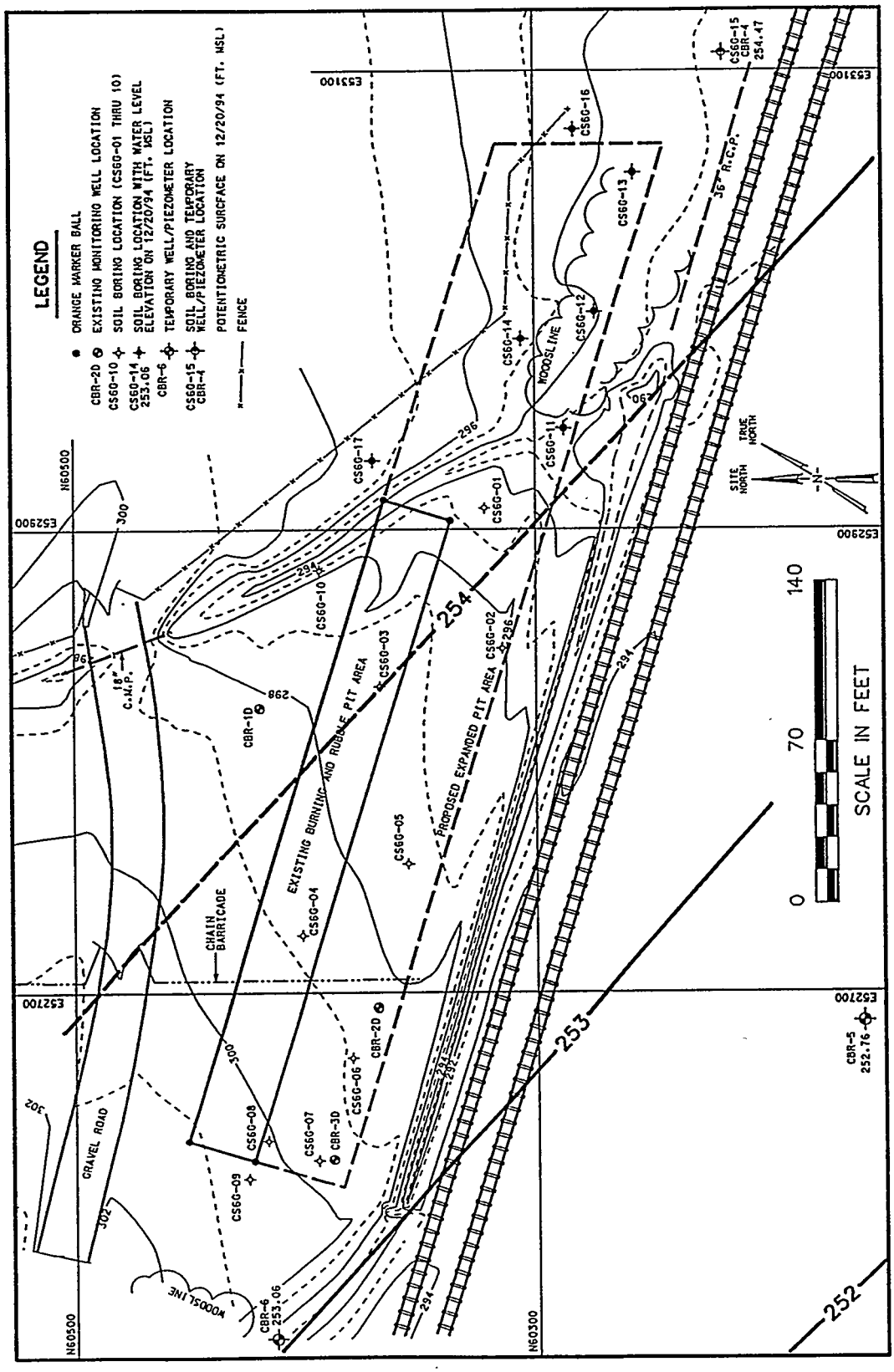

Figure 15. Potentiometric Surface of the Water Table (Aquifer Unit IIB) at the BRP6G

2.0 FIELD METHODS

Field work at BRP6G was conducted between November 2 and December 30, 1994. Field activities included mud rotary drilling techniques for temporary groundwater monitoring well installation, well development, groundwater sampling, field permeability testing (slug testing), hollow stem auger drilling techniques with split-spoon sample collection, visual classification of soil, collection of surficial soil samples, and collection of surface water/sediment samples. Environmental Monitoring and Testing Corporation (EMTC) and Environmental Exploration, Inc. (EEI) was subcontracted by WSRC to provide drilling services. All field activities were conducted in accordance with methods and procedures in the specified "Hydrogeologic Data Collection Methods, Procedures and Specifications", WSRC 3Q5 manual (WSRC, 1992), the RFI/RI Program Plan (1993a), and direction from the WSRC STR. Records for each temporary groundwater monitoring well include daily field logs and monitoring well installation reports. Appendix B presents the daily field logs for the project. Appendix C presents the field records for the individual wells. Records for each soil boring include daily field logs, field geologic logs, and soil boring installation reports. Borehole records for each soil boring are combined and arranged according to soil boring number and are presented as Appendix D. Daily sign-in/sign-out logs and work zone entry/exit logs are included in Appendix E.

2.1 Drilling and Geologic Sampling

Mud rotary drilling methods were used during drilling and installation of the temporary groundwater monitoring wells. A total of three temporary groundwater monitoring wells were installed for this project: CBR-4, CBR-5, and CBR-6.

Name changes of the original staked locations for the temporary groundwater monitoring wells were necessary. The new names are more in keeping with standard reporting format and assisted in data management of the corresponding groundwater sampling locations.

Original Name	New Name
CBR-T1	CBR-6
CBR-T2	CBR-5
CBR-T3	CBR-4

Bentonite-based drilling fluids (Quik-Gel™) were used only during the mud rotary drilling and well installations. Drilling was accomplished with a tri-cone drill bit. The drilling fluid parameters

were carefully monitored and adjusted to properly clean the borehole, enhance stability and reduce drilling fluid loss. For groundwater monitoring well installations the boreholes were drilled to a nominal 20.3-cm (8-in.) diameter for the 5.1-cm (2-in.) diameter polyvinyl chloride (PVC) wells. See Table 1 for groundwater monitoring well installation information.

The field oversight used an organic vapor analyzer (OVA) or an HNu (trace gas analyzer) to monitor for the presence of volatile organics, which could originate from the borehole during drilling. Also, samples of the drill cuttings were collected for screening by WSRC HP to monitor for potential radioactive materials.

Hand auger and hollow stem auger drilling techniques were used throughout the project for soil sample collection. The first two soil samples 0.0 to 0.30 m (0.0 to 1.0-ft depth) and 0.30 to 0.61 m (1.0 to 2.0 ft) were collected at each sample location. A stainless steel 3-inch diameter hand auger was used to collect these samples and advance the borehole to the required sampling depth. Subsurface soil samples [deeper than 0.61 m (2.0 ft)] were collected at each sample location using a truck-mounted auger drill rig. Hollow-stem augers advanced the borehole to the required sampling depth. Soil samples and lithologic samples were obtained by split-spoon from each soil boring. A 61-cm (24-in.) long, 5.1-cm (3-in.) outside diameter (O.D.) stainless steel split-spoon was lowered on drill rod through the hollow stem augers to the desired sampling depth. The split-spoon was hydraulically pushed or hammer driven into the formation. A total of 12 soil borings were installed for this project (CS6G-11 through CS6G-22). The split-spoons were opened in the field onto a clean plastic covered surface and immediately examined and described in the field by the technical oversight. Small portions of each sample were placed in Ziplock bags and later screened with either an OVA or a HNu for the presence of volatile organics. The soil was gently homogenized to ensure a representative composite sample over the depth of the sample interval. Then the soil was placed in appropriate laboratory supplied containers and stored in coolers onsite until prepared for offsite shipment.

Sample handling procedures and associated mobilization, demobilization, decontamination, and quality control procedures are specified in WSRC 3Q5 and the RFI/RI Program Plan. To prevent and minimize cross-contamination between sampling locations, decontamination procedures were utilized. All down-hole drilling equipment (rig, hollow stem augers, etc.) were steam cleaned prior to use at the beginning of each soil boring. Then plastic sheeting was placed under the drill rig. Decontamination procedures for sampling equipment is detailed in Section 2.2.2. Soil cuttings from the augered boreholes were not removed from the waste unit area, but were either placed back

Table 1
Summary of Groundwater Monitoring Well Installation

Well Number	Date Well Installed	Original Ground Surface Elevation	Depth Drilled	Top of Liquid Level Pipe Elevation	Depth To Top Screen	Screen Length	Depth To Bottom Well	Depth To Top of Filter Pack	Depth to Top of Fine Sand	Depth To Top of Bentonite Seal
CBR-4	11/4/94	--	62.0	--	40.2	20.0	60.5	36.6	NA	18.9
CBR-5	11/3/94	--	57.0	--	35.0	20.0	55.2	33.0	NA	30.0
CBR-6	11/3/94	--	62.0	--	40.2	20.0	60.4	35.9	NA	32.5

NOTES:

All depths from original ground surface (ft bls).
All elevations relative to msl in ft.
All wells constructed with screen size 0.016 in. and filter pack 0.018 - 0.022 in. (FX-50).
-- Not available

ABBREVIATIONS:

NA - Not Applicable

into the borehole in the soil boring abandonment process or dispersed about the unit area as specified in WSRC 3Q5.

Detailed geologic logs were prepared by the RUST E&I environmental engineer in the field. The field logs are included in Appendices C and D and arranged by borehole number. The grain-size classifications were based upon the modified Wentworth Scale in accordance with WSRC 3Q5.

Grain Size Classification	Diameter (mm)
Pebbles	4 - 64
Granules (very fine pebbles)	2 -4
Very Coarse Sand	1 - 2
Coarse Sand	1/2 - 1
Medium Sand	1/4 - 1/2
Fine Sand	1/8 - 1/4
Very Fine Sand	1/16 - 1/8
Silt	1/256 - 1/16
Clay	< 1/256

Size fraction percentages were based upon visual inspection and comparison with percentage charts. The degree of sorting present in the sample was based upon visual analysis. The following sorting classification system was adopted:

Well Sorted	90% of sample within 2 sand size classes
Moderately Sorted	90% of sample within 3 sand size classes
Poorly Sorted	90% of sample within 4 sand size classes
Very Poorly Sorted	90% of sample within more than 4 size classes

Color descriptions were based upon comparisons with a standard Munsell™ color chart. The features described on the logs consisted primarily of major sediment type, texture, color, carbonate zones, sedimentary structures, fossils, and accessory minerals. In general, grain sizes, percentages, color, roundness, and sphericity were described by comparison with charts. The soil was also visually classified according to the Unified Soil Classification System (USCS).

2.2 Temporary Groundwater Monitoring Well Design, Installation, and Sampling

2.2.1 Temporary Groundwater Monitoring Well Construction

Three temporary groundwater monitoring wells were installed in the Water Table (CBR-4, CBR-5 and CBR-6). Well construction details for each monitoring well are presented in Appendix C and Table 1. The monitoring wells have been surveyed for location and elevation, and the information was included in an as-built report table provided to WSRC. The available as-built survey data for the groundwater monitoring wells are presented in Table 2.

All monitoring wells were constructed in accordance with specifications and procedures described in WSRC 3Q5 for monitoring wells, and the South Carolina Well Standards and Regulations, R.61-71 of the Code of Laws of South Carolina [South Carolina Department of Health and Environmental Control (SCDHEC), 1985]. The monitoring wells will be surveyed for location and elevation by WSRC, and the information will be included in an as-built report provided to WSRC. Screen intervals for the 5-cm (2-in.) diameter wells were selected after considering hydrogeologic data obtained from previous studies, reports and lithology.

The 5-cm (2-in.) diameter wells were constructed of PVC casing, machine slotted PVC screens with 0.041-cm (0.016-in.) slot width, and a bottom plug either 6.1 or 9.1 cm (2.4 or 3.6 in.) in length. Two stainless steel centralizers were installed as presented in Appendix B.

The filter pack consisted of 0.046 to 0.056-cm (0.018 to 0.022-in.) uniform silica sand. The filter pack was installed from the bottom of the borehole to a minimum of 0.6 m (2 ft) above the screen through a tremie pipe placed adjacent to the well screen. A minimum of 0.9 to 1.5-m (3 to 5-ft) thick bentonite pellet seal was installed above the filter pack. After at least 2 hours of hydration time, a cement/bentonite grout cap was installed through a tremie pipe lowered to just above the bentonite seal. The minimum allowable cement weight was 1.58 g/cm^3 (13.2 lbs/gal). Any variations in well construction is presented in Appendix C.

A strong effort was made to minimize the potential of introducing contamination into the subsurface or the local environment during drilling operations. This effort was made so that the results of water quality sampling would be representative of actual groundwater conditions. All well construction materials were secured or wrapped in plastic for storage at the drill site. The

Table 2
Coordinates and Elevation Details

Well Number	Northing	Easting	Top of Casing Elevation*	Pad Elevation*
CBR-4	60218.24 33.24560867	53107.95 81.64393628	295.84	293.4
CBR-5	60158.39 33.24479117	52687.98 81.64492561	295.89	293.3
CBR-6	60413.28 33.24512914	52549.53 81.64578486	303.91	301.4

Soil Boring	Northing	Easting	Ground Surface Elevation*
CS6G-11	60292.81 33.24547969	52927.78 81.64455530	293.0
CS6G-12	60278.56 33.24556414	52998.90 81.64434044	294.2
CS6G-13	60275.55 33.24564386	53051.84 81.64419522	293.9
CS6G-14	60304.73 33.24558158	52974.07 81.64445658	295.4
CS6G-15	60257.33 33.24550322	52990.29 81.64432189	293.4
CS6G-16	60265.53 33.24572022	53112.24 81.64401678	293.4
CS6G-17	60334.64 33.24560667	52948.92 81.64458086	296.6
CS6G-18	60393.28 33.24567778	52912.99 81.64478928	298.4
CS6G-19	59918.47 33.24551744	53458.61 81.64243128	293.3
CS6G-20	60041.66 33.24455736	52702.91 81.64465972	290.1

Table 2 (continued)
Coordinates and Elevation Details

Soil Boring	Northing	Easting	Ground Surface Elevation*
CS6G-21	60468.84 33.24428697	51957.93 81.64744997	299.9
CS6G-22	60315.96 33.24553683	52931.42 81.64459067	292.4
CS6G-23	60284.13 33.24531669	52839.65 81.64477044	291.0
CS6G-24	60245.76 33.24544075	52967.73 81.64435880	289.2
CS6G-25	60192.74 33.24563730	53160.10 81.64374947	288.1
CS6G-26	60391.23 33.24498311	52489.87 81.64589911	293.1
CS6G-27	60408.66 33.24491783	52426.24 81.64610044	293.7
CS6G-28	60428.72 33.24486497	52366.66 81.64629622	293.6
CS6G-29	59772.66 33.24398319	52715.75 81.64410372	279.8
CS6G-30	59934.33 33.24472905	52953.74 81.64379108	282.2
CS6G-31	5996.22 33.24504417	53062.99 81.64362364	284.4
CS6G-32	60071.58 33.24532817	53134.87 81.64358072	285.7
CS6G-33	60114.87 33.24549680	53179.56 81.64354711	286.4

* Elevations relative to Mean Sea Level.
LAT indicates latitude in decimal degrees. LON indicates longitude in decimal degrees.

drilling and downhole equipment, including drilling and development tools, bailers, pumps, well casings, and well screens were steam cleaned just prior to use or installation and between well sites to minimize the chances of cross-contamination. At each site, plastic sheeting was placed under the drilling rig to contain any fluid leaks from service trucks or the drill rig. Any oil or hydraulic leaks present on the plastic sheet were absorbed with dry bentonite powder and disposed of by WSRC drilling subcontract personnel.

2.2.2 Well Development

Following subsurface completion, each well was developed under guidelines outlined in WSRC 3Q5 and under the direction of WSRC personnel. Well development records included such information as pH, specific conductance, and volume of water removed from the wells. Well development reports were prepared by the drilling companies and submitted to WSRC Environmental Protection Department Groundwater Monitoring Group. Well development results are summarized in Table 3 of this report. Appendix F includes well development records from EMTC.

Initially, each well was developed by bailing slowly. This procedure allows the filter-sand to settle around the screen properly, while purging heavy drilling mud from the well casing, and initiating breakdown of the mud cake formed during rotary drilling operations. The wells were bailed as soon as possible after completion in order to facilitate the initial breakdown of the mud cake.. As the development process progressed, the wells were surged by rapidly raising and lowering the bailer. The muddy water was then bailed.

If the groundwater monitoring wells required additional development, a submersible pump outfitted with a surge block was used to surge, or swab discreet areas of the screened zone and remove large volumes of fluid. This surge block was made of a rigid rubber stopper attached to the tremie pipe a few feet above the submersible pump. It was only slightly smaller in diameter than the inside diameter of the well being developed, so that the tremie could be raised and lowered to swab an area of the screen. The surge block would push water out of the screen zone as the tremie and pump were lowered and pull water into the screen zone as they were lifted. When the pH and conductivity of the well had stabilized, the submersible pump was removed from the well. Both of these methods were utilized in the development of the groundwater monitoring wells (see Table 3).

Table 3
Summary of Well Development

Well Number	Development Method**	Development Hours	Approximate Well Yield (gpm) During Development	Estimated Volume of Water Removed in gallons during Development	pH Initial/Final	Specific Conductance (µmhos/cm) Initial/Final)	Water Level Initia/Final (Depth in ft bls)	Water Level Elevation (ft msl)
CBR-6	B/S	6.5	0.1	202	6.25/NR	NR	48/53.5	--
CBR-5	B/S	8	0.5	152	6.14/NR	NR	41/50	--
CBR-4	B/S	12	0.75	425	NR	NR	29/41.5	--

** B - Bailing /S - Swabbing and Surging
NR - No Record
-- Not available
Table prepared from well development records from EMTC.

2.2.3 Groundwater Sampling

Groundwater samples were collected in two different sampling phases from the three temporary groundwater monitoring wells (CBR-4, CBR-5, and CBR-6) on December 5 and December 28, 1994. The Addendum to Chapter 4 of the RFI/RI Work Plan for the Central Shops Burning/Rubble Pit, 631-6G lists the sampling analytes (see Appendix A). All wells were sampled in accordance with WSRC 3Q5. A summary table of the sampling data is presented in Appendix G. The analytical results for this groundwater sampling are not yet available and will not be presented in this report.

2.2.4 Field Permeability Testing

After well development was complete, slug tests (both rising and falling head) were performed on each monitoring well to estimate the hydraulic conductivity (K) of the screened formations. The data were analyzed using the Bouwer and Rice (1976) method (Aqtesolv Aquifer Test Solver, version 1.1, Aqtesolv Test Design and Analysis Computer Software by Geraghty & Miller, Inc., Environmental Services Modeling group).

Test Procedure

Slug tests require the instantaneous displacement of a volume of water within a well or piezometer. A field testing system was used which could be easily set up with a PVC slug (cylinder). The slug was a cylinder constructed of nominal PVC pipe. The cylinder or slug was 2.54 cm (1 in.) in diameter. The cylinder had caps secured on both ends and one end cap was fitted with a lifting hook. The pipe was filled with clean water to serve as ballast.

Falling head test data were reported for each of the monitoring wells. The falling head tests were performed by tying a nylon rope to the lifting hook of the cylinder, submerging the cylinder, and measuring the fall in head in the well casing as the water level returned to static conditions. A pressure transducer linked to an electronic data recorder was used to record the fall in head.

A rising head test was performed once the falling head test reached near static conditions. The rising head test measures the rise in head or the recharge of water after the submerged cylinder had been quickly removed from the well or piezometer.

Data Analysis

The Bouwer and Rice Method (1976) was used in this program to analyze the slug test data. It is applicable to fully or partially-penetrating wells in confined and unconfined aquifers and assumes negligible drawdown of the Water Table around the well and no flow above the Water Table. (Aqtesolv Aquifer Test Solver, version 1.1)

The Bouwer and Rice equation for estimating hydraulic conductivity is:

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \times \frac{1}{t} \times \ln \frac{y_o}{y_t}$$

where, R_e = effective radial distance over which the head difference is dissipated

r_c = radius of the section where the water level is rising. If the water level is rising within the screen,

$$rc = \sqrt{r_c^2 + n(r_w^2 - r_c^2)}$$

r_w = radial distance between well center and undisturbed aquifer (r_c plus thickness of gravel envelope or developed zone outside casing)

L = height of perforated, screened, encased or otherwise open section of well through which groundwater enters

y = the level of water in the well above or below the Water Table

y_o = y at time zero

y_t = y at time t

t = time since y_o

An empirical equation is used that relates R_e to the geometry and boundary conditions of the system:

$$\ln \frac{R_e}{r_w} = \frac{1}{\frac{1.1}{\ln(H/r_w)} + \frac{A + B \ln[(D-H)/r_w]}{(L/r_w)}}$$

where H = vertical distance from the Water Table to the base of L
D = the aquifer thickness
A,B = dimensionless parameters found by comparing their relationship to L/r_w on a graph of curves provided by Bouwer and Rice (1976).

The observed values of y are plotted against t on semilogarithmic paper (y on the log scale).

Results

Hydraulic conductivity estimates for temporary wells CBR-04 through CBR-06 ranged from 2.95E-5 cm/sec (9.68E-7 ft/sec) to 4.2E-4 cm/sec (1.378E-5 ft/sec) and averaged 1.88E-4 cm/sec (6.18E-6 ft/sec). The hydraulic conductivity estimates for all the wells slug tested (rising and falling head) are presented in Table 4. Data plots of the slug tests are included in Appendix H. These hydraulic conductivity estimates were fairly typical for the lithologies encountered.

2.3 Soil Sampling

2.3.1 Soil Sample Locations and Intervals

The objectives of the soil sampling investigation are (1) to confirm the results of the previous soil sampling (2) to define the pit boundaries in light of the new data provided by historical aerial photographs, and (3) to characterize any potential sources of contamination at the BRP6G and to determine the location of these sources. The Addendum to Chapter 4 of the RFI/RI Work Plan for the Central Shops Burning/Rubble Pit, 631-6G, details the changes to the work plan unit assessment activities and lists the sampling interval and analytes (see Appendix A).

Soil boring locations are illustrated in Figures 3 and 4. See Table 2 for coordinates and ground surface elevations. Borings CS6G-11 and CS6G-14 were expected to be located within the proposed expanded pit/unit area. Results from these borings will provide information regarding the presence or absence of contaminants within the area designated by the historical aerial photographs as the BRP6G.

Table 4
Groundwater Monitoring Well
Hydraulic Conductivity Estimates *

	Hydraulic Conductivity (K)		
Well No.	(ft/sec)	(ft/day)	(cm/sec)
CBR-4◊	3.19E-6	0.276	9.72E-5
CBR-5	8.48E-6	0.733	2.59E-4
CBR-6	6.78E-6	0.587	2.068E-4
		Average	
Hydrostratigraphic Unit/Zone	Range ft/sec	ft/day	cm/sec
Aquifer Zone IIB_2 (Water Table)	9.68 E-7 to 1.38E-5	0.53	1.88E-4

* Based on Field Permeability Testing (Slug Tests)

◊ The Falling Head slug test for CBR-4 was not acceptable; therefore the K presented is for the Rising Head slug test only.

Borings CS6G-15, CS6G-16, and CS6G-17 are located outside the proposed expanded unit/area. Results from these borings will provide information regarding the presence or absence of contaminants outside of the area designated as the BRP6G by the historical aerial photographs.

Background soil sample locations (CS6G-18 through CS6G-22) were selected in cooperation with a soil taxonomist at the time the sampling was conducted (Figure 4). Selected locations are considered beyond the area that potentially may have been impacted from waste disposal activities at the unit. In addition, six surficial 0 - 0.3 m (0-1 ft) soil samples were obtained within the ditch located along the railroad, south of the pit. Three of the samples were selected within the ditch, upgradient and beyond the area of potential impact by the unit. The remaining three samples were collected within the ditch, downgradient from the pit.

The first sample was collected at the surface to 0.3 m (1.0 ft) bls. The second sample was collected from 0.3 m to 0.6 m (1.0 to 2.0 ft) bls. Samples were then collected continuously at 0.6 m (2.0 ft) intervals until two consecutive samples screened clean for volatile organics below the bottom of the pit (Figure 16). The bottom of the pit was designated as the interface from observed burn material and residual soil. The Addendum to Chapter 4 of the RFI/RI Work Plan for the Central Shops Burning/Rubble Pit, 631-6G (Appendix A) designates the analyses to be performed at each sampling interval. The list of possible analytes include Target Compound List/Target Analyte List (TCL/TAL) with Tentatively Identified Compounds (Library Scan) (TIC), Dioxins/Furans, Radiological Indicators, Gas Chromatograph/Mass Spectrophotometer (GC/MS) volatile organic compounds (VOCs), RCRA metals, and TCL VOCs only.

A split of each soil sample was screened in the field for organic vapors using an OVA or an HNu, as outlined in WSRC 3Q5 and the RFI/RI Program Plan. As negotiated with SCDHEC, sampling continued when VOCs field screening indicated contamination in either of the last two samples. When elevated VOCs were detected, samples were collected every 1.5 m (5 ft) down to the Water Table or until field screening indicated no contamination in two consecutive samples, whichever came first (see Figure 16 under the heading "anomalies").

In accordance with WSRC 3Q5 and the RFI/RI Program Plan, field quality control samples were collected during the soils investigation. Trip blanks were added to the work plan and were submitted for TCL VOC analytes. Aqueous trip blanks were provided by the laboratory at the

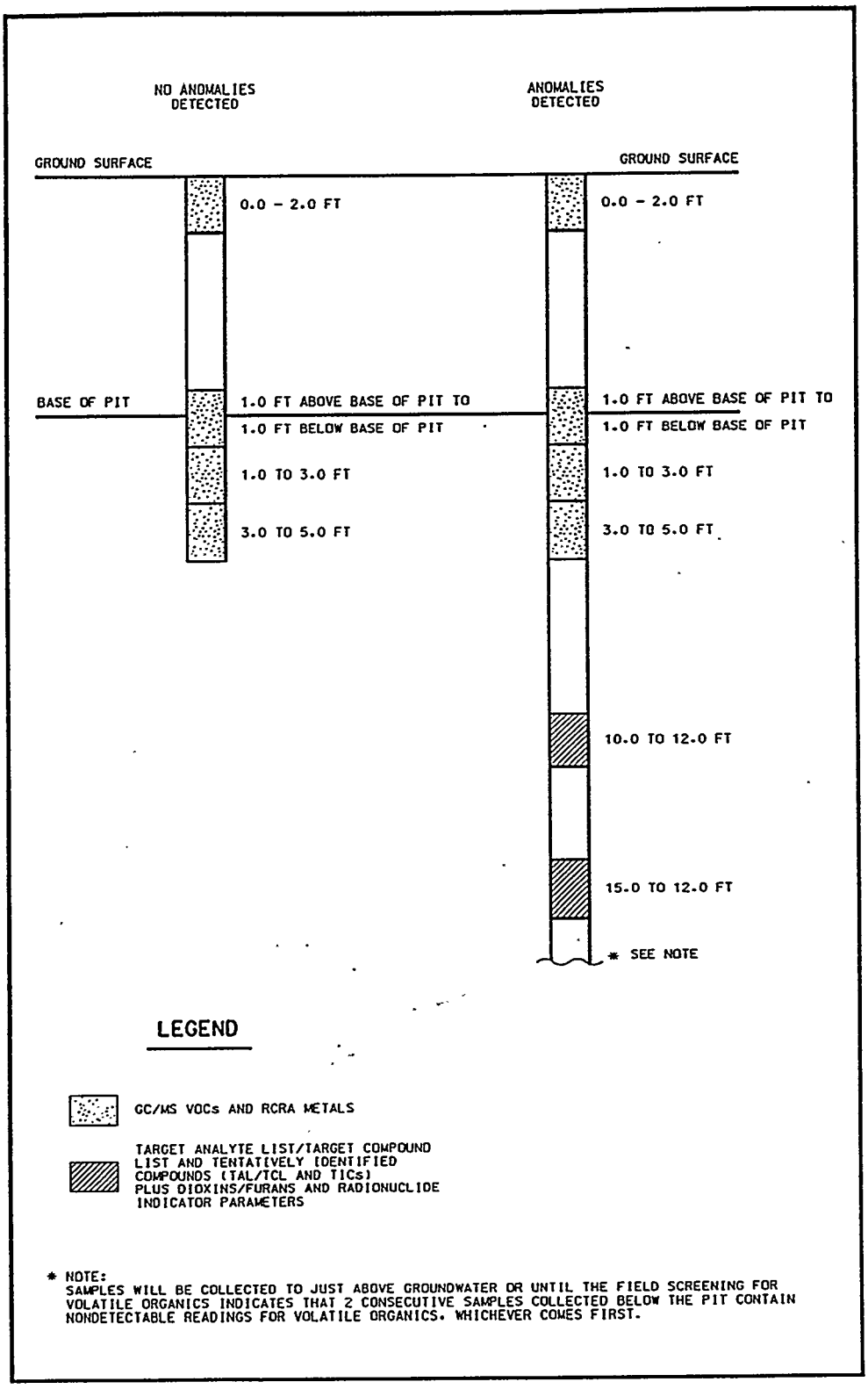

Figure 16. Soil Sampling Depths and Analytical Parameters

frequency of one trip blank per cooler. All samples for VOC analysis were placed in the same cooler for each day's sample shipment.

2.3.2 Soil Sampling Procedures

As previously described in Section 2.1, soil was collected from each soil boring using a stainless steel hand auger or a split-spoon. Caution was taken to ensure minimum loss of volatiles by keeping the split-spoon closed until the soil sample was collected. Scrapings were taken down the length of the split-spoon sample and placed in air tight plastic bags for volatile screening with an OVA. Scrapings were also taken along the length of the split-spoon to fill the VOC containers for laboratory analysis. A small section of the sample was set aside for descriptive purposes (see Section 2.1) and the remainder of the sample was carefully homogenized and the remaining laboratory containers were filled. Sample container, preservation, storage, and holding time requirements are specified in the Central Shops Burning/Rubble Pit 631-6G, Revision 2, RFI/RI Work Plan. All disposable sampling supplies and materials were removed from the waste unit areas and disposed of in accordance with current WSRC procedures.

Preparation for sample collection included pre-printed chain-of-custody (COC) forms, pre-printed labels with bar code identification system, and receipt of required laboratory containers (including laboratory trip blanks). These tasks were handled by EMS. Sample container and documentation kits were then gathered (containers for each interval at each sampling location), and the bar code identification system was put into effect via the accompanying COC forms. There was a bar code printed for the container and corresponding COC form and for the EPD/EMS Soil Sample Logbooks. When the sample interval had been determined in the field, the final phase of the bar code identification system was enacted. The final bar code sticker was placed in the EPD/EMS Soil Sample Logbook under the sample identification (ID) number for that specific sampled interval in that specific soil boring [i.e., sample ID 101876 is the sample collected from 0.00 to 0.61 m (0.00 to 2.00 ft) bls, which is the first sampling interval in soil boring CS6G-11]. The time, date, sampler, sample type, sample matrix, Munsell™ color, lithologic description, soil wetness, associated samples, and unified soil classification are also recorded in the EPD/EMS Soil Sample Logbook.

Preparation for soil sample collection includes decontamination of the soil sampling equipment. Sampling equipment (split-spoons, stainless steel bowls, spatulas, etc.) were decontaminated prior to use in accordance with the following cleaning procedures:

- Sampling equipment or materials not used immediately after decontamination were placed on a plastic sheet and secured to avoid potential contamination.
- Clean with deionized water and phosphate-free laboratory detergent, (Alconox) using a brush if necessary to remove particulate matter and surface films.
- Rinse thoroughly with deionized water.
- Rinse with pesticide-grade isopropanol solvent.
- Rinse thoroughly with deionized water, and allow to air dry before use.
- Wrap sampling equipment completely with aluminum foil, shiny side out, to prevent contamination if equipment is to be stored or transported.

Clean, disposable gloves will be worn while handling sampling equipment or downhole tools during decontamination. Deionized water will be stored in plastic containers and applied from plastic pump sprayers or decanted directly from the storage container. Storage of isopropanol at SRS requires storage in a non-flammable, steel container marked flammable.

2.3.3 Soil Sample Results

Soil borings were installed according to the planned order and consisted of: CS6G-11, CS6G-12, CS6G-13, CS6G-14, CS6G-15, CS6G-16, CS6G-17, CS6G-18, CS6G-19, and CS6G-20, CS6G-21 and CS6G-22. The first borings drilled were those considered most likely to contain elevated contaminant values. In addition, this sequence allowed definition of the pit depths and boundaries in the borings that were located within the pit areas (see Table 5). The depths to pit bottom were used to determine sample depths in the four borings located outside the pit (CS6G-11, CS6G-15, CS6G-16, and CS6G-17) and the background borings (CS6G-18 through CS6G-21).

During soil boring installation, an OVA or HNu was used to screen for the presence of volatile organics to determine the vertical extent for sampling. OVA readings were below detection limits for all borings inside the pit boundaries except for boring CBR-14 with OVA readings as follows:

BORING CS6G-14

Depth Below Ground Surface (ft)	OVA Reading (ppm)
0-1	15
1-2	20
2-4	3
4-6	10
6-8	12
8-10	0
13-15	0

Table 5
Summary of Soil, Surface Water/Sediment Sampling

Sample Location	Sample Number	Sampling Date	Number of Split-Spoon Samples*	Total Depth HSA	Depth of the BOP	Sample ID Number	Munsell™ Color Primary/	Munsell™ Color Secondary	Sampling Depths From/To	Unified Soil Classification	Analyte Code	Location
CS6G-11		11/14/94	4	10.0	NA							Outside Pit
	01E					101874	NA	NA	0.0-1.0	NA	1,2,3	
	01					101876	10Yr 4/2	NA	0.0-1.0	CL	1,2,3	
	02					101877	10Yr 8/2	10Yr 6/6	1.0-2.0	CL	1,2,3	
	03					101878	10Yr 6/6	10Yr 8/2	2.0-4.0	CL	1,2,3	
	04					101879	5Yr 5/6	NA	4.0-6.0	CL	1,2,3	
	05					101880	10Yr 8/2	NA	6.0-8.0	CL	1,2,3	
	06					101881	10Yr 8/2	NA	8.0-10.0	CL	1,2,3	
CS6G-12		11/15/94	3	8.0	3.5							Inside Pit
	01					101884	5Yr 5/4	NA	0.0-1.0	SM	1,2,3	
	02					101885	5PB 3/2	NA	1.0-2.0	SM	1,2,3	
	03					101886	10Yr 6/2	NA	2.0-4.0	CL	1,2,3	
	04					101887	10Yr 6/6	10Yr 6/2	4.0-6.0	CL	1,2,3	
	05					101888	10Yr 6/6	10Yr 6/2	6.0-8.0	CL	1,2,3	
	07E					101889	NA	NA	6.0-8.0	NA	1,2,3	
CS6G-13		11/15/94	3	8.0	3.8							Inside Pit
	01					101890	10Yr 5/4	NA	0.0-1.0	CL	1,2,3	
	02E					101891	NA	NA	1.0-2.0	NA	1,2,3	
	02					101892	NA	NA	1.0-2.0	NA	1,2,3	
	03					101893	10Yr 8/2	NA	2.0-4.0	CL	1,2,3	
	04					101894	10Yr 8/2	NA	4.0-6.0	CL	1,2,3	
	04D					101895	10Yr 8/2	NA	4.0-6.0	CL	1,2,3	
	05					101896	10Yr 8/2	NA	6.0-8.0	CL	1,2,3	
CS6G-14		11/16/94	5	15.0	7.0							Inside Pit
	01					101897	5Y 4/1	NA	0.0-1.0	SM	1,2,3	
	02					101898	5Yr 6/4	NA	1.0-2.0	SM	1,2,3	
	03					101899	5Yr 6/4	NA	2.0-4.0	CL	1,2,3	
	04					103700			4.0-6.0		1,2,3	
	05					103701			6.0-8.0		1,2,3	
	06					103702	10Yr 8/2	NA	8.0-10.0		1,2,3	
	07A					103703	10Yr 8/2	5Yr 5/6	13.0-15.0	CH	5,6	
	07					103704	10Yr 8/2	5Yr 5/6	13.0-15.0	CH	5,6	
	08E					103706	NA	NA	13.0-15.0	NA	5,6	

Table 5 (continued)
Summary of Soil, Surface Water/Sediment Sampling

Sample Location	Sample Number	Sampling Date	Number of Split-Spoon Samples*	Total Depth HSA	Depth of the BOP	Sample ID Number	Munsell™ Color Primary/	Secondary	Sampling Depths From/To	Unified Soil Classification	Analyte Code	Location
CS6G-15		11/17/94	3	12.0	NA							Outside Pit
	01					103707	5Yr 4/1	NA	0.0-1.0	SM	1,2,3	
	01A					103708	5Yr 4/1	NA	0.0-1.0	SM	1,2,3	
	02					103710	10Yr 6/6	NA	1.0-2.0	SM	1,2,3	
	03					103711	10Yr 8/2	5Yr 5/6	2.0-4.0	CL	1,2,3	
	03E					103712	NA	NA	2.0-4.0	NA	1,2,3	
	04					103713	10Yr 8/2	5Yr 5/6	4.0-6.0	CL	1,2,3	
	05					103714	10Yr 8/2	5Yr 5/6	10.0-12.0	CL	1,2,3	
CS6G-16		11/17/94	3	12.0	NA							
	01					103716	10Yr 5/4	NA	0.0-1.0	SM	1,2,3	
	02					103717	N2	NA	1.0-2.0	SM	1,2,3	
	03					103718	N2	NA	2.0-4.0	SM	1,2,3	
	04					103719	10Yr 6/2	5Yr 5/6	5.0-7.0	CL	1,2,3	
	05					103720	N8	NA	10.0-12.0	CH	1,2,3	
CS6G-17		11/17/94	3	12.0	NA							
	01					103721	10Yr 7/4	NA	0.0-1.0	SP	1,2,3	
	02					103722	5Yr 6/4	NA	1.0-2.0	CL	1,2,3	
	03					103722	5Yr 6/4	NA	2.0-4.0	CL	1,2,3	
	03A					103724	5Yr 6/4	NA	2.0-4.0	CL	1,2,3	
	04					103725	10Yr 8/2	5Yr 6/4	5.0-7.0	CH	1,2,3	
	05					103726	10Yr 8/2	NA	10.0-12.0	CH	1,2,3	
CS6G-18		11/18/94	10	47.0	NA							Background
	01					103727	5Yr 4/4	NA	0.0-1.0	CL	1,2,3	
	02					103728	5Yr 5/6	NA	1.0-2.0	CL	1,2,3	
	03					103729	5Yr 5/6	NA	2.0-4.0	CL	1,2,3	
	04					103730	5Yr 5/6	NA	5.0-7.0	SP	1,2,3	
	04E					103731	NA	NA	5.0-7.0	NA	1,2,3	
	05					103732	5RP 4/2	NA	10.0-12.0	CL	1,2,3	
	06					103733	5RP 4/2	NA	15.0-17.0	CL	5,6	
	07					103734	5R 8/2	5R 7/4	20.0-22.0	CL	5,6	
	07A					103735	5R 8/2	5R 7/4	20.0-22.0	CL	5,6	
	08					103736	5R 8/2	5R 7/4	25.0-27.0	CL	5,6	
	09					103737	5RP 6/2	NA	30.0-32.0	CH	5,6	
	10					103738	5R 6/2	NA	35.0-37.0	CH	5,6	
	11					103739	5R 6/2	NA	40.0-42.0	CH	5,6	
	12					103740	5R 6/2	NA	45.0-47.0	CH	5,6	
	12A					103741	5R 6/2	NA	45.0-47.0	CH	5,6	

Table 5 (continued)
Summary of Soil, Surface Water/Sediment Sampling

Sample Location	Sample Number	Sampling Date	Number of Split-Spoon Samples*	Total Depth HSA	Depth of the BOP	Sample ID Number	Munsell™ Color Primary/ Secondary		Sampling Depths From/To	Unified Soil Classification	Analyte Code	Location
CS6G-19		11/22/94	10	47.0	NA							Background
	01					103743	10Yr 7/4	NA	0.0-1.0	SB	1,2,3	
	02					103744	10Yr 7/4	NA	1.0-2.0	SM	1,2,3	
	03					103745	5Yr 5/6	10Yr 6/2	2.0-4.0	CL	1,2,3	
	04					103746	5Yr 5/6	10Yr 8/2	5.0-7.0	CL	1,2,3	
	04A					103747	5Yr 5/6	10Yr 8/2	5.0-7.0	CL	1,2,3	
	05					103748	5RP 4/2	10Yr 8/2	10.0-12.0	CL	1,2,3	
	06					103749	5RP 4/2	5Y 8/1	15.0-17.0	CL	5,6	
	07					103750	5R 4/6	NA	20.0-22.0	CL	5,6	
	08					103751	5RP 6/2	NA	25.0-27.0	CH	5,6	
	09					103752	5R 4/6	NA	30.0-32.0	CL	5,6	
	10					103753	5P 6/2	NA	35.0-37.0	CL	5,6	
	11					103754	5P 6/2	NA	40.0-42.0	CL	5,6	
	12					103755	5R 7/4	NA	45.0-47.0	SP	5,6	
	12D					103756	5R 7/4	NA	45.0-47.0	SP	5,6	
CS6G-20		11/28/94	10	47.0	NA							Background
	01					103758	10Yr 6/6	10Yr 6/2	0.0-1.0	SC	1,2,3	
	02					103759	10Yr 8/6	NA	1.0-2.0	CL	1,2,3	
	02E					103760	NA	NA	1.0-2.0	NA	1,2,3	
	03					103761	10Yr 8/6	NA	2.0-4.0	CL	1,2,3	
	03D					103762	10Yr 8/6	NA	2.0-4.0	CL	1,2,3	
	04					103763	10Yr 6/6	NA	5.0-7.0	CL	1,2,3	
	05					103764	10Y 8/2	10R 5/4	10.0-12.0	CL	5,6	
	06					103768	10Yr 8/2	10R 3/4	15.0-17.0	CL	5,6	
	07					103769	10Yr 8/2	5RP 4/2	20.0-22.0	CH	5,6	
	08					103770	10Yr 8/2	5RP 4/2	25.0-27.0	CH	5,6	
	09					103771	10Yr 8/2	5RP 4/2	30.0-32.0	CH	5,6	
	10					103773	10R 7/4	NA	35.0-37.0	SP	5,6	
	11A					103774	10Yr 8/2	NA	40.0-42.0	SM	5,6	
	11					103775	10Yr 8/2	NA	40.0-42.0	SM	5,6	
	12D					103776	10Yr 8/2	NA	45.0-47.0	SM	5,6	
	12					103777	10Yr 8/2	NA	45.0-47.0	SM	5,6	
CS6G-21		12/1/94	10	47.0	NA							Background
	01					103780	10Yr 6/6	10R 6/4	0.0-1.0	CL	1,2,3	
	02					103781	10Yr 6/6	10R 6/4	1.0-2.0	CL	1,2,3	
	03					103782	10Yr 8/2	5Yr 5/6	2.0-4.0	CL	1,2,3	
	03E					103783	NA	NA	2.0-4.0	NA	1,2,3	

Table 5 (continued)
Summary of Soil, Surface Water/Sediment Sampling

Sample Location	Sample Number	Sampling Date	Number of Split-Spoon Samples*	Total Depth HSA	Depth of the BOP	Sample ID Number	Munsell™ Color Primary/	Munsell™ Color Secondary	Sampling Depths From/To	Unified Soil Classification	Analyte Code	Location
	04					103784	10Yr 8/2	5Yr 5/6	5.0-7.0	CL	1,2,3	
	05					103785	10Yr 8/2	5Yr 5/6	10.0-12.0	CL	5,6	
	06					103786	10Yr 8/2	5Yr 5/6	15.0-17.0	CH	5,6	
	06A					103787	10Yr 8/2	5Yr 5/6	15.0-17.0	CH	5,6	
	07D					103788	5RP 4/2	NA	20.0-22.0	CH	5,6	
	07					103789	5RP 4/2	NA	20.0-22.0	CH	5,6	
	08					103790	5Y 8/1	5RP 4/2	25.0-27.0	CH	5,6	
	09					103791	10Yr 8/2	NA	30.0-32.0	CH	5,6	
	10					103792	N9	NA	35.0-37.0	CL	5,6	
	11					103793	N9	NA	40.0-42.0	CL	5,6	
	12					103794						
CS6G-22		12/6/94			NA							Drainage feature
	01					102534	10R 6/6	10R 6/2	0.0-1.0	CL	1,2,3	
	02					102535	N1	NA	1.0-2.0	SM	1,2,3	
	03					102536	N1	NA	2.0-4.0	SM	1,2,3	
	03D					102537	N1	NA	2.0-4.0	SM	1,2,3	
CS6G-23	01	12/6/94				102532	10R 6/6	NA	0.0-1.0	SM	1,2,3	
CS6G-24	01	12/5/94				102530	10R 6/6	NA	0.0-1.0	SM	1,2,3	
CS6G-25	01	12/6/94				102531	10R 6/6	NA	0.0-1.0	SM	1,2,3	
CS6G-26	01	12/5/94				102529	5Yr 5/6	NA	0.0-1.0	SM	1,2,3	
CS6G-27	01	12/5/94				102528	5Yr 5/6	NA	0.0-1.0	SM	1,2,3	
CS6G-28	01	12/5/94				102526	5Yr 5/6	NA	0.0-1.0	SM	1,2,3	
	01A					102527	5Yr 5/6	NA	0.0-1.0	SM	1,2,3	

NA Not applicable
Analyte Codes for Soil Samples:
1. TCL/TAL w/TIC
2. Dioxins/Furans
3. Rad Indicators (gross alpha and non-volatile beta)
5. GC/MS VOCs
6. RCRA Metals
7. TCL VOCs only
8. TCL VOCs w/TIC

QA/QC Sample Codes:
A Duplicate
D Split
E Rinsate Sample

Table 5 (continued)
Summary of Soil, Surface Water/Sediment Sampling

Sample Location	Sample Number	Sampling Date	Number of Split-Spoon Samples*	Total Depth HSA	Depth of the BOP	Sample ID Number	Munsell™ Color Primary/ Secondary		Sampling Depths From/To	Unified Soil Classification	Analyte Code	Location
CS6G-29		12/7/94										
	01					102540	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	02					102541	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
	02E					102542	NA	NA	NA	NA	5,6,7,8,12	
CS6G-30												
	01					102543	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	02					102544	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
CS6G-31												
	01					102545	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	01D					102555	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	02					102546	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
	02D					102556	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
CS6G-32												
	01					102547	NA	NA	NA	NA	4,5,6,7,8,9,19,10	
	02					102548	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
CS6G-33												
	01					102549	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	01A					102550	NA	NA	NA	NA	4,5,6,7,8,9,10,11	
	02					102551	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	
	02A					102552	5Yr 5/6	NA	Surface	SM	5,6,7,8,12	

NA Not applicable

Analyte Codes for Surface Water/Sediment Samples:
1. Total organic halogens
2. Metals (Ag, As, Ba, Cd, Cr, Cu, Pb, Mn, Hg, Nl, Se)
3. Semi-volatile organic constituents, including polycyclic hydrocarbons (PAH)
4. Volatile organic constituents (volatile organic analysis, gas chromatography, mass spectrometer (VOA GC/MS)
5. Radionuclide indicators (gross alpha, nonvolatile bet, total radium) and tritium
6. Surface water tempearture, dissolved oxygen, pH, depth, flow (estimate)
7. Sediment pH, TOC
8. Inorganics (Cl, F, SO4, NO3, Na, Fe)
9. TOC, TSS, TDS

QA/QC Sample Codes:
A Duplicate
D Split
E Rinsate Sample

Several factors possibly affected the readings that were encountered and the background (ambient readings). The calibration gas (methane) is ±2 parts per million (ppm with a minimum detectable limit of 0.2 ppm. Another factor is that ambient background readings will vary depending on the geographical location where the instrument is being used. However, background readings should normally be in the range of 3 to 5 ppm when calibrated with methane. An acceptable background reading of 1.0 to 1.5 ppm methane is normal. In addition to the measurement of a normal methane background, 2 to 4 ppm of equivalent methane background can be caused by acceptable levels of contamination in the OVA's hydrogen fuel and/or hydrogen fuel handling system which will result in a total equivalent methane reading of 3 to 5 ppm as background.

Measurements of 6 to 7 ppm may be acceptable background reading depending on site conditions that affect background. The background reading may be zeroed out or nulled even though in reality the background still exists. The background reading is measured by zeroing the meter with the flame out and noting the meter indication after the flame is on.

Possible causes for high background readings from the OVA include:

- impurities in the hydrogen fuel system
- interferences trapped in the porous bronze sample filter of the Mixed/Burner Assembly
- contamination in the air sample line

It is suspected that the listed readings were due to naturally occurring sources, methane from rotting vegetation and/or terpines from pine tree roots located within the vicinity of the boring. Also, the BRP6G unit is located near a recycling yard that had a generator running at all times during the work day. Other deciding factors that may have provided readings were:

- weather, because humidity can effect the accuracy of the OVA by ±20% of individual full scale
- isopropanol rinse required for equipment decontamination because residual isopropanol on sampling gloves or clothes could have resulted in a high background detection

Table 5 is a summary of drilling depths, sample intervals and other information included in the EPD/EMS Soil Sample Logbook. The bottom of the pit (BOP) and a burnt, black layer with debris

were encountered in three boreholes inside the pit/unit boundaries (see Table 5). All 12 soil borings were installed, sampled, and abandoned. Section 2.5 provides detailed descriptions for all of the soil borings. Figure 17 depicts the outline of the pit boundary.

2.4 Surface Water/Sediment Sampling

2.4.1 Sampling Locations and Intervals

A minimum of five surface water and sediment samples (CS6G-29 through CS6G-33) were obtained from the ephemeral stream, located approximately 61 m (200 ft) southeast of the unit (Figure 4). At the time the unit reconnaissance was made it appeared that the drain was hydrologically influenced solely by surface runoff. Selection of adequate background locations for surface water and sediment sampling does not appear to be possible, considering that the origin of the drain is located downgradient from the unit. The Addendum to Chapter 4 of the RFI/RI Work Plan for the Central Shops Burning/Rubble Pit, 631-6G (Appendix A) provided the proposed analyte list.

Surface water/sediment samples were analyzed for Total Organic Halogens (TOH), RCRA metals, semi-volatile organic compounds [including polycylic hydrocarbons (PAH)], GC/MS VOC, radionuclide indicators and tritium, sediment pH and TOC, Inorganics, Total Organic Carbon (TOC), Total Suspended Solids (TSS), and Total Dissolved Solids (TDS).

Field measurements of the surface water included water temperature, dissolved oxygen, pH, and estimated flow (Appendix I). QA/QC samples were also analyzed and collected as specified in the Addendum to Chapter 4 of the RFI/RI Work Plan for the Central Shops Burning/Rubble Pit, 631-6G. A summary of the surface water/sediment sampling is provided in Table 5.

2.4.2 Sampling Procedures

Surface water/sediment sampling was conducted in accordance with procedures specified in the RFI/RI Program Plan and WSRC 3Q5.

Samples were collected from downstream to upstream locations in order to prevent compromising the sampling locations. Surface water samples were collected first at each location and then the surface sediment sample for that location was collected. Caution was taken to ensure minimum

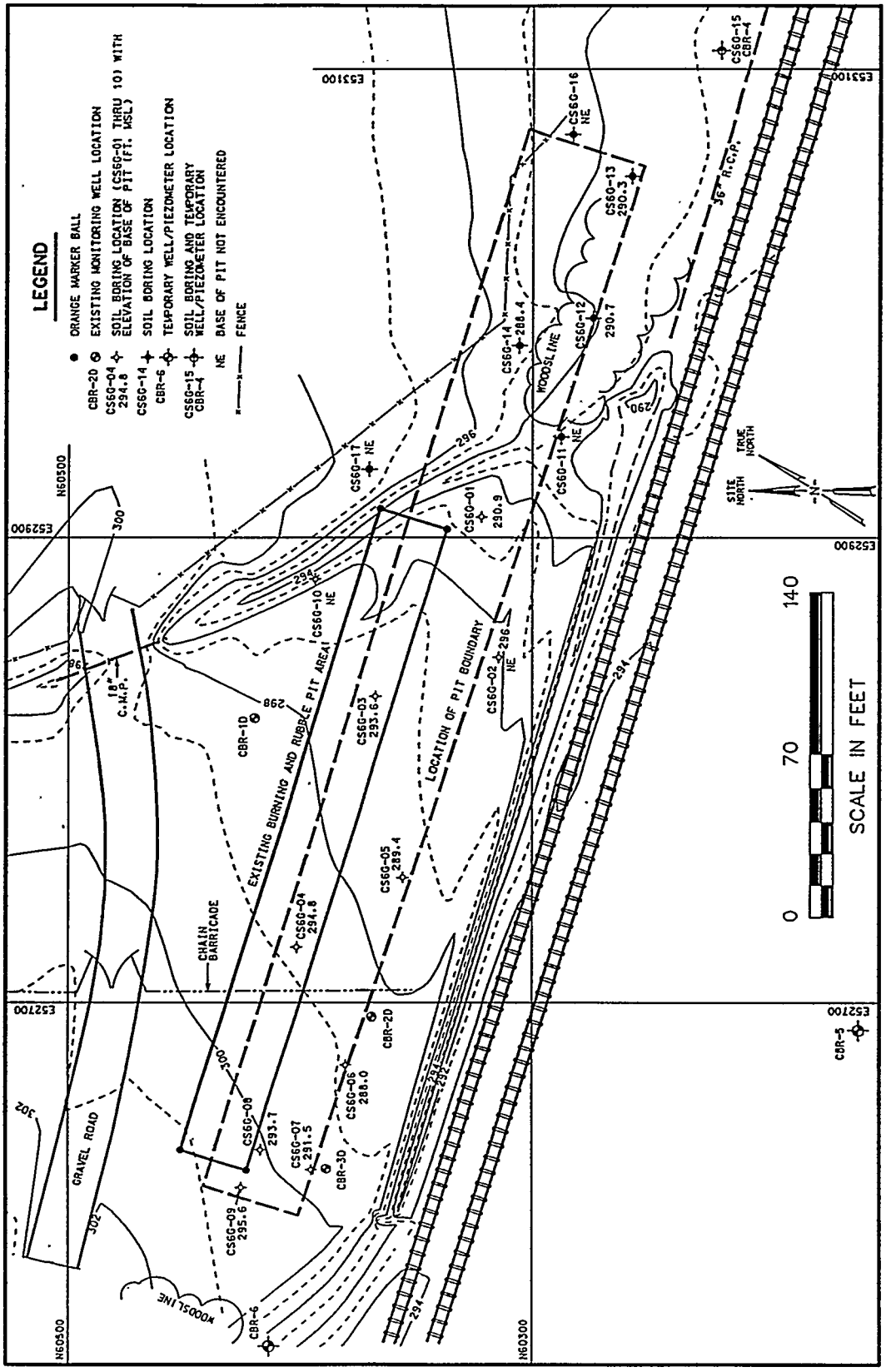

Figure 17. Location of Pit Boundary

loss of volatiles. All disposable sampling supplies and materials were removed from the waste unit area and disposed of in accordance with current WSRC procedures.

Preparation for sample collection and the use of the EPD/EMS soil sample logbooks were described previously in Section 2.3.2. This method was also used for the surface water/sediment sampling. Decontamination procedures of the sampling equipment was also described in Section 2.3.2. Where applicable, these same methods were employed.

2.5 Boring Activity/Problems

2.5.1 Temporary Groundwater Monitoring Wells

Field logs, well construction diagrams, and monitoring well installation reports are presented in Appendices B and C. This section describes any problems associated with well installation.

CBR-4

Temporary well CBR-4 was installed on November 4, 1994 to a total depth of 18.43 m (60.48 ft) below land surface. This well is located southeast of the pit boundary. Difficulties during well installation included improper placement of the bentonite seal. The use of tremie pipe to place well material (sand, bentonite etc.) at the desired depths is highly effective. However, during installation of bentonite an obstruction between the top of the sandpack 11.15 m (36.30 ft) and the measured top of bentonite 8.38 m (27.5 ft) was encountered. The amount of bentonite added to the well should have raised the bentonite to approximately 10 m (33.0 ft), therefore not accounting for an approximate 1.5 m (5 ft) section of the well. Since this well was to be considered a temporary well additional bentonite was added to the well and allowed to hydrate for over 48 hours to 5.8 m (18.9 ft) bls. The additional bentonite was placed to prevent possible portland cement intrusion during placement. This temporary well was considered acceptable for the specified purposes.

CBR-5

Temporary well CBR-5 was installed on November 3, 1995. The well was installed to a depth of 16.7 m (55 ft) bls south of the pit boundary. No problems were encountered during drilling or well installation.

CBR-6

Temporary well CBR-6 was installed on November 3, 1995. The well was installed to a depth of 18.4 m (60.4 ft) bls east of the pit boundary. No problems were encountered during drilling or well installation.

2.5.2 Soil Borings

Descriptions of drilling and sampling activities for each soil boring are summarized below. Field logs and soil boring installation reports are included in this report as Appendices B and D. Sample numbers, sample dates number of split spoon samples, total depth to the BOP, EPD/EMS Soil Sample Logbook sample ID number, munsell color, sample depth, unified soil classification, analyte code, QA/QC identifier, and location for each soil boring are presented in Table 5. It should be noted all soil borings terminated above the water table were properly abandoned by backfilling with soil cuttings from that soil boring.

2.5.2.1 Soil Borings Located Within the Estimated Boundary of BRP6G

CS6G-11

This soil boring was installed on November 14, 1994. This boring was proposed within the pit boundary, however visual inspection of the soil sample results did not indicate disturbance and was believed to be located outside the unit boundary. The soil boring was terminated at 2.4 m (8.0 ft) bls and the final sample was collected from 2.4 to 3.0 m (8.0 to 10.0 ft) bls. No OVA readings were above background levels.

CS6G-12

This soil boring was installed on November 15, 1994. No drilling problems were encountered. This soil boring was located in the eastern part of the original pit. Burn material was observed at 0.45 m (1.5 ft). Residuum was observed at 1.1 m (3.5 ft) and assumed to be the BOP. The soil boring was terminated at 1.8 m (6.0 ft) bls and the final sample was collected from 1.8 to 2.4 m (6.0 to 8.0 ft) bls. OVA readings were not above background levels.

CS6G-13

This soil boring was installed on November 15, 1994. No drilling problems were encountered. This soil boring was located in the eastern part of the original pit. Burn material, including ash, organics, old nails, copper wire, and gravel was observed at from 0.15 to 0.3 m (0.5 to 1.0 ft) bls. Residuum was observed at 1.2 m (3.8 ft) bls and assumed to be the BOP. The soil boring was terminated at 1.8 m (6.0 ft) bls and the final sample was collected from 1.8 to 2.4 m (6.0 to 8.0 ft) bls. OVA readings were not above background levels.

CS6G-14

This soil boring was installed on November 16, 1994. No drilling problems were encountered. This soil boring was located in the eastern part of the original pit. Burn material, including ash, black burned wood, glass fragments miscellaneous nails, concrete rubble, and yellow plastic was observed at from 1.5 to 2.13 m (5.0 to 7.0 ft) bls. Residuum was observed at 2.13 m (7.0 ft) bls and assumed to be the BOP. The soil boring was terminated at 4.0 m (13.0 ft) bls and the final sample was collected from 4.0 to 4.6 m (13.0 to 15.0 ft) bls. OVA readings were above background levels as noted in Section 2.3.3.

2.5.2.2 Soil Borings Located Outside the Estimated Boundary of BRP6G

CS6G-15

This soil boring was installed on November 17, 1994. No drilling problems were encountered. This soil boring was proposed outside and southeast of the original pit. This soil boring was to be sampled at intervals consistent with the borings inside the pit. This boring was terminated at 3.0 m (10.0 ft) bls and the final sample was collected from 3.0 to 3.6 m (10.0 to 12.0 ft) bls. OVA readings were not above background levels.

CS6G-16

This soil boring was installed on November 17, 1994. No drilling problems were encountered. This soil boring was proposed outside and east of the original pit. This soil boring was to be sampled at intervals consistent with the borings inside the pit. This boring was terminated at 3.0 m (10.0 ft) bls and the final sample was collected from 3.0 to 3.6 m (10.0 to 12.0 ft) bls. OVA

readings above background levels were 6.0 and 15.0 ppm from samples collected from 0.3 to 0.6 m (1.0 to 2.0) ft and 0.6 to 1.2 m (2.0 to 4.0 ft), respectively.

CS6G-17

This soil boring was installed on November 17, 1994. No drilling problems were encountered. This soil boring was proposed outside and east of the original pit. This soil boring was to be sampled at intervals consistent with the borings inside the pit. This boring was terminated at 3.0 m (10.0 ft) bls and the final sample was collected from 3.0 to 3.6 m (10.0 to 12.0 ft) bls. OVA readings above background levels were 3.0 and 6.0 ppm from samples collected from 0.3 to 0.6 m (1.0 to 2.0) ft and 0.6 to 1.2 m (2.0 to 4.0 ft), respectively.

2.5.2.3 Background Soil Boring Locations

CS6G-18 Through CS6G-21

Background soil boring locations, CS6G-18 through CS6G-21, were chosen by a WSRC soil scientist. Presently, the soil boring locations have not been surveyed and not located on Figure 3. These soil borings were installed between November 18 and December 1, 1994 and exact dates are presented on Table 5. All of these borings were drilled and sampled at predetermined depths as shown in Table 5. There were no drilling problems associated with soil boring installation outside of delays due to rain.

2.5.2.4 Soil Boring in Drainage Feature

A drainage feature running through the eastern portion of the pit boundary was suspect as being a source of horizontal impact. A soil boring CS6G-22 was performed on December 6, 1994. This boring was proposed to evaluate the potential for contaminants from the pit to impact storm water runoff associated with the drainage feature. Burn material was observed at 0.45 m (1.5 ft) to boring termination at 1.1 m (3.5 ft) bls.

3.0 SUMMARY

Preliminary results from the 1994 unit characterization indicate that contamination is present in the RFI/RI unit soils. As stipulated in the Rev. 2 RFI/RI work plan, a downgradient groundwater monitoring well is to be installed in the water table aquifer. To help determine a permanent location for the groundwater monitoring well, three temporary groundwater monitoring wells were installed, developed sampled and slug tested (one to the west, one to the south, and one to the southeast. Water level data from these wells helped determine the hydraulic gradient of the groundwater. The hydraulic conductivity estimates were fairly typical for the lithologies encountered. Groundwater samples were collected for VOCs in two separate phases.

Twelve soil borings were installed, sampled, and abandoned in the BRP6G as part of the additional unit assessment activities of the Central Shops 631-6G RFI/RI. Soil samples were collected at designated intervals for TAL/TCL with TIC, Dioxins/Furans, radionuclide indicators, GC/MS VOCs, RCRA metals and/or TCL VOCs only. The bottom of the pit was encountered in three of the boreholes. A burnt, black layer was found in three of these boreholes within the pit.

Surficial soil samples were collected at six locations with in the ditch located along the railroad, south of the pit. These samples were analyzed for TAL/TCL with TIC, Dioxins/Furans and radionuclide indicators. Five surface water/sediment samples were collected from the ephemeral stream approximately 61 m (200 ft) southeast of the unit. These samples were analyzed for TOH, RCRA metals, semi-volatiles, GC/MS VOCs, radionuclide indicators and tritium, inorganics, TOC, TSS, and TDS. The surface sediments were analyzed for pH. The surface water was analyzed in the field for water temperature, dissolved oxygen, pH, depth, and estimated flow. The analytical results from these soil samples will be produced by General Engineering Laboratories of Charleston, South Carolina, and published in another report.

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Appendix A

Addendum 4.0

Additional Sampling and Groundwater Monitor Well Installation for the RFI/RI Work Plan for Central Shops Burning/Rubble Pit, 631-6G

ADDENDUM 4.0 ADDITIONAL SOIL SAMPLING AND GROUNDWATER MONITORING WELL INSTALLATION

Addendum 4.0 is required to conduct additional sampling at the Central Shops Burning Rubble Pit 631-6G (CSBRP6G) RCRA/CERCLA Unit. This additional sampling is based on information obtained during unit characterization sampling conducted in March and April 1994 and observations in the historical aerial photography of the area.

SRS conducted a review of historical aerial photographs which indicates that the waste unit is not accurately marked in the field, and the location extends an additional 100 - 125 feet further east of the waste unit markers (orange balls). The photographs also showed that the pit was in operation from 1951 through 1955. In addition, the ditch immediately adjacent to the eastern most edge of the marked unit runs through the original waste unit and a portion of the waste unit is more than likely being used currently (1994) as a laydown yard.

The additional sampling will be conducted at a total of 12 soils locations (Figure 4-A1). Four locations are inside the estimated location of the waste unit, three locations are just outside the unit, and five background locations (not shown) will be selected. Specific background soil sample locations will be selected in cooperation with a soil taxonomist at the time the sampling is conducted. The soil taxonomist will select locations which are considered beyond the area that potentially may have been impacted from waste disposal activities at the unit. In addition, 6 surficial (0-1 foot) soil samples will be obtained within the ditch located along the railroad, south of the pit. Three of the samples will be selected within the ditch, upgradient and beyond the area of potential ash deposition. The remaining five samples will be collected within the ditch, downgradient from the pit. The total number of samples proposed for collection at each of the sampling locations is listed in Table 4-A1, including an additional 10 percent to be collected for quality assurance/quality control purposes. The proposed analyte list, identical to the analytical program used during the 1994 unit characterization sampling and outlined in section 4.3, is also detailed in Table 4-A1.

A minimum of five surface water and sediment samples will be obtained from the ephemeral stream, located approximately 200 feet southeast of the pit (Figure 4-A2). At the time the unit reconnaissance was made it appeared that the drain was hydrologically influenced solely by surface runoff. Selection of adequate background locations for surface water and sediment sampling does not appear to be possible, considering that the origin of the drain is located downgradient from the unit. Table 4-A2 provides the analyte list.

Preliminary results from the 1994 unit characterization indicate that contamination is present in the RFI/RI unit soils. A downgradient groundwater monitoring well will be installed in the water table aquifer, an action stipulated in the section 4.4, if contamination is detected in the unit soils. To help determine a permanent location for the monitoring well, three temporary well piezometers will be installed (as shown in Figure 4-A1) per WSRC 3Q5, one to the west, one to the south, and one to the southeast. Water level data from these wells will help determine the hydraulic gradient of the groundwater. Table 4-A3 provides a list of the temporary wells/piezometers and analyses required. One or more of the wells/piezometers will be chosen to be a permanent monitoring well. The remaining temporary wells/piezometers will be abandoned.

If preliminary characterization results (including results from this addendum) indicate the potential for notable ecological impact, then ecological sampling may be required.

All sampling, analytical activities, and groundwater monitoring well installations will follow the approach outlined in this RFI/RI Work Plan.

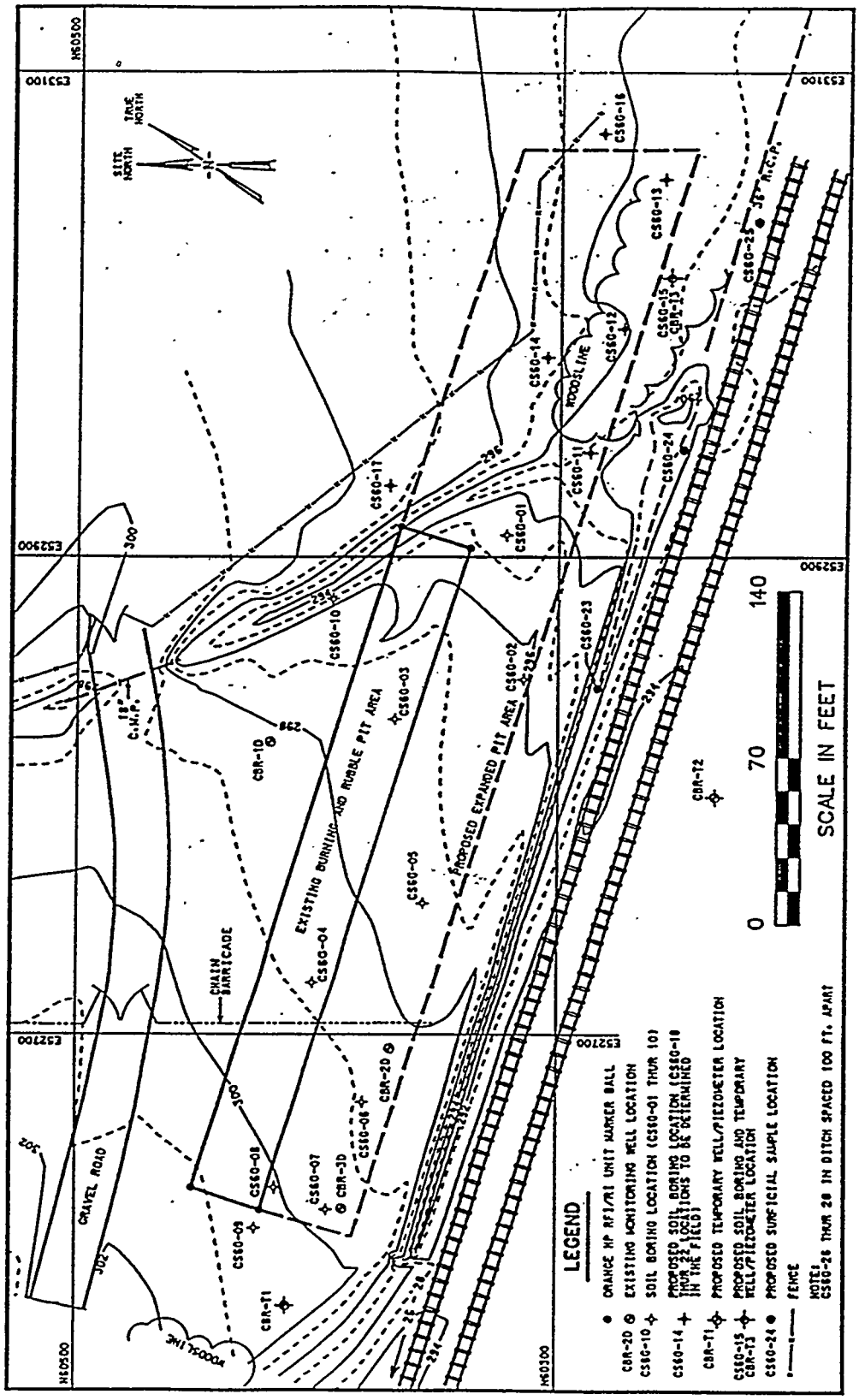


Figure 4-A1. Additional Soil Sampling and Well Piezometer Installation Locations

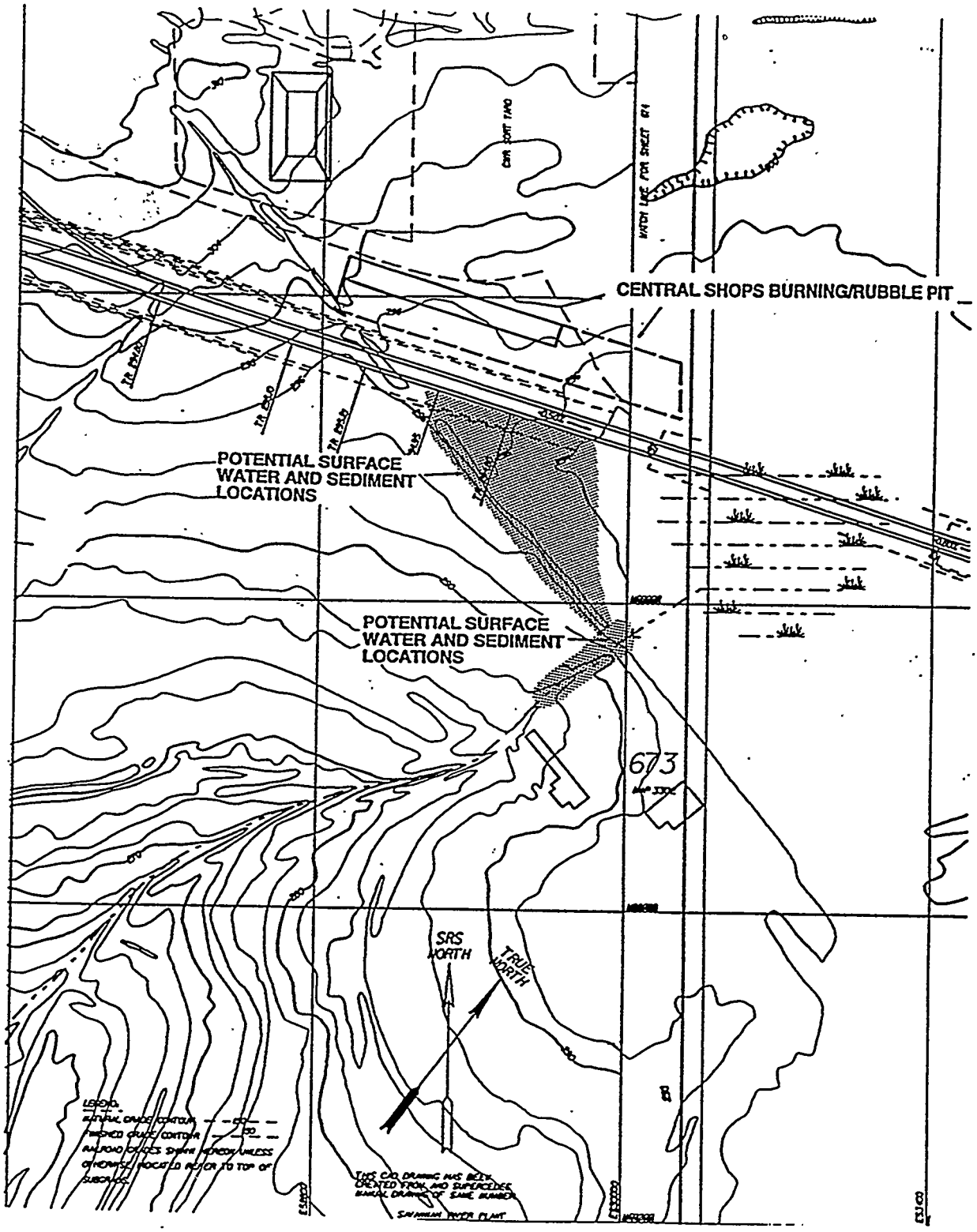


Figure 4-A2. Surface Water and Sediment Sample Locations

Table 4-A1
Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. * TOP	SAMPLE INT. * BOTTOM	ANALYTE CODE
CS6G	11	01	Hand Auger	Soil	Surface inside pit **	0.0	1.0	123
CS6G	11	02	Hand Auger	Soil	Inside pit	1.0	2.0	123
CS6G	11	03	Split-spoon	Soil	Inside pit	2.0	4.0 Δ	123
CS6G	11	04	Split-spoon	Soil	+1 to -1 ft BOP			123
CS6G	11	4A	Split-spoon	Duplicate	+1 to -1 ft BOP			123
CS6G	11	05	Split-spoon	Soil	-1 to -3 ft BOP			123
CS6G	11	06	Split-spoon	Soil	-3 to -5 ft BOP			123
CS6G	11	07	Split-spoon	Soil	-10 to -12 ft BOP			56
CS6G	11	08	Split-spoon	Soil	-15 to -17 ft BOP			56
CS6G	11	09	Split-spoon	Soil	-20 to -22 ft BOP			56
CS6G	11	10	Split-spoon	Soil	-25 to -27 ft BOP			56
CS6G	11	11	Split-spoon	Soil	-30 to -32 ft BOP			56
CS6G	11	12	Split-spoon	Soil	-35 to -37 ft BOP			56
CS6G	11	13	Split-spoon	Soil	-40 to -42 ft BOP			56
CS6G	11	14	Split-spoon	Soil	-45 to -47 ft BOP			56
CS6G	12	01	Hand Auger	Soil	Surface inside pit **	0.0	1.0	123
CS6G	12	02	Hand Auger	Soil	Inside pit	1.0	2.0	123
CS6G	12	03	Split-spoon	Soil	Inside pit	2.0	4.0 Δ	123
CS6G	12	04	Split-spoon	Soil	+1 to -1 ft BOP			123
CS6G	12	05	Split-spoon	Soil	-1 to -3 ft BOP			123
CS6G	12	06	Split-spoon	Soil	-3 to -5 ft BOP			123
CS6G	12	07	Split-spoon	Soil	-10 to -12 ft BOP			56
CS6G	12	08	Split-spoon	Soil	-15 to -17 ft BOP			56
CS6G	12	09	Split-spoon	Soil	-20 to -22 ft BOP			56
CS6G	12	9A	Split-spoon	Duplicate	-20 to -22 ft BOP			56
CS6G	12	10	Split-spoon	Soil	-25 to -27 ft BOP			56
CS6G	12	11	Split-spoon	Soil	-30 to -32 ft BOP			56
CS6G	12	12	Split-spoon	Soil	-35 to -37 ft BOP			56
CS6G	12	13	Split-spoon	Soil	-40 to -42 ft BOP			56
CS6G	12	14	Split-spoon	Soil	-45 to -47 ft BOP			56
CS6G	13	01	Hand Auger	Soil	Surface inside pit **	0.0	1.0	123
CS6G	13	02	Hand Auger	Soil	Inside pit	1.0	2.0	123
CS6G	13	03	Split-spoon	Soil	Inside pit	2.0	4.0 Δ	123
CS6G	13	04	Split-spoon	Soil	+1 to -1 ft BOP			123
CS6G	13	05	Split-spoon	Soil	-1 to -3 ft BOP			123
CS6G	13	06	Split-spoon	Soil	-3 to -5 ft BOP			123
CS6G	13	07	Split-spoon	Soil	-10 to -12 ft BOP			56
CS6G	13	08	Split-spoon	Soil	-15 to -17 ft BOP			56
CS6G	13	09	Split-spoon	Soil	-20 to -22 ft BOP			56
CS6G	13	10	Split-spoon	Soil	-25 to -27 ft BOP			56

Table 4-A1

Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. * TOP	SAMPLE INT. * BOTTOM	ANALYTE CODE
CS6G	13	11	Split-spoon	Soil	-30 to -32 ft BOP			56
CS6G	13	11A	Split-spoon	Duplicate	-30 to -32 ft BOP			56
CS6G	13	12	Split-spoon	Soil	-35 to -37 ft BOP			56
CS6G	13	13	Split-spoon	Soil	-40 to -42 ft BOP			56
CS6G	13	14	Split-spoon	Soil	-45 to -47 ft BOP			56
CS6G	14	01	Hand Auger	Soil	Surface inside pit **	0.0	1.0	123
CS6G	14	02	Hand Auger	Soil	Inside pit	1.0	2.0	123
CS6G	14	03	Split-spoon	Soil	Inside pit	2.0	4.0 Δ	123
CS6G	14	04	Split-spoon	Soil	+1 to -1 ft BOP			123
CS6G	14	05	Split-spoon	Split	-1 to -3 ft BOP			123
CS6G	14	06	Split-spoon	Soil	-3 to -5 ft BOP			123
CS6G	14	07	Split-spoon	Soil	-10 to -12 ft BOP			56
CS6G	14	7A	Split-spoon	Duplicate	-10 to -12 ft BOP			56
CS6G	14	08	Split-spoon	Soil	-15 to -17 ft BOP			56
CS6G	14	09	Split-spoon	Soil	-20 to -22 ft BOP			56
CS6G	14	10	Split-spoon	Soil	-25 to -27 ft BOP			56
CS6G	14	11	Split-spoon	Soil	-30 to -32 ft BOP			56
CS6G	14	12	Split-spoon	Soil	-35 to -37 ft BOP			56
CS6G	14	13	Split-spoon	Soil	-40 to -42 ft BOP			56
CS6G	14	14	Split-spoon	Soil	-45 to -47 ft BOP			56
CS6G	15	01	Hand Auger	Soil	Surface outside pit ≠	0.0	1.0	123
CS6G	15	02	Hand Auger	Soil	Surface outside pit	1.0	2.0	123
CS6G	15	2A	Split-spoon	Duplicate	outside pit	1.0	2.0	123
CS6G	15	03	Split-spoon	Soil	outside pit	2.0	4.0	123
CS6G	15	04	Split-spoon	Soil	outside pit	5.0	7.0	123
CS6G	15	05	Split-spoon	Soil	outside pit	10.0	12.0	123
CS6G	15	06	Split-spoon	Soil	outside pit	15.0	17.0	56
CS6G	15	07	Split-spoon	Soil	outside pit	20.0	22.0	56
CS6G	15	08	Split-spoon	Soil	outside pit	25.0	27.0	56
CS6G	15	09	Split-spoon	Soil	outside pit	30.0	32.0	56
CS6G	15	10	Split-spoon	Soil	outside pit	35.0	37.0	56
CS6G	15	11	Split-spoon	Soil	outside pit	40.0	42.0	56
CS6G	15	11A	Split-spoon	Duplicate	outside pit	40.0	42.0	56
CS6G	15	12	Split-spoon	Soil	outside pit	45.0	47.0	56
CS6G	16	01	Hand Auger	Soil	Surface outside pit ≠	0.0	1.0	123
CS6G	16	02	Hand Auger	Soil	Surface outside pit	1.0	2.0	123
CS6G	16	03	Split-spoon	Soil	outside pit	2.0	4.0	123
CS6G	16	04	Split-spoon	Soil	outside pit	5.0	7.0	123
CS6G	16	05	Split-spoon	Soil	outside pit	10.0	12.0	123

Table 4-A1

Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. * TOP	SAMPLE INT. * BOTTOM	ANALYTE CODE
CS6G	16	06	Split-spoon	Soil	outside pit	15.0	17.0	56
CS6G	16	6A	Split-spoon	Duplicate	outside pit	15.0	17.0	56
CS6G	16	07	Split-spoon	Soil	outside pit	20.0	22.0	56
CS6G	16	08	Split-spoon	Soil	outside pit	25.0	27.0	56
CS6G	16	09	Split-spoon	Soil	outside pit	30.0	32.0	56
CS6G	16	10	Split-spoon	Soil	outside pit	35.0	37.0	56
CS6G	16	11	Split-spoon	Soil	outside pit	40.0	42.0	56
CS6G	16	12	Split-spoon	Soil	outside pit	45.0	47.0	56
CS6G	17	01	Hand Auger	Soil	Surface outside pit ≠	0.0	1.0	123
CS6G	17	02	Hand Auger	Soil	Surface outside pit	1.0	2.0	123
CS6G	17	03	Split-spoon	Soil	outside pit	2.0	4.0	123
CS6G	17	3A	Split-spoon	Duplicate	outside pit	2.0	4.0	123
CS6G	17	04	Split-spoon	Soil	outside pit	5.0	7.0	123
CS6G	17	05	Split-spoon	Soil	outside pit	10.0	12.0	123
CS6G	17	06	Split-spoon	Soil	outside pit	15.0	17.0	56
CS6G	17	07	Split-spoon	Soil	outside pit	20.0	22.0	56
CS6G	17	08	Split-spoon	Soil	outside pit	25.0	27.0	56
CS6G	17	09	Split-spoon	Soil	outside pit	30.0	32.0	56
CS6G	17	10	Split-spoon	Soil	outside pit	35.0	37.0	56
CS6G	17	11	Split-spoon	Soil	outside pit	40.0	42.0	56
CS6G	17	12	Split-spoon	Soil	outside pit	45.0	47.0	56
CS6G	17	12A	Split-spoon	Duplicate	outside pit	45.0	47.0	56
CS6G	18	01	Hand Auger	Soil	Background	0.0	1.0	123
CS6G	18	02	Hand Auger	Soil	Background	1.0	2.0	123
CS6G	18	03	Split-spoon	Soil	Background	2.0	4.0	123
CS6G	18	3A	Split-spoon	Duplicate	Background	2.0	4.0	123
CS6G	18	04	Split-spoon	Soil	Background	5.0	7.0	123
CS6G	18	05	Split-spoon	Soil	Background	10.0	12.0	123
CS6G	18	06	Split-spoon	Soil	Background	15.0	17.0	56
CS6G	18	07	Split-spoon	Soil	Background	20.0	22.0	56
CS6G	18	08	Split-spoon	Soil	Background	25.0	27.0	56
CS6G	18	09	Split-spoon	Soil	Background	30.0	32.0	56
CS6G	18	10	Split-spoon	Soil	Background	35.0	37.0	56
CS6G	18	11	Split-spoon	Soil	Background	40.0	42.0	56
CS6G	18	12	Split-spoon	Soil	Background	45.0	47.0	56
CS6G	18	12A	Split-spoon	Duplicate	Background	45.0	47.0	56
CS6G	19	01	Hand Auger	Soil	Background	0.0	1.0	123
CS6G	19	02	Hand Auger	Soil	Background	1.0	2.0	123
CS6G	19	03	Split-spoon	Soil	Background	2.0	4.0	123

Table 4-A1
Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. TOP	SAMPLE INT. BOTTOM	ANALYTE CODE
CS6G	19	04	Split-spoon	Soil	Background	5.0	7.0	123
CS6G	19	04A	Split-spoon	Duplicate	Background	5.0	7.0	123
CS6G	19	05	Split-spoon	Soil	Background	10.0	12.0	123
CS6G	19	06	Split-spoon	Soil	Background	15.0	17.0	56
CS6G	19	07	Split-spoon	Soil	Background	20.0	22.0	56
CS6G	19	08	Split-spoon	Soil	Background	25.0	27.0	56
CS6G	19	09	Split-spoon	Soil	Background	30.0	32.0	56
CS6G	19	10	Split-spoon	Soil	Background	35.0	37.0	56
CS6G	19	11	Split-spoon	Soil	Background	40.0	42.0	56
CS6G	19	12	Split-spoon	Soil	Background	45.0	47.0	56
CS6G	20	01	Hand Auger	Soil	Background	0.0	1.0	123
CS6G	20	02	Hand Auger	Soil	Background	1.0	2.0	123
CS6G	20	03	Split-spoon	Soil	Background	2.0	4.0	123
CS6G	20	04	Split-spoon	Soil	Background	5.0	7.0	123
CS6G	20	05	Split-spoon	Soil	Background	10.0	12.0	123
CS6G	20	06	Split-spoon	Soil	Background	15.0	17.0	56
CS6G	20	07	Split-spoon	Soil	Background	20.0	22.0	56
CS6G	20	08	Split-spoon	Soil	Background	25.0	27.0	56
CS6G	20	09	Split-spoon	Soil	Background	30.0	32.0	56
CS6G	20	10	Split-spoon	Soil	Background	35.0	37.0	56
CS6G	20	11	Split-spoon	Soil	Background	40.0	42.0	56
CS6G	20	12	Split-spoon	Soil	Background	45.0	47.0	56
CS6G	21	01	Hand Auger	Soil	Background	0.0	1.0	123
CS6G	21	02	Hand Auger	Soil	Background	1.0	2.0	123
CS6G	21	03	Split-spoon	Soil	Background	2.0	4.0	123
CS6G	21	04	Split-spoon	Soil	Background	5.0	7.0	123
CS6G	21	05	Split-spoon	Soil	Background	10.0	12.0	123
CS6G	21	06	Split-spoon	Soil	Background	15.0	17.0	56
CS6G	21	6A	Split-spoon	Duplicate	Background	15.0	17.0	56
CS6G	21	07	Split-spoon	Soil	Background	20.0	22.0	56
CS6G	21	08	Split-spoon	Soil	Background	25.0	27.0	56
CS6G	21	09	Split-spoon	Soil	Background	30.0	32.0	56
CS6G	21	10	Split-spoon	Soil	Background	35.0	37.0	56
CS6G	21	11	Split-spoon	Soil	Background	40.0	42.0	56
CS6G	21	12	Split-spoon	Soil	Background	45.0	47.0	56
CS6G	22	01	Hand Auger	Soil	Background	0.0	1.0	123
CS6G	22	02	Hand Auger	Soil	Background	1.0	2.0	123
CS6G	22	03	Split-spoon	Soil	Background	2.0	4.0	123
CS6G	22	04	Split-spoon	Soil	Background	5.0	7.0	123

Table 4-A1

Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. * TOP	SAMPLE INT. * BOTTOM	ANALYTE CODE
CS6G	22	04A	Split-spoon	Duplicate	Background	5.0	7.0	123
CS6G	22	05	Split-spoon	Soil	Background	10.0	12.0	123
CS6G	22	06	Split-spoon	Soil	Background	15.0	17.0	56
CS6G	22	07	Split-spoon	Soil	Background	20.0	22.0	56
CS6G	22	08	Split-spoon	Soil	Background	25.0	27.0	56
CS6G	22	09	Split-spoon	Soil	Background	30.0	32.0	56
CS6G	22	10	Split-spoon	Soil	Background	35.0	37.0	56
CS6G	22	11	Split-spoon	Soil	Background	40.0	42.0	56
CS6G	22	12	Split-spoon	Soil	Background	45.0	47.0	56
CS6G	23	01	Hand Auger	Soil	R.R. Ditch - Downgradient			123
CS6G	24	01	Hand Auger	Soil	R.R. Ditch - Downgradient			123
CS6G	25	01	Hand Auger	Soil	R.R. Ditch - Downgradient			123
CS6G	26	01	Hand Auger	Soil	R.R. Ditch - Upgradient			123
CS6G	27	01	Hand Auger	Soil	R.R. Ditch - Upgradient			123
CS6G	28	01	Hand Auger	Soil	R.R. Ditch - Upgradient			123
CS6G	28	01A	Hand Auger	Duplicate	R.R. Ditch - Upgradient			123
CS6G	TB	01		Trip Blank	Cooler 1			7
CS6G	TB	02		Trip Blank	Cooler 2			7
CS6G	TB	03		Trip Blank	Cooler 3			7
CS6G	TB	04		Trip Blank	Cooler 4			7
CS6G	TB	05		Trip Blank	Cooler 5			7
CS6G	TB	06		Trip Blank	Cooler 6			7
CS6G	TB	07		Trip Blank	Cooler 7			7
CS6G	FB	01		Field Blank	Day 1			123
CS6G	FB	02		Field Blank	Day 2			123
CS6G	FB	03		Field Blank	Day 3			123
CS6G	FB	04		Field Blank	Day 4			123
CS6G	FB	05		Field Blank	Day 5			123
CS6G	FB	06		Field Blank	Day 6			123
CS6G	FB	07		Field Blank	Day 7			123
CS6G	RA	01		Rinsate (A)	Day 1			123
CS6G	RB	01		Rinsate (S)	Day 1			123
CS6G	RA	02		Rinsate (A)	Day 2			123
CS6G	RB	02		Rinsate (S)	Day2			123
CS6G	RA	03		Rinsate (A)	Day 3			123
CS6G	RB	03		Rinsate (S)	Day 3			123
CS6G	RA	04		Rinsate (A)	Day 4			123
CS6G	RB	04		Rinsate (S)	Day 4			123

Table 4-A1

Analytical Parameters for Soil and Surfical Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE INSTRUMENT	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE INT. * TOP	SAMPLE INT. * BOTTOM	ANALYTE CODE
CS6G	RA	05		Rinsate (A)	Day 5			123
CS6G	RB	05		Rinsate (S)	Day 5			123
CS6G	RA	06		Rinsate (A)	Day 6			123
CS6G	RB	06		Rinsate (S)	Day 6			123
CS6G	RA	07		Rinsate (A)	Day 7			123
CS6G	RA	07		Rinsate (S)	Day 7			123

Sample Pt Column

TB Trip Blank
FB Field Blank
RA Rinsate - Auger
RB Rinsate - Splitspoon

Sample Num Column

A Duplicate
B Split (10% splits will be added if necessary)

Analyte Codes

1 - TCL/TAL w/TIC
2 - Dioxins/Furans
3 - Rad Indicators
5 - GC/MS VOCs
6 - RCRA Metals
7 - TCL VOCs only

Notes

(A) = Auger
(S) = Splitspoon
BOP = Bottom of Pit
bls = Below Land Surface

** Sample interval (in ft bls) to be determined from BOP depth
* Sampling will be terminated @ -5 ft BOP (inside pit) or 12 ft bls (outside pit) if VOC field screening indicates two consequtive samples with no contamination
≠ If the BOP is discovered, sampling will follow same intervals as inside pit
Δ Samples will be collected in 5 ft intervals until BOP is found

Table 4-A2
Analytical Parameters for Surface Water and Sediment Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLE TYPE	SAMPLE LOCATION	ANALYTE CODE NUMBERS
CS6G	29	01	Surface Water	Ephemeral Stream	1,2,3,4,5,6,8,9
CS6G	29	02	Sediment	Ephemeral Stream	2,3,4,5,7
CS6G	30	01	Surface Water	Ephemeral Stream	1,2,3,4,5,6,8,9
CS6G	30	02	Sediment	Ephemeral Stream	2,3,4,5,7
CS6G	31	01	Surface Water	Ephemeral Stream	1,2,3,4,5,6,8,9
CS6G	31	1B	Split-Surface Water	Ephemeral Stream	2,3,4,5
CS6G	31	02	Sediment	Ephemeral Stream	2,3,4,5,7
CS6G	31	02B	Split-Sediment	Ephemeral Stream	2,3,4,5
CS6G	32	01	Surface Water	Ephemeral Stream	1,2,3,4,5,6,8,9
CS6G	32	02	Sediment	Ephemeral Stream	2,3,4,5,7
CS6G	33	01	Surface Water	Ephemeral Stream	1,2,3,4,5,6,8,9
CS6G	33	1A	Duplicate - Surface Water	Ephemeral Stream	2,3,4,5
CS6G	33	02	Sediment	Ephemeral Stream	2,3,4,5,7
CS6G	33	2A	Duplicate - Sediment	Ephemeral Stream	2,3,4,5
CS6G	TB	#	Trip Blank		4
CS6G	FC	01	Field Blank - Surface Water		4
CS6G	FD	01	Field Blank - Sediment		4
CS6G	RC	01	Rinsate - Surface Water		4,5
CS6G	RD	01	Rinsate - Sediment		4,5

Sample Point Column

TB Trip Blank
FC Field Blank - Surface Water
FD Field Blank - Sediment
RC Rinsate - Surface Water Equipment
RD Rinsate - Sediment Equipment

Sample Number Column

A Duplicate Blank
B Split Sample
Use next consecutive number available from previous shipments

Analyte Codes are as follows

1 - Total organic halogens
2 - Metals (Ag, As, Ba, Cd, Cr, Cu, Pb, Mn, Hg, Ni, Se)
3 - Semi-volatile organic constituents, including polycyclic hydrocarbons (PAH)
4 - Volatile organic constituents [volatile organic analysis, gas chromatograph, mass spectrometer (VOA GC/MS]
5 - Radionuclide indicators (gross-alpha, non-volatile beta, total radium) and tritium
6 - Surface water temperature, dissolved oxygen, pH, depth, flow (estimate)—field measurements
7 - Sediment pH, TOC
8 - Inorganics (Cl, F, SO4, N03, Na, Fe)
9 - TOC, TSS, TDS

Table 4-A3

Analytical Parameters for Groundwater Samples

FACILITY IDENTIFIER	SAMPLE PT	SAMPLE NUM	SAMPLING TYPE	CONSTITUENTS FOR ANALYSIS	HYDROLOGIC INTERVAL
CBR	T1	01	Groundwater	2	Water Table
CBR	T2	01	Groundwater	2	Water Table
CBR	T3	01	Groundwater	2	Water Table
CBR	T3	01A	Groundwater	2	Water Table
CBR	T3	01B	Groundwater	2	Water Table
CBR	TB	01	Trip Balnk	2	
CBR	FB	01	Field Blank	2	
CBR	RB	01	Rinsate Blank	2	

* temporary well/piezometers to be sampled once

Analyte Codes are as follows

2 - TCL/TAL w/TIC
3 - Tritium

Sample Point Column

TB Trip Blank
FB Field Blank
RB Rinsate Blank

Sample Number Column

A Duplicate
B Split

Appendix B

Daily Field Logs

KH ≈ 48°F CLEAR 11/2/94 - WET

NOTES BY: KELLY HUNTER - Kelly Hunter - KH -

7:20 - @ WELL BUILDING - WAITING ON DRILL CREW

7:50 - SPOKE W/ Janelle Jansen W/WSRC - JANELLE CALLED THE DRILL CREW - THEY (THE DRILL CREW) DID NOT KNOW OF THE PROJECT - IT WILL TAKE ≈ 2 HOURS TO COLLECT THE TOOLS AND SHOW UP ON SITE - TRYED TO CALL DAVID CLARK TO LET HIM KNOW.

8:35 - DAVID CLARK AND RAY PLUNKETT @ WELL BUILDING - WE WENT OVER SCOPE & PROJECT DETAILS

8:50 - DAVID CLARK & RAY PLUNKETT LEFT SITE TO RETURN @ 10:00 ~~WIT~~ ETA OF DRILL CREW. - 10:00 DRILL CREW @ WELL

10:45 - ON-SITE - DAVID CLARK & RAY PLUNKETT ON SITE ALSO DOE REPRESENTATIVE

11:05 - WENT OVER H&S PLAN W/ ALL WHO WERE IN ATTENDANCE - ~~A~~

11:10 - CHECKED OSHA TRAINING CERTIFICATES FOR ALL DRILLING SUB EMPLOYEES CHECKED - OK. ✓

- MOBED TO CBR-6 LOCATION - PLACED PLASTIC IN PROPOSED LOCATION

11:22 - CALIBRATED HNu

11:22 - DRILLERS BEGIN SETUP FOR DRILLING

11:30 - DRILLERS LEFT SITE TO GET THE WATER TRUCK FOR MUD ROTARY

11:30 - Janelle Jansen ON SITE

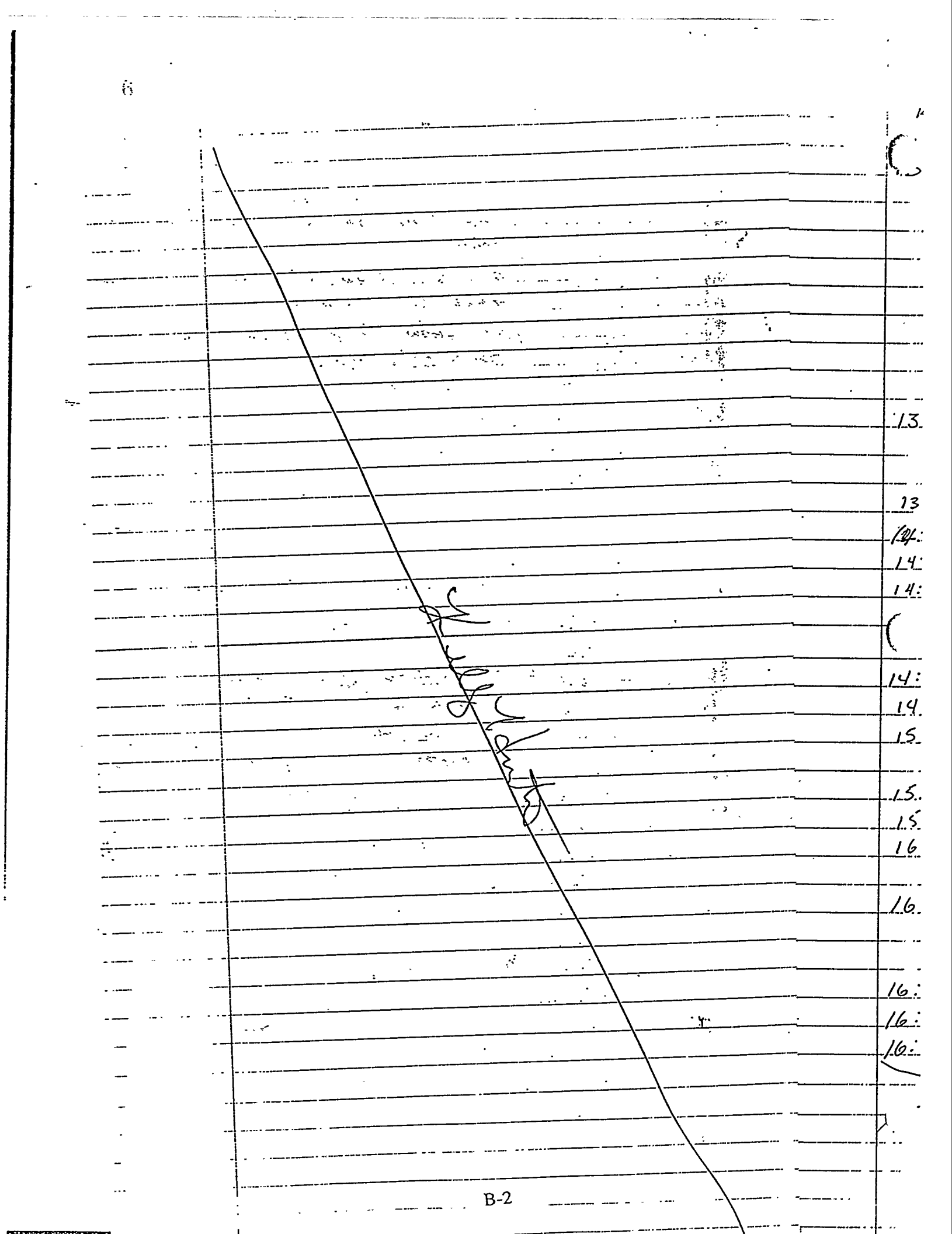
12:00 - Janelle Jansen LEFT SITE

12:05 - RAY PLUNKETT " "

12:15 - DAVE CLARK & I RECON ACCESS TO CBR-6

12:38 - DRILLERS BACK ON SITE W/ WATER

13:15 TRUCK. DRILLERS DON'T HAVE BARRIER ROPE - LEFT SITE TO RETRIEVE

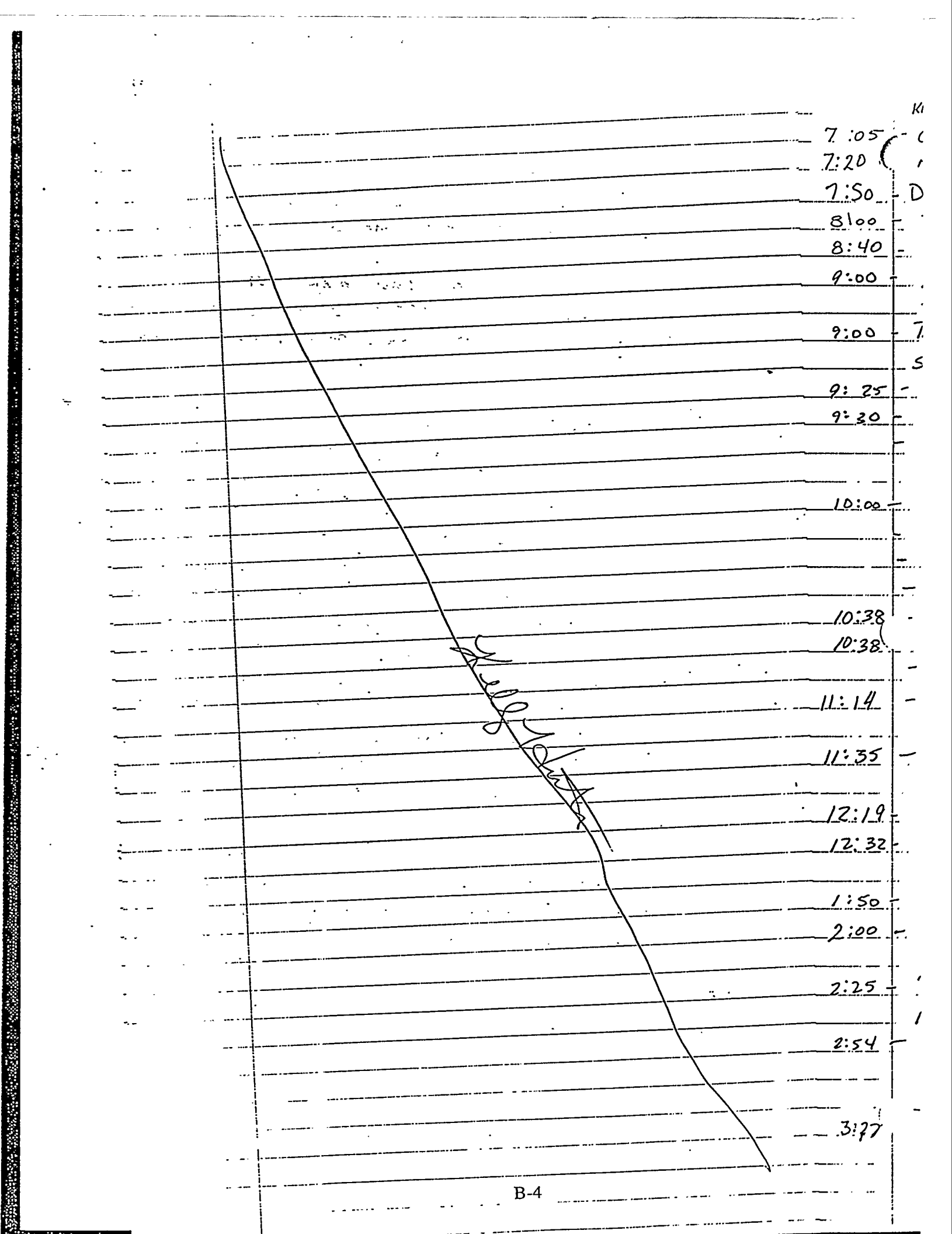


B-2

KH 11/2/94 CLEAR ≈ 62°F

13:30 - DRILLER HELPERS SETTING UP RIG
- MEASUREMENTS
7 7/8" MUD ROTARY BIT
BIT & TWO SUBS - 3.0'
MEASURED THREE RODS @ 20.00

13:47 - BEGAN DRILLING - CBR-06
- CHECKED NOISE LEVEL AROUND THE RIG
THE HIGHEST LEVEL WAS 87.7 dBa.
13:55 - CHECKED BREATHING ZONE WITH HNu 0 ppm
14:05 - MEASURED THREE RODS -
14:10 - DRILLER SHOVED BACK UP @ SITE
14:15 - HOOKED UP THE DESANDER & STARTED UP - I CLASSIFIED SOIL TO BE A COURSE-med Silty, SAND
14:25 - ADDING A DRILL ROD - 20.0' BGS
14:37 - Begin Drilling Again
15:30 - PEA GRAVEL & CLAY CLOGED UP DE-SANDER PUMP - TRYING TO REMOVE OBSTRUCTION -
15:39 - REMOVED OBSTRUCTION -
15:42 - ADDING ON ANOTHER DRILL ROD
16:02 - BORING TERMINATED @ 61.0' BGS
3+20+20+18 ⇒ 61.0' BGS
16:05 - CIRCULATING MUD TO CLEAN OUT BORING - IT APPEARS TO BE IN CLAY
16:05 - DAVID CLARK LEFT SITE
16:20 - DRILLERS & TRIP OUT RODS
16:30 - LEFT SITE FOR WELL BUILDING

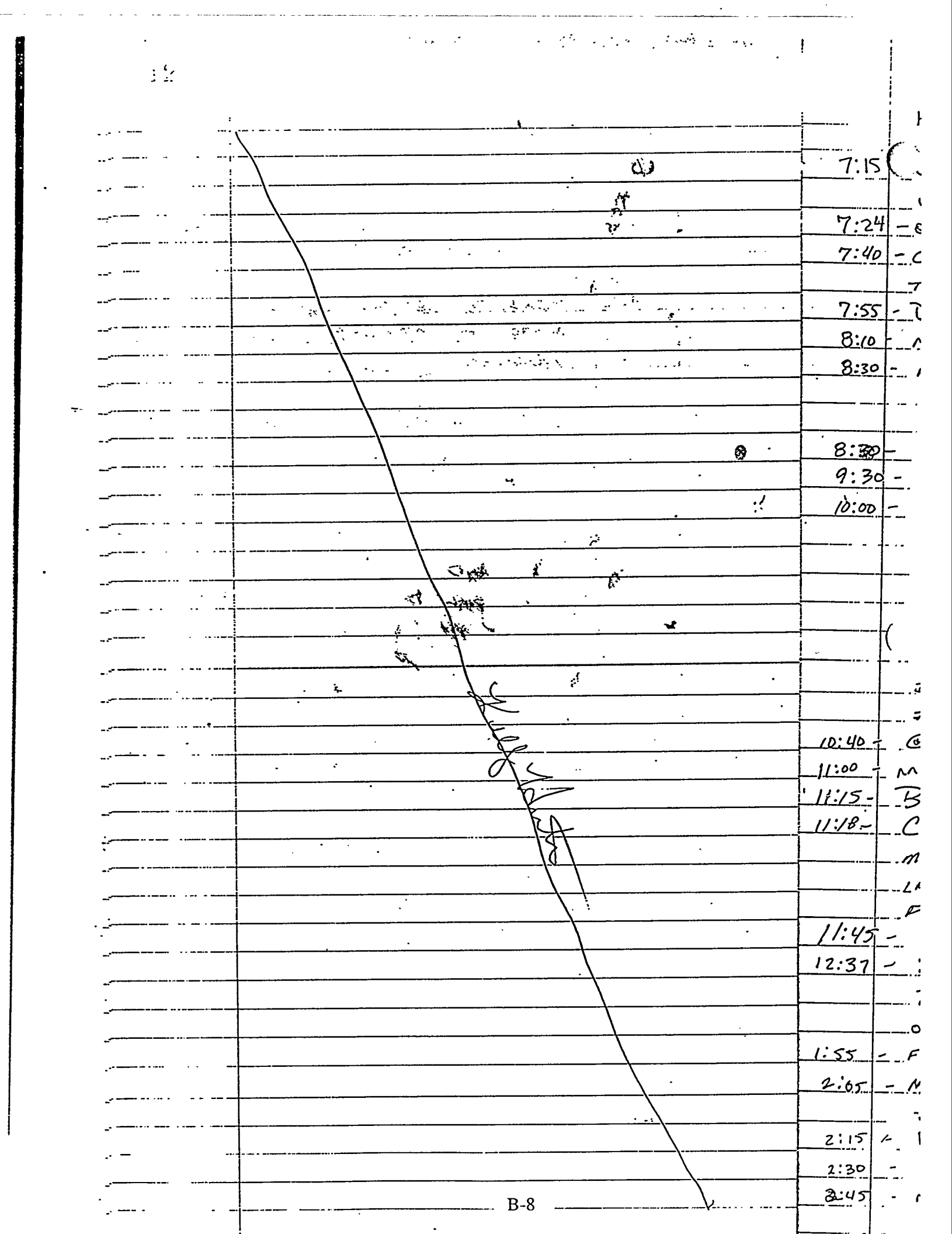

7:05
7:20
7:50
8:00
8:40
9:00
9:00
9:25
9:30
10:00
10:38
10:38
11:14
11:35
12:19
12:32
1:50
2:00
2:25
2:54
3:17

11/3/94 KH CLEAR ≈ 78°F

4:00 - SCREEN USED 0.016" SLOTTED (2) 10' SECTIONS - SEE WELL CONSTRUCTION/MATERIAL INFORMATION FORMS FOR MEASUREMENTS OF MATL. ETC.

4:45 - FINISHED SETTING WELL - PREPARE FOR MOBE TO CBR-04 LOCATION IN THE MORNING

5:00 - LEFT SITE FOR WELL BUILDING


7:15
7:24
7:40
7:55
8:10
8:30
8:30
9:30
10:00
10:40
11:00
11:15
11:18
11:45
12:37
1:55
2:05
2:15
2:30
2:45

KH CLEAR ≈ 70°F 11/4/94

7:15 - @ WELL BUILDING TO PICKUP TWO WAY RADIO

7:24 - ON SITE / WAITING ON DRILLERS

7:40 - CHECKED WATER LEVEL IN CBR-06 - 49.72 FROM TOP OF CASING

7:55 - DRILLERS ON SITE - DECONED & ERMT - Yesterday EVENING

8:10 - MOBED TO CBR-04

8:30 - NEW DRILLER ON SITE - WENT OVER H&S PLAN WITH C. BALEY - NOTE: CHECKED HIS OSHA TRAINING CERTIFICATES - ALL IN ORDER

8:30 - RIG SET UP FOR WELL INSTALLATION @ CBR-04

9:30 - BEGAN DRILLING

10:00 - THE OVA WAS LEFT ON OVER NIGHT AND THE BATTERY IS DEAD. I CHECKED WITH THE DRILL CREW AND TOLD THEM IF THEY WANTED WE COULD SHUT DOWN DRILLING OPERATIONS UNTIL WE GET A NEW OVA - THEY SAID IT WAS NOT NECESSARY TO SHUT DOWN BUT IF THEY SMELLED ORGANIC VAPORS THEY WOULD. ~~IF~~

10:40 - @ ≈ 42' - CHANGING RODS (ADDING 20' SECTION)

11:00 - MEASURED ALL PVC WELL MATERIAL (SCREEN, PLUG, CASING)

11:15 - BORING TERMINATED @ 62.0' BGS

11:18 - CIRCULATING WATER & MUD TO THIN THE MUD SO SAND WILL FALL - ALSO WATER TRUCK LEFT TO REFILL FOR TRIMMING OF SAND & BENT FOR WELL CONSTRUCTION

11:45 - WATER TRUCK BACK ON SITE.

12:37 - SET WELL @ 60.0 ft BGS WELL CONSTRUCTION DETAILS - MEASUREMENTS - MATERIAL USED - (ETC.) ARE ON THE WELL CONSTRUCTION DIAGRAMS & TALLY SHEET.

1:55 - FINISHED SETTING CBR-04

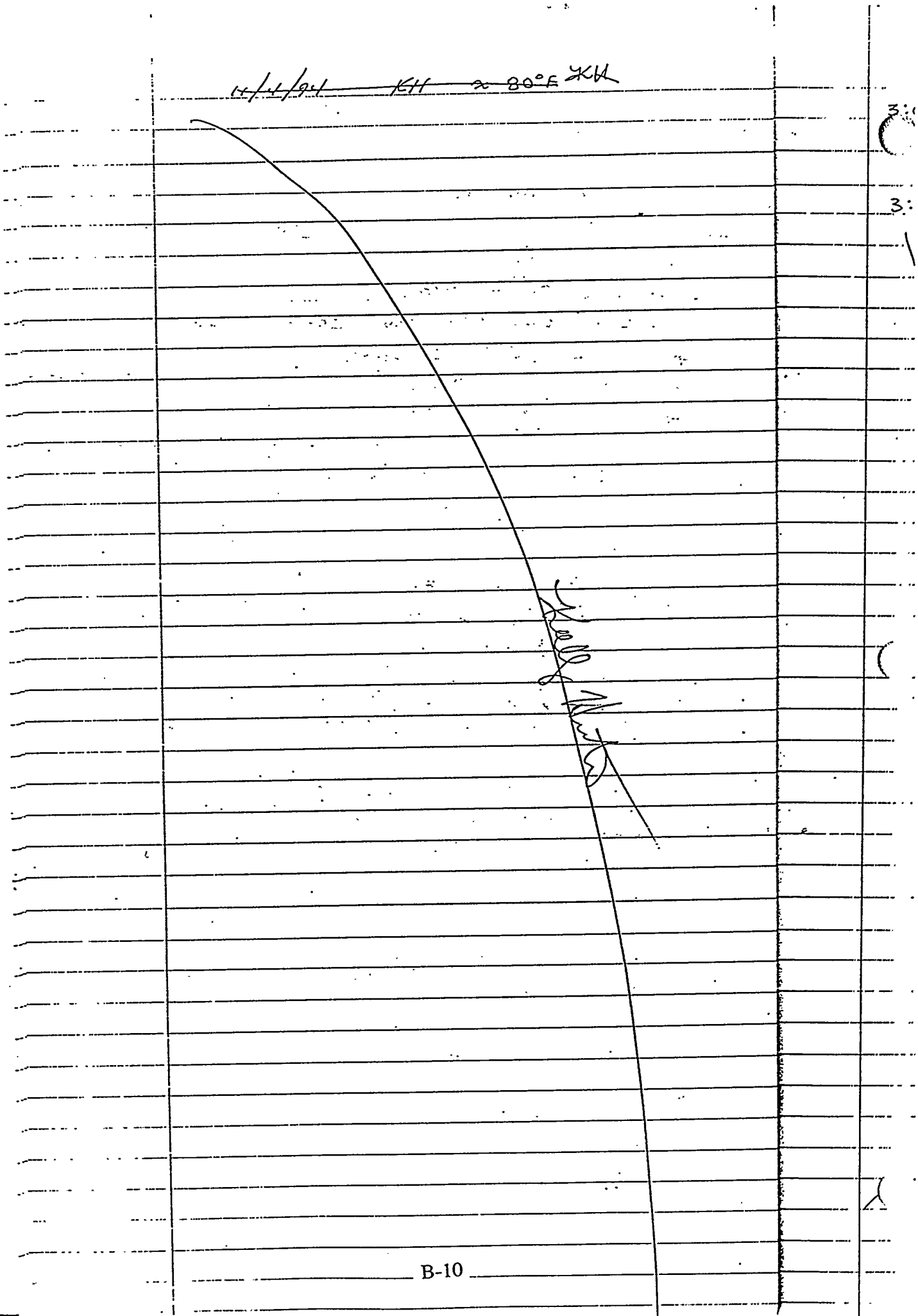
2:05 - MOBE TO CBR-06 TO GROUT TO GROUND SURFACE

2:15 - BEGAN MIXING GROUT - TYPE 1 CEMENT PORTLAND

2:30 - GROUTED TO GROUND SURFACE - GROUT 13.2 lb/gal

2:45 - MOBED TO CBR-05 WITH THE SAME GROUT/REMAINDER TO GROUT TO GROUND SURFACE

P.O


14/4/94 KH ≈ 80°F KH

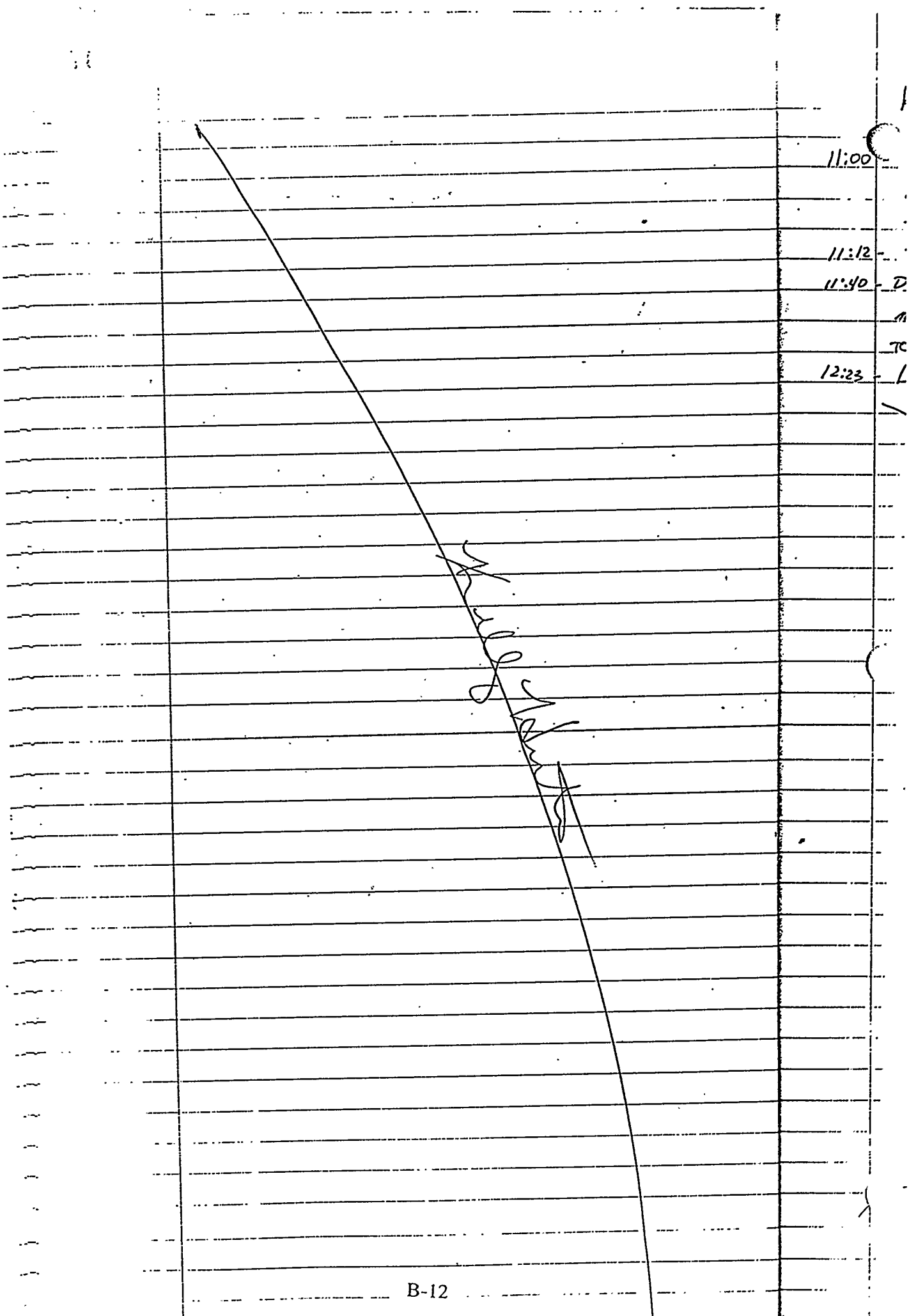
11/4/94 KH ≈ 80°F CLEAR

3:00 – CONNECTED TRIMMIE PIPE PUMPED REMAINDER OF 13.2 MIX

3:30 – MIXED ANOTHER GROUT MIX 13.4 lb/gal

GROUTED TO SURFACE

3:50 – LEFT SITE FOR WELL BUILDING


11:00
11:12
11:40
12:23

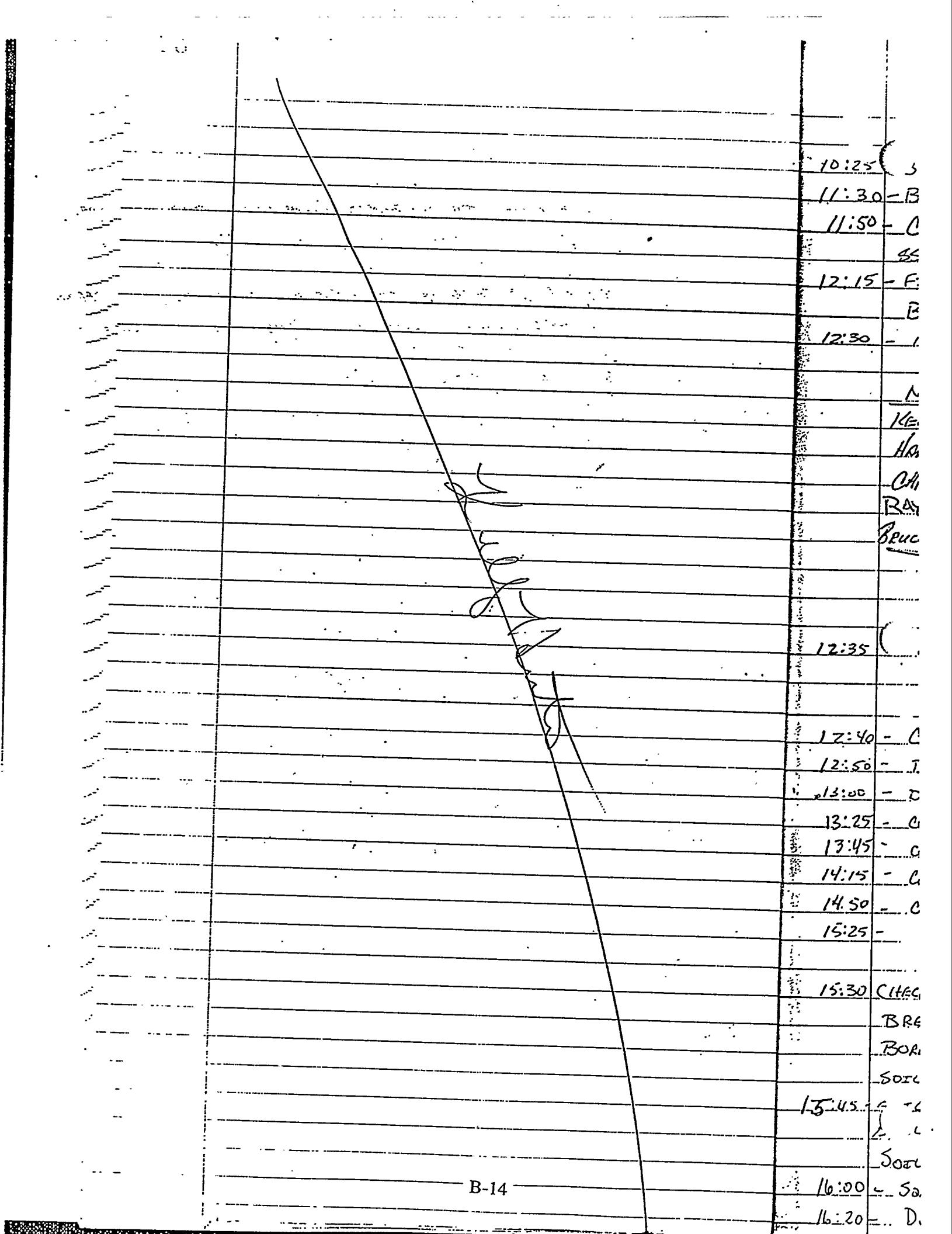
KH ..... 11/7/94 ... CLEAR ≈ 70°F.

11:00 - ON SITE TO OVERSEE GROUTING OF CBR-4 - MEASURED TOP OF BENTONITE @ 18.9' - TOLD DRILLERS TO GET A SIDE DISCHARGE PIPE TO GROUT TO SURFACE -

11:12 - DRILLERS LEFT SITE TO GET SIDE DISCHARGE CONNECTION.

11:40 - DRILLERS BACK ON SITE W/ SIDE DISCHARGE PIPE - BEGAN MIXING GROUT - MIXED 13.4 lb/gal MIX -> GROUTED TO GROUND SURFACE.

12:23 - LEFT SITE


10:25
11:30 - B
11:50 - C
12:15 - F
12:30 -
12:35
12:40 - C
12:50 - T
13:00 - D
13:25 - C
13:45 - C
14:15 - C
14.50 - C
15:25 -
15:30
16:00 - So
16:20 - D

KH CLEAR ≈ 70°F 11/14/94

(KELLY HUNTER RECORDING)

10:25 - BRUCE KRISTENSON, RAY PLUNKETT ON SITE

11:30 - BEGAN SET UP & DECON SAMPLING EQUIPMENT

11:50 - COLLECTED RINSATE SAMPLE W/ DECONED SS-SPOON SS-HAND AUGER & SS BOWL

12:15 - FILLED OUT CHAIN OF CUSTODY FOR TRIP BLANK - DRILLERS ON SITE

12:30 - HEALTH & SAFETY PLAN MEETING

NAME	REPRESENTING	SIGNATURE
KELLY HUNTER	RUST E&I	Kelly Hunter
HAROLD REED	~~Harold E. Reed~~ E.E.I.	Harold E. Reed
CHARLES CRENSHAW	E.E.I.	Charles Crenshaw
RAY PLUNKETT	WSRC	Ray Plunkett
BRUCE S. KRISTENSEN	RUST E&I	B S Kristensen

12:35 - CHECKED OSHA TRAINING RECORDS FOR DRILLER & DRILLER'S HELPER - PAPER IN ORDER & UP TO DATE

12:40 - CALIBRATED OVA

12:50 - DRILLERS BEGAN DECON EQMT

13:00 - DAVID CLARK ON SITE - BEGAN DRILLING CS6G-11

13:25 - COLLECTED SOIL SAMPLE FROM 0-1 FT BGS

13:45 - COLLECTED SOIL SAMPLE FROM 1-2' FT BGS

14:15 - COLLECTED SOIL SAMPLE FROM 2-4 FT BGS

14:50 - COLLECTED SOIL SAMPLE FROM 4-6 FT BGS

15:25 - " " " 6-8 FT BGS

15:30 CHECKED SOIL SAMPLES W/OVA & BREATHING ZONE

BREATHING ZONE 0 ppm

BOREHOLE 0 ppm

SOIL SAMPLE FROM 4-6' BGS 0 ppm

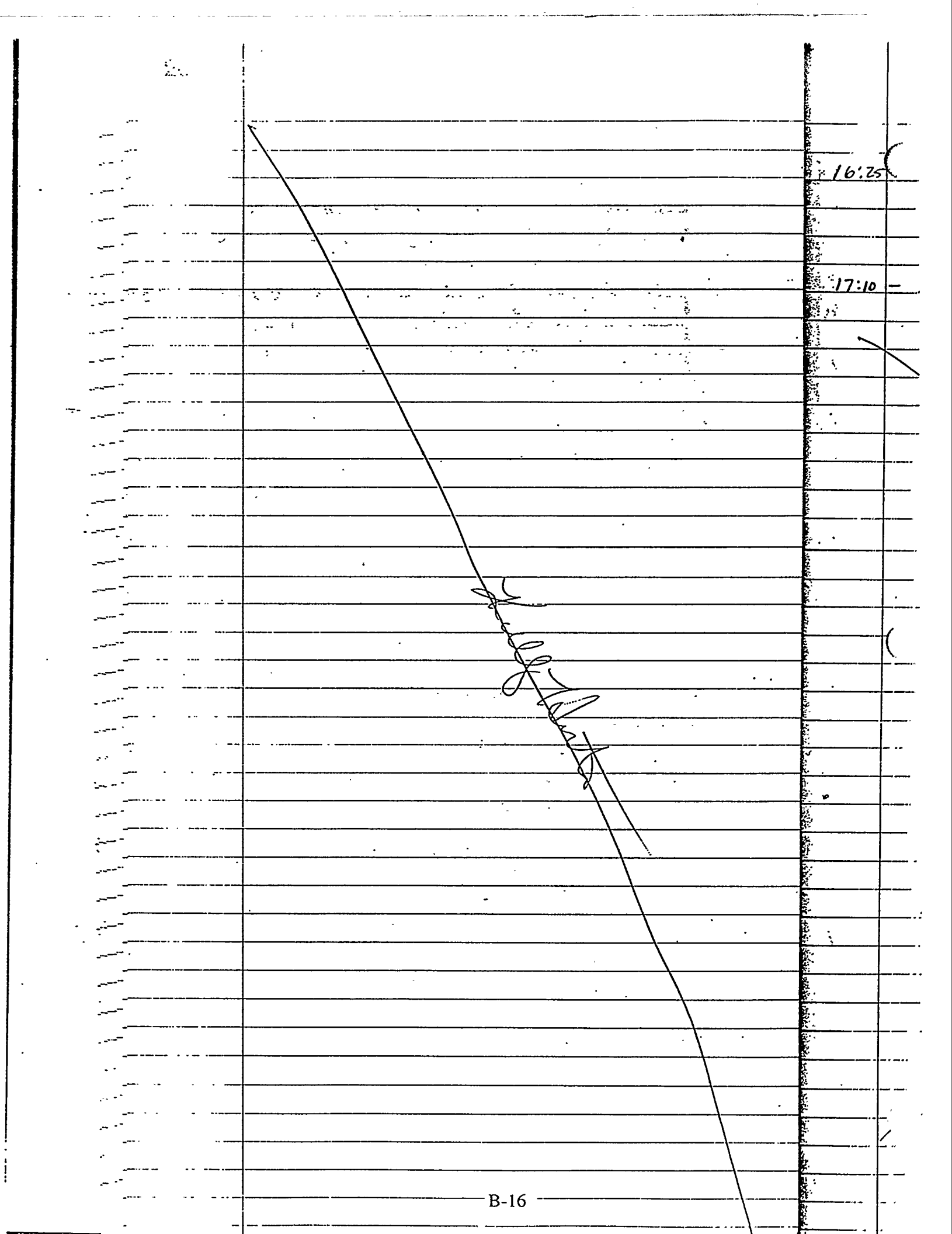
15:45 - SOIL SAMPLE FROM 6-8 BGS 5 ppm

SOIL SAMPLE FROM THE BOTTOM OF 8' BGS 0 ppm

SOIL SAMPLE FROM SAMPLE FROM 8-10' BGS 0 ppm

16:00 - SAMPLE FROM 8-10'

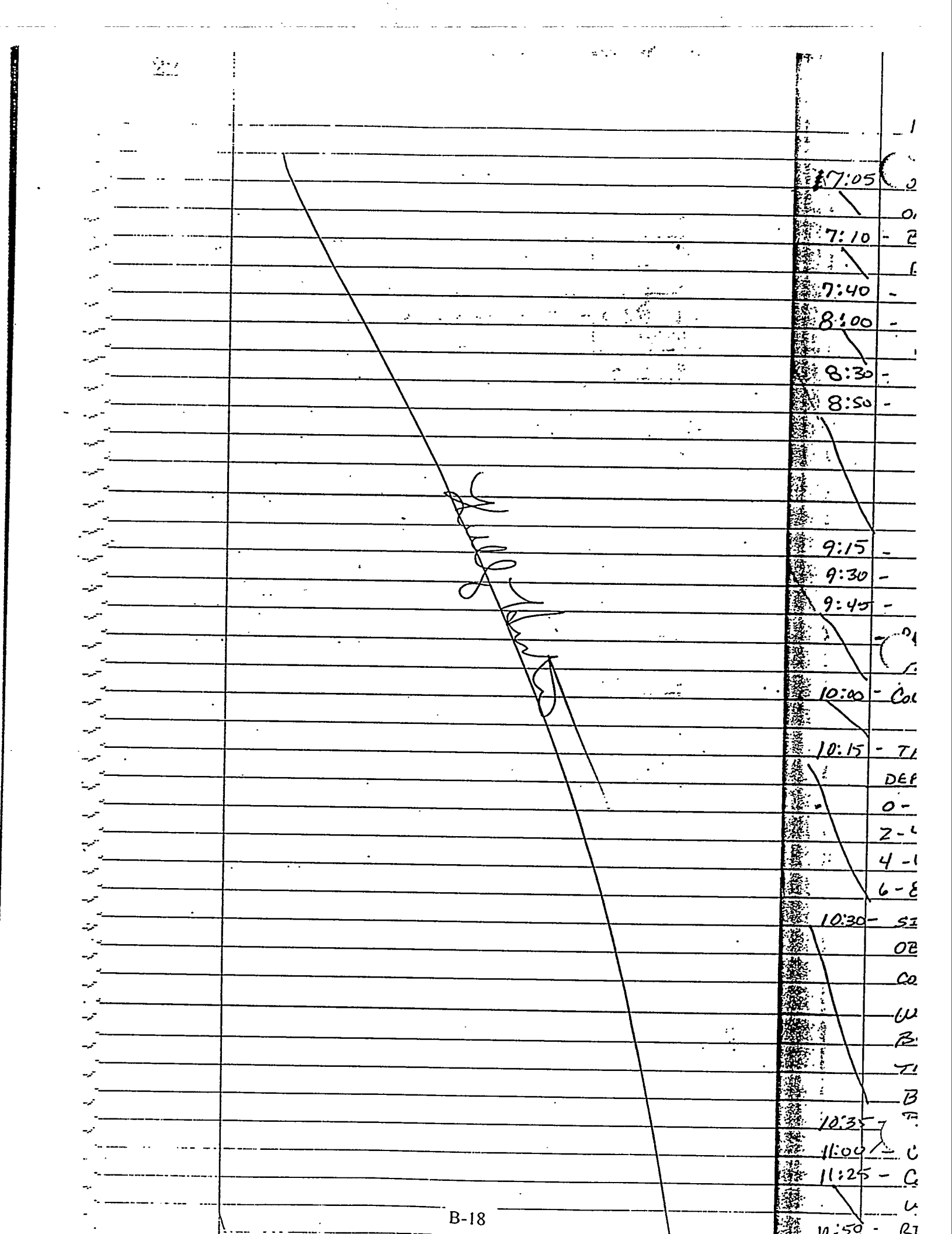
16:20 - Duplicate sample 8-10' BGS


16:25
17:10

KH CLEAR COOL ≈ 70°F 11/14/94

16:25 - BORING TERMINATED @ 12' BGS
DID NOT DETECT THE BOTTOM OF THE
~~ROB~~ BRP - RESIDUUM DETECTED @ 2' BGS
CONTINUED DRILLING PER THE WORK PLAN

17:10 - LEFT SITE - BK - TAKING SOIL SAMPLES TO
THE WELL BUILDING


7:05
7:10
7:40
8:00
8:30
8:50
9:15
9:30
9:45
10:00
10:15
10:30
11:00
11:25

11/15/94 KH CLEAR ≈ 60°F

7:05 - ON SITE - BC & DRILLERS ALREADY ON SITE

7:10 - BEGAN MOBE OF DECON EQMT - DRILL RIG ETC TO BORING CS6G-17

7:40 - CALIBRATED OVA -

8:00 - FILLED OUT TRIP BLANK COC & RED BOOK (SAMPLE BOOK)

8:30 - TOOK 1st HAND AUGER 0-1

8:50 - TOOK 2nd HAND AUGER 1.0-1.5 · DARK ORGANIC MATERIAL PEAT & possible BURN MATERIAL @ 1.5' BGS & SAND PALE IN COLOR · BEGINS STILL BELIEVED TO BE FILL HOWEVER NO SUSPECT BURN MATERIAL

9:15 - TOOK SAMPLE FROM 2-4 FT BGS

9:30 - " " " 4-6 FT BGS

9:45 - WSRC PERSONELL ON SITE

- RESIDUUM OBSERVED @ 4' BGS - THEREFORE THE BOTTOM OF THE PIT OBSERVED

10:00 - COLLECTED SOIL SAMPLE FROM 6-8' BGS

10:15 - TAKING OVA READINGS ON SAMPLES

DEPTH	OVA READING (ppm)
0-2	0
2-4	0
4-6	0
6-8	0

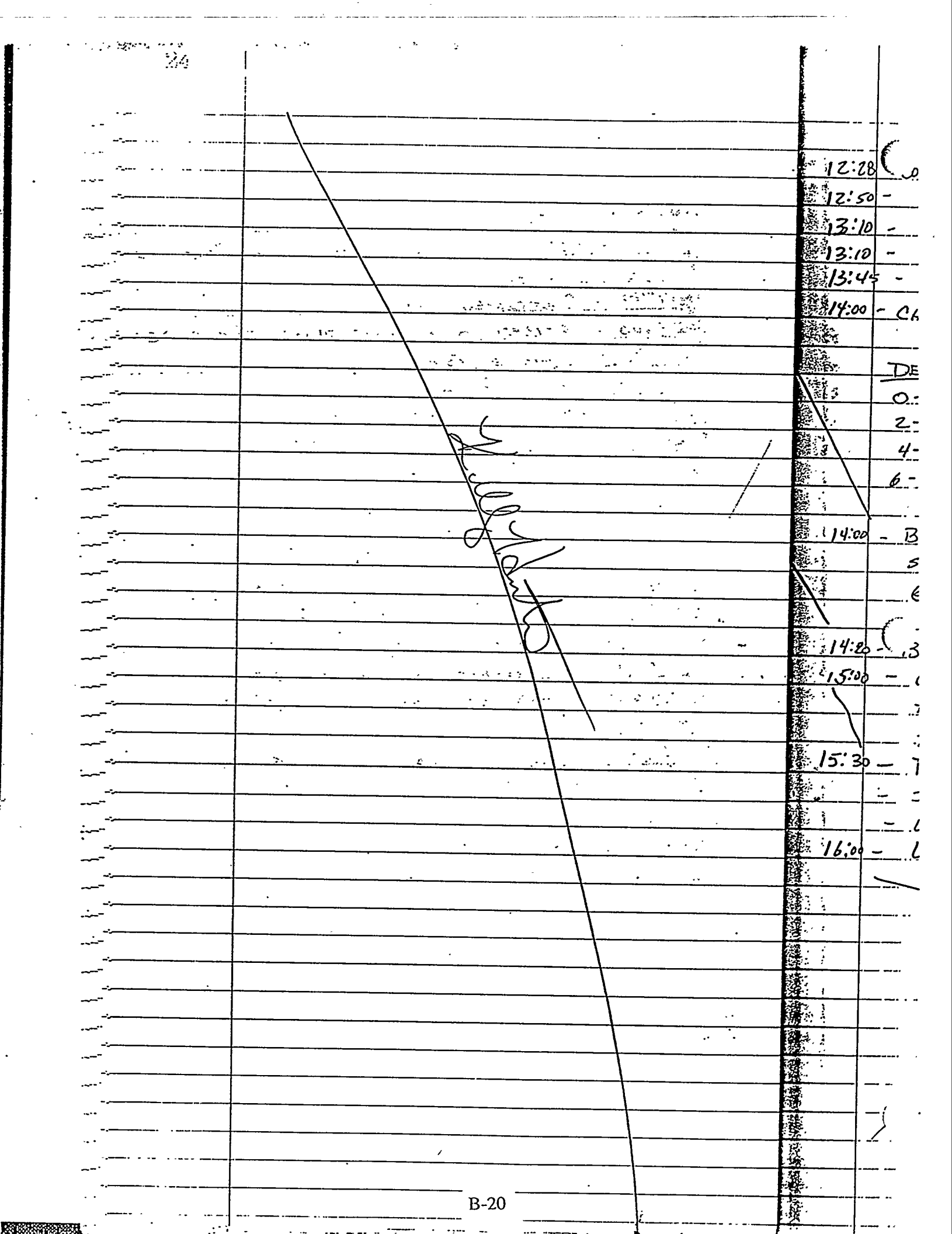
10:30 - SINCE THE BOTTOM OF THE PIT WAS OBSERVED @ 3.5' BGS - TWO SAMPES WERE COLLECTED BELOW THE BOTTOM OF THE PIT WITH NON DETECT ON THE OVA. THEREFOR BORING WAS TERMINATED @ 6' BGS AND THE LAST SPLIT SPOON WAS FROM 6-8' BGS

10:35 - BEGAN MOBE TO CS6G-13

11:00 - Collected a rinsate blank

11:25 - Collected a sample from 0-1.0' BGS WITH HAND AUGER

11:59 - RINSATE BLANK COLLECTED


24
12:28
12:50 -
13:10 -
13:10 -
13:45 -
14:00 - CA
DE
0:
2-
4-
6-
14:00 - B
5
14:80 - 3
15:00 -
15:30 -
16:00 -

11/15/94 KH CLEAR ≈ 75°F

12:28 - Collected sample from 1 to 2 ft BGS w/ HAND AUGER
12:50 - " " " 2 to 4 ft BGS w/ SPLIT SPOON
13:10 - " " " 4 to 6 ft BGS w/ SPLIT SPOON
13:10 - " " " 4 to 6 ft Duplicate
13:45 - " " " 6 to 8 ft BGS w/ SPLIT SPOONS
14:00 - CHECKING SOIL SAMPLES W/ OVA

DEPTH	READINGS
0-2	0 ppm
2-4	0 ppm
4-6	0 ppm
6-8	0 ppm

14:00 - BASED ON THE OVA READINGS NO FURTHER SAMPLING REQUIRED - BORING TERMINATED @ 6' W/ LAST SAMPLE COLLECTED FROM 6'-8' BGS.
14:20 - BEGAN DECON OF DRILLING EQUIPMENT
15:00 - CALLED IT A DAY - DID NOT WANT TO START DRILLING AND NOT BE ABLE TO FINISH THE BORING TODAY - DRILLERS LEFT SITE
15:30 - BK LEFT SITE
- I STAYED AND WORKING ON PAPER WORK
- LABLED BOTTLES FOR THE MORNING
16:00 - LEFT SITE

6:58 -
7:10 - E
7:10 - S
7:45 - T
7:55 -
8:00 -
8:26 -
8:55
9:30
10:05
10:30 TOO
SA
10:40 - T
10:45 -
10:55 -
10:55 -
12:00 -
BLO
14:00 -
14:00 -

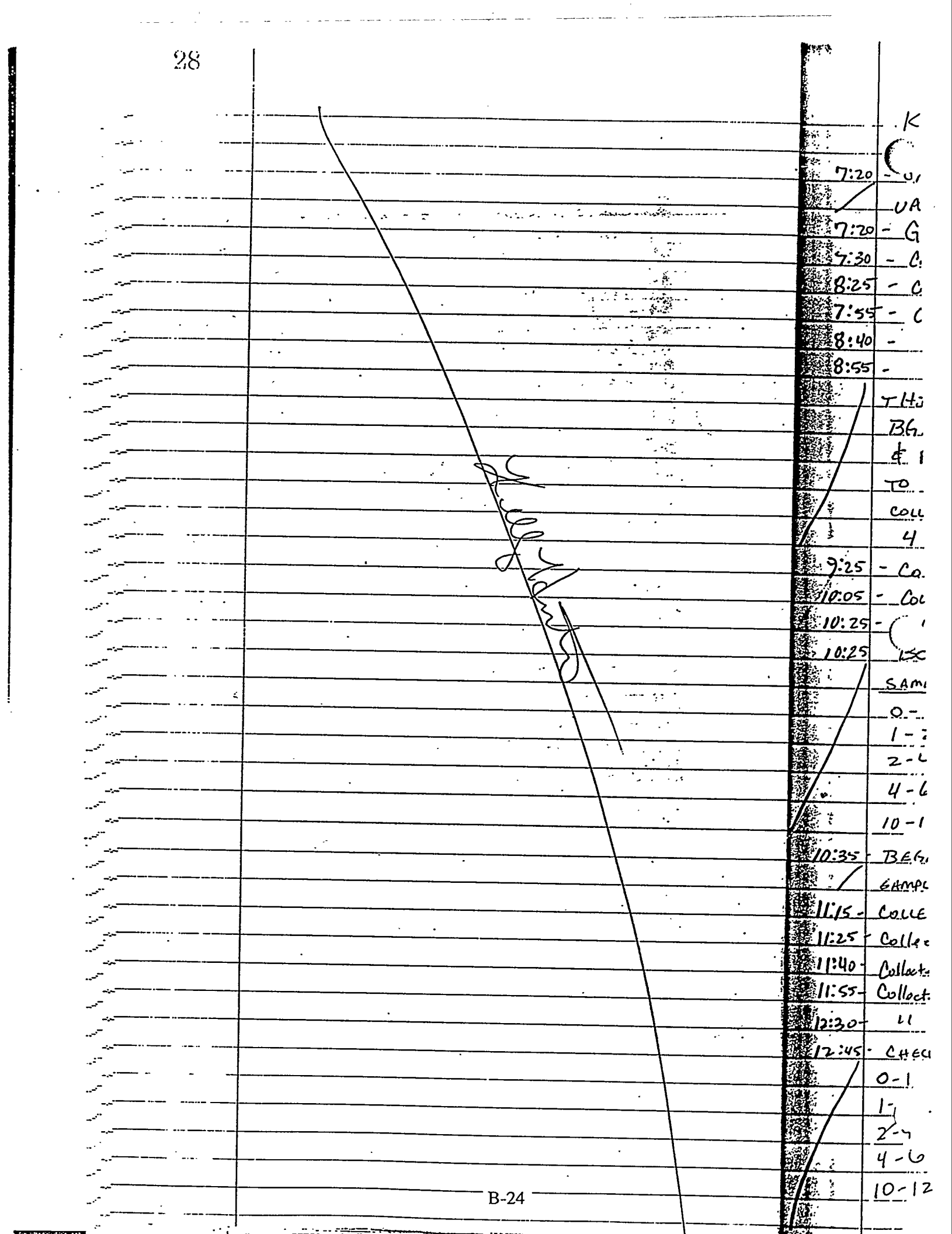
KH CLOUDY ≈ 68°F 11/16/94

6:58 - ON SITE - DRILLERS ON SITE
7:10 - BK ON SITE - MOBE TO QS66-014
7:10 - SET UP FOR DAYS SAMPLING - CALIBRATED OVA
7:45 - TOOK SOIL SAMPLE FROM 0-1' BGS - HAND AUGER
7:55 - " " " " 1'-2' BGS - HAND AUGER
8:00 - " " " " 2-4' BGS - SPLIT SPOON
8:25 - " " " " 4-6 BGS - SPLIT SPOON
8:55 " " " " 6-8 BGS - SPLIT SPOON
9:30 " " " " 8-10 BGS - " "
10:05 " " " " 13-15 BGS - " "
10:30 TOOK OVA READINGS

SAMPLE INTERVAL	OVA READING (PPM)
0-1	15
1-2	20
2-4	3
4-6	10
6-8	12
8-10	Ø
13-15	Ø

10:40 - BORING TERMINATED @ 15' BGS
10:45 - WERC PERSONELL ON SITE
10:55 - MOBE TO DEGN DRILLING EQUIPMENT
10:55 - MOBE TO QS66-15 & BEGAN GENERAL SETUP
12:00 - LIGHT RAIN WILL WAIT UNTIL IT BLOWS OVER
14:00 - ~~NO~~ RAIN HEAVY WILL SHUT DOWN FOR DAY
14:00 - LEFT SITE

Kelly Black



K
7:20 - U
UA
7:20 - G
7:30 - C
8:25 - C
7:55 - C
8:40 -
8:55 -
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9:25 - Co
10:05 - Col
10:25 -
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4-6
10-1
10:35 - BEG
SAMPL
11:15 - COLLE
11:25 - Colle
11:40 - Collect
11:55 - Collect
12:30 - 11
12:45 - CHEC
0-1
1-
2-
4-6
10-12

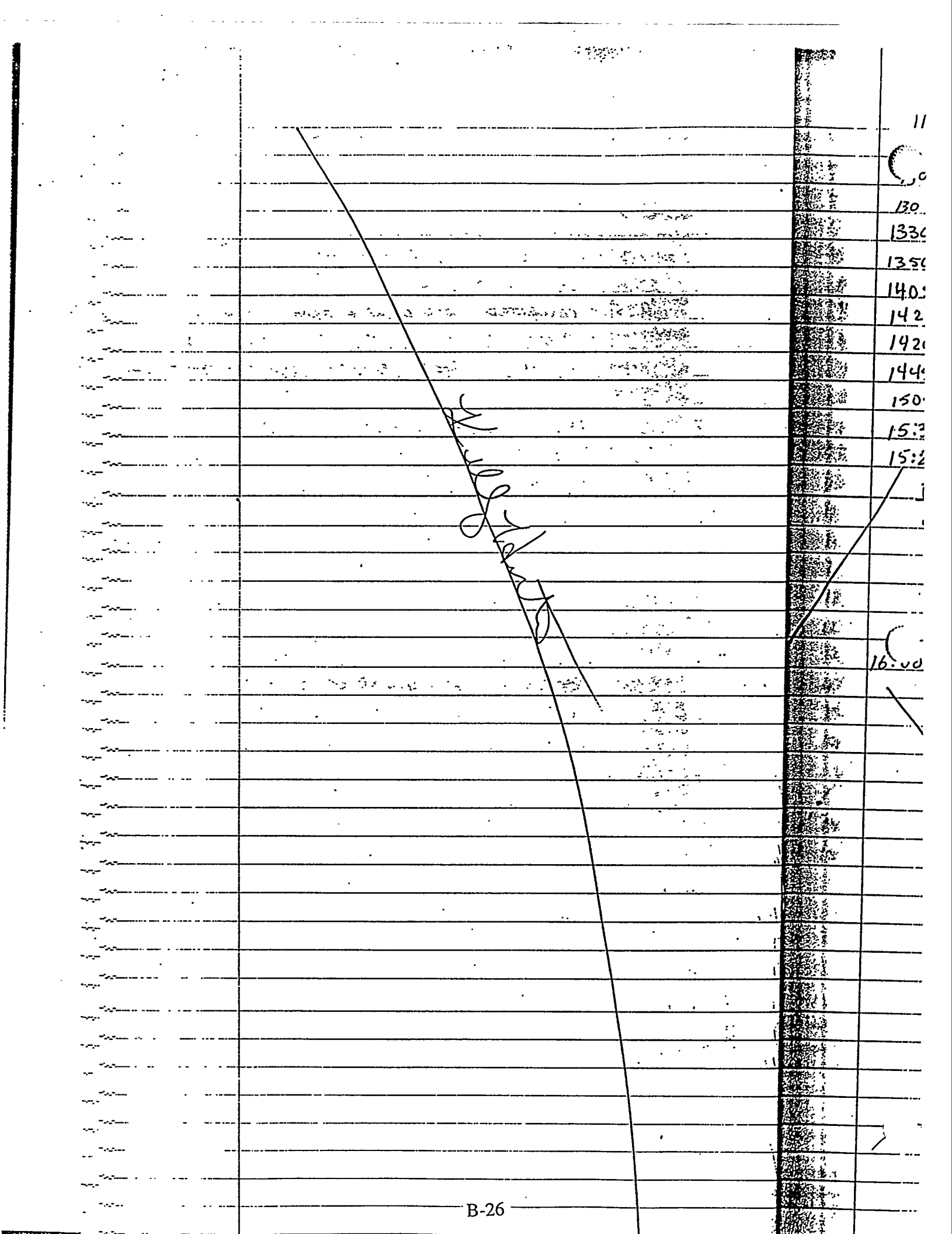
KH 11/17/94 55°F CLOUDY

7:20 - ON SITE - DRILLERS & BK ON SITE
UAON ARIVAL -
7:20 - GENERAL SETUP CSGG-15
7:30 - CALIBRATED OVA
8:25 - COLLECTED SOIL SAMPLE FROM 1.0 to 2.0 HAND AUGER
7:35 - COLLECTED " " " 0.0 to 1.0 " "
8:40 - " SOIL SAMPLE FROM 2.0 to 4.0 SPLIT SPOON
8:55 - " " " " 4.0 to 6.0 " "
THIS Sample 4 to 6 was proposed @ 5' to 7' BGS However since fill was observed to 2.5' BGS & RESIDUUM WAS OBSERVED @ 2.5' IT WAS DECIDED TO CHANGE THE SAMPLE DEPTH TO HAVE ON SAMPLE COLLECTED BENEATH THE FILL/RESIDUUM ENTERFACE 4 to 6
9:25 - COLLECTED RINSATE SAMPLE
10:05 - COLLECTED SOIL SAMPLE FROM 10'-12' BGS
10:25 - CHECKED SOIL SAMPLES WITH OVA
10:25 BORING TERMINATED @ 12' BGS

SAMPLE DEPTH	OVA READING (ppm)
0-1	0
1-2	0
2-4	0
4-6	0
10-12	0

10:35 BEGAN DECON OF DRILLING EQMT & SOIL SAMPLE EQUIPMENT - MOBED TO CSGG-16
11:15 COLLECTED 1st SAMPLE 0-1 ft BGS w/ HAND AUGER
11:25 Collected Sample 1-2 ft BGS " " "
11:40 Collected Sample 2-4 ft " " SPLIT SPOON
11:55 Collected Sample 4-6 ft " " " "
12:30 " " 10-12 ft " " " "
12:45 CHECKED SOIL SAMPLES W/ OVA

0-1	0 ppm
1-2	6 ppm
2-4	15 ppm
4-6	0 ppm
10-12	0 ppm

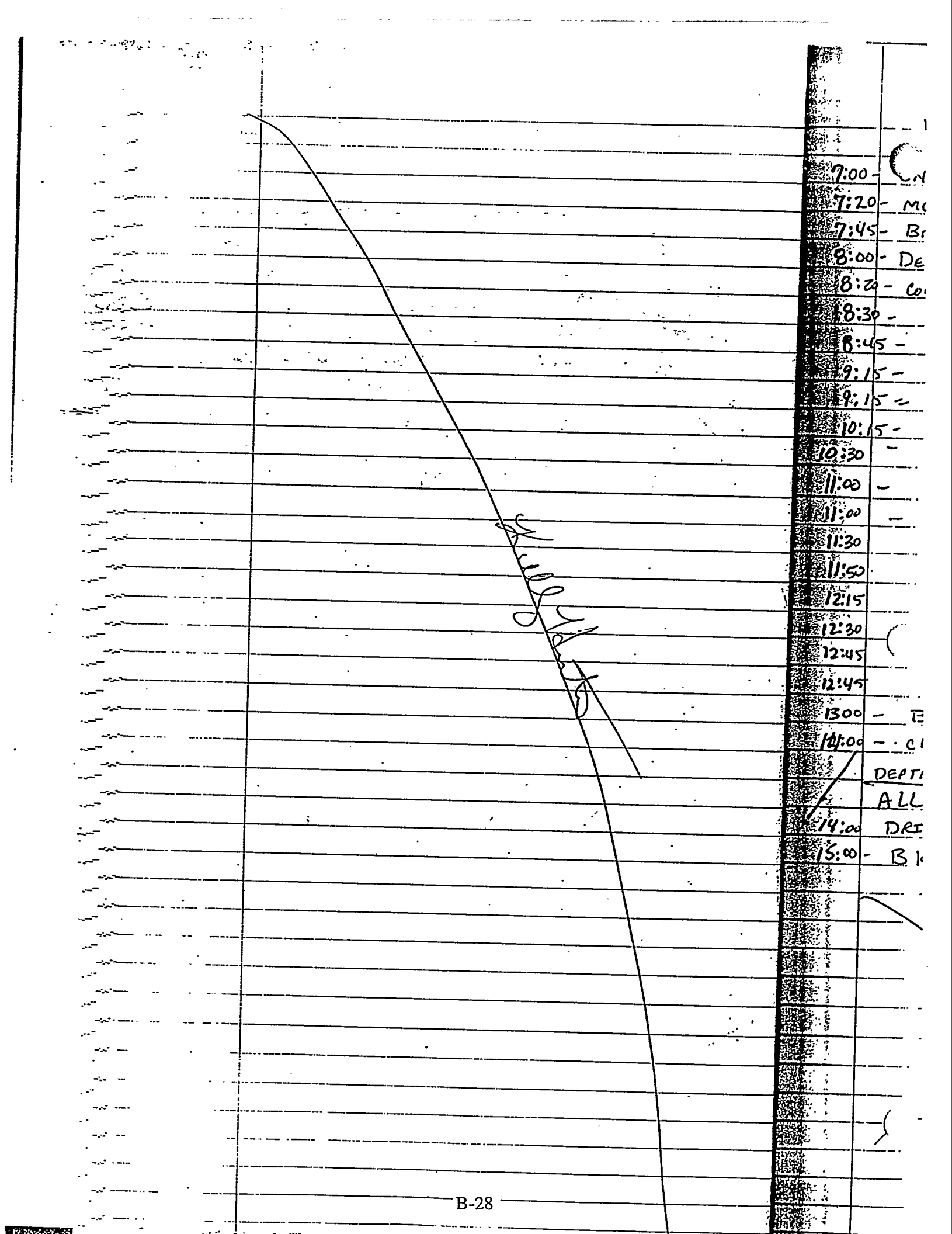

11
130
1330
1350
1400
142
1420
1440
1500
15:3
15:2
16:00

11/17/94 KH ≈50°F CLOUDY

1300 - BORING TERMINATED @ 12' BGS
1305 - BEGAN DECON OF DRILLING EQMT
1330 - MOBED TO CSGG-17 LOCATION
1350 - TOOK 1st± SOIL SAMPLE FROM 0-1' BGS
1405 - " 2nd± " " " " 1-2' BGS
1420 - " 3rd± " " " " 2-4' BGS
1420 - " DUPLICATE OF 3rd± SAMPLE
1445 - " 4th± " " " 5'-7' BGS
1505 - " 5th± " " " 10'-12'
15:30 - BEGAN GENERAL SITE CLEANUP - DECON
15:20 - TOOK OVA READINGS

DEPTH	OVA READING (PPM)
0-1	0
1-2	3
2-4	6
5-7	0
10-12	0

16:00 - LEFT SITE


7:00 -
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7:45 - B
8:00 - D
8:20 - C
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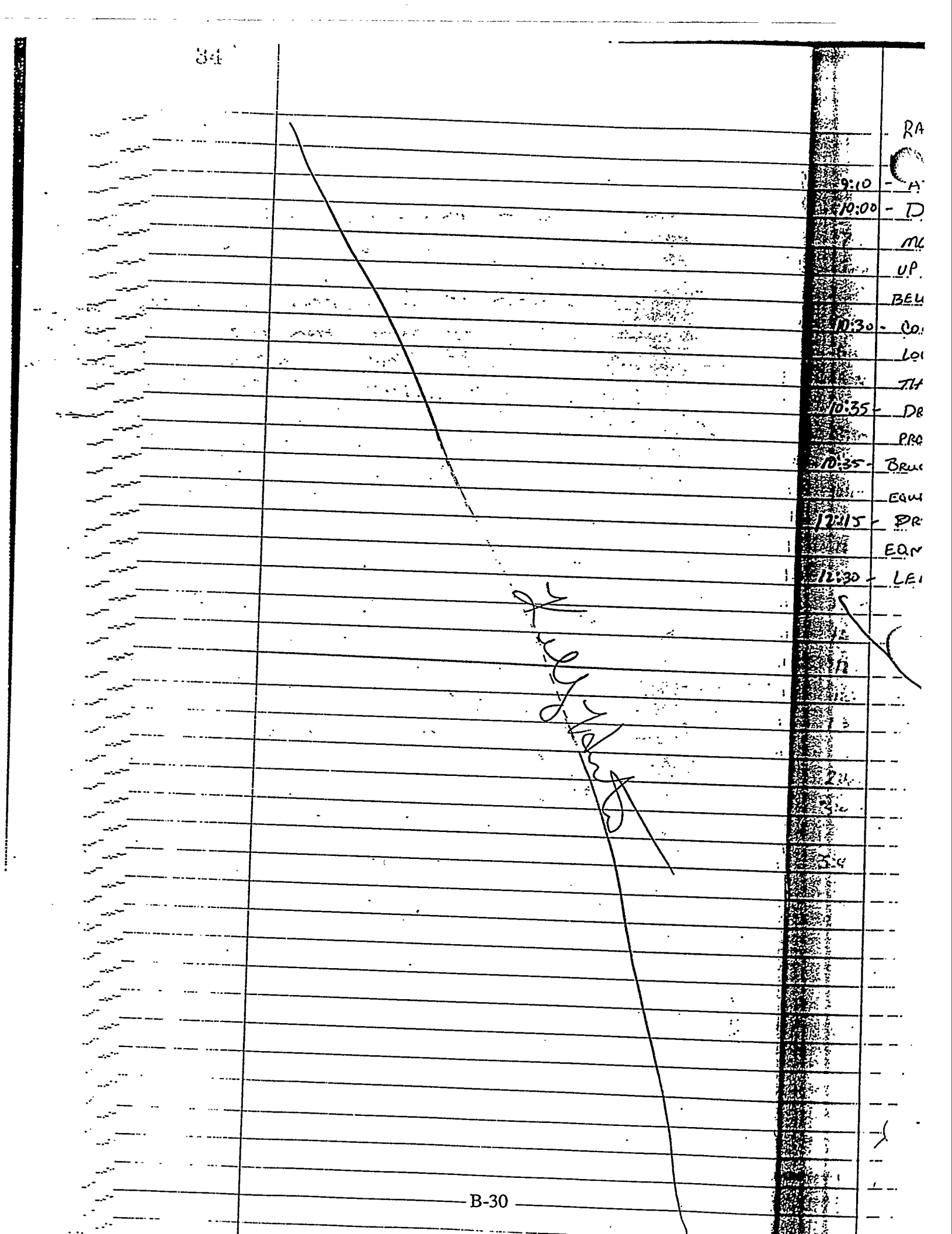
8:45 -
9:15 -
9:15 -
10:15 -
10:30 -
11:00 -
11:00 -
11:30
11:50
12:15
12:30
12:45
12:45
1300 - E
14:00 - C
DEPT
ALL
14:00 DRI
15:00 - B

11/18/94 KH ~55°F CLOUDY

7:00 - ON SITE - DRILLERS ON SITE UPON ARIVAL
7:20 - MOBE TO CS66-18 LOCATION
7:45 - Bruce Kristenson on SITE - DAVE CLARK - RAY PLUNKETT
8:00 - DECONED SAMPLING EQMT
8:20 - COLLECTED 1st Sample FROM 0-1 ft BGS - HAND AUGER
8:30 - " 2nd Sample From 1-2 " " " "
8:45 - " 3rd Sample From 2-4 " " SPLIT SPOON
9:15 - " 4th Sample " 5-7 " " " "
9:15 - " RINSATE w/ 4th Sample SPLIT SPOON
10:15 - " 5th Sample From 10-12 ft BGS SPLIT SPOON
10:30 - " 6th Sample From 15-17 " " "
11:00 - " 7th Sample " 20-22 " " "
11:00 - " 8th " " 20-22 - DUPLICATE
11:30 " 9th " " 25-27-
11:50 " 10th " " 30-32
12:15 " 11th " " 35-37
12:30 " 12th " " 40-42
12:45 " 13th " " 45-47
12:45 " 14th " " 45-47 DUPLICATE
13:00 - BORING TERMINATED @ 45' BGS
14:00 - CHECKING SOIL SAMPLES w/ OVA

DEPTH	OVA READING (ppm)
ALL	0

14:00 DRILLERS LEFT SITE
15:00 BK & J LEFT SITE


3-1
RA
9:10 - A
10:00 - D
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10:35 - DR
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12:15 - BR
EQ
12:30 - LE

RAIN KH ≈ 65°F 11/21/04

K. HUNTER RECORDING.

9:10 - AT WELL BUILDING WAITING ON DRILLERS

10:00 - DRILLERS ARIVE @ WELL BUILDING - WE MOBE TO CENTRAL SHOPS - PREPARE TO GROUT UP: BORING CS6G-18 - BECAUSE WE DRILLED BELOW THE WATER TABLE -

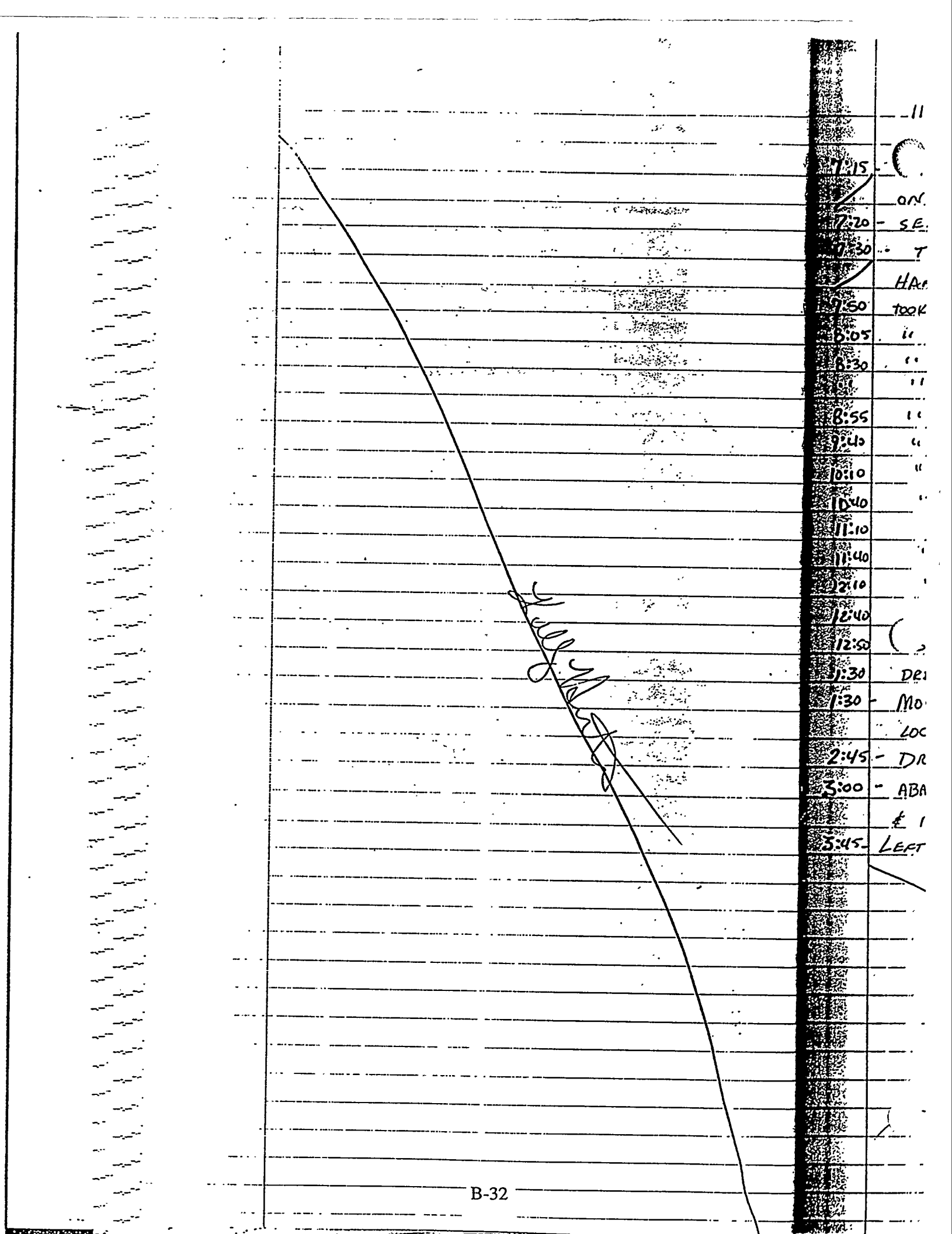
10:30 - COULD NOT GET THE DRILL RIG TO CS6G-18 LOCATION DUE TO RAIN/MUD - WILL GROUT LATER THIS WEEK (WED).

10:35 - DRILLERS SERVICING THE STEAM CLEANER - NOT WORKING PROPERLY

10:35 - BRUCE KRISTIANSEN ON SITE - LOADED - ALL DECON EQUIPMENT - TABLES ETC TO CS6G-19 LOCATION.

11:15 - DRILLERS STILL PERFORMING MAINTANCE ON EQMT - WE ARE CALLING IT A DAY.

11:30 - LEFT SITE


11
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12:50
1:30
DR
1:30 - MO
LOC
2:45 - DR
3:00 - ABA
& I
3:45 - LEFT

11/22/94 KH CLEAR ≈ 55°F

7:15 - ON SITE - BRUCE KRISTENSEN & DRILLERS ON SITE UPON ARIVAL

7:20 - SET UP FOR SOIL SAMPLING CS6G-19

7:30 - TOOK 1st SAMPLE FROM 0-1' BGS WITH HAND AUGER -

7:50 - TOOK 2nd Sample 1-2' BGS w/ HAND AUGER

8:05 " 3rd " 2-4' BGS " SPLIT SPOON

8:30 " 4th " 5-7' BGS " " "

" DUPLICATE @ 5'-7' BGS " "

8:55 " 5th Sample 10'-12' BGS @ 8' "

9:40 " 6th " 15-17 BGS " "

10:10 " 7th " 20-22 BGS " "

10:40 " 8th " 25-27 BGS " "

11:10 " 9th " 30-32 BGS " "

11:40 " 10th " 35-37 BGS " "

12:10 " 11th " 40-42 BGS " "

12:40 " 12th " 45-47 BGS " " & DUPLICATE

12:50 BORING TERMINATED @ 45' BGS

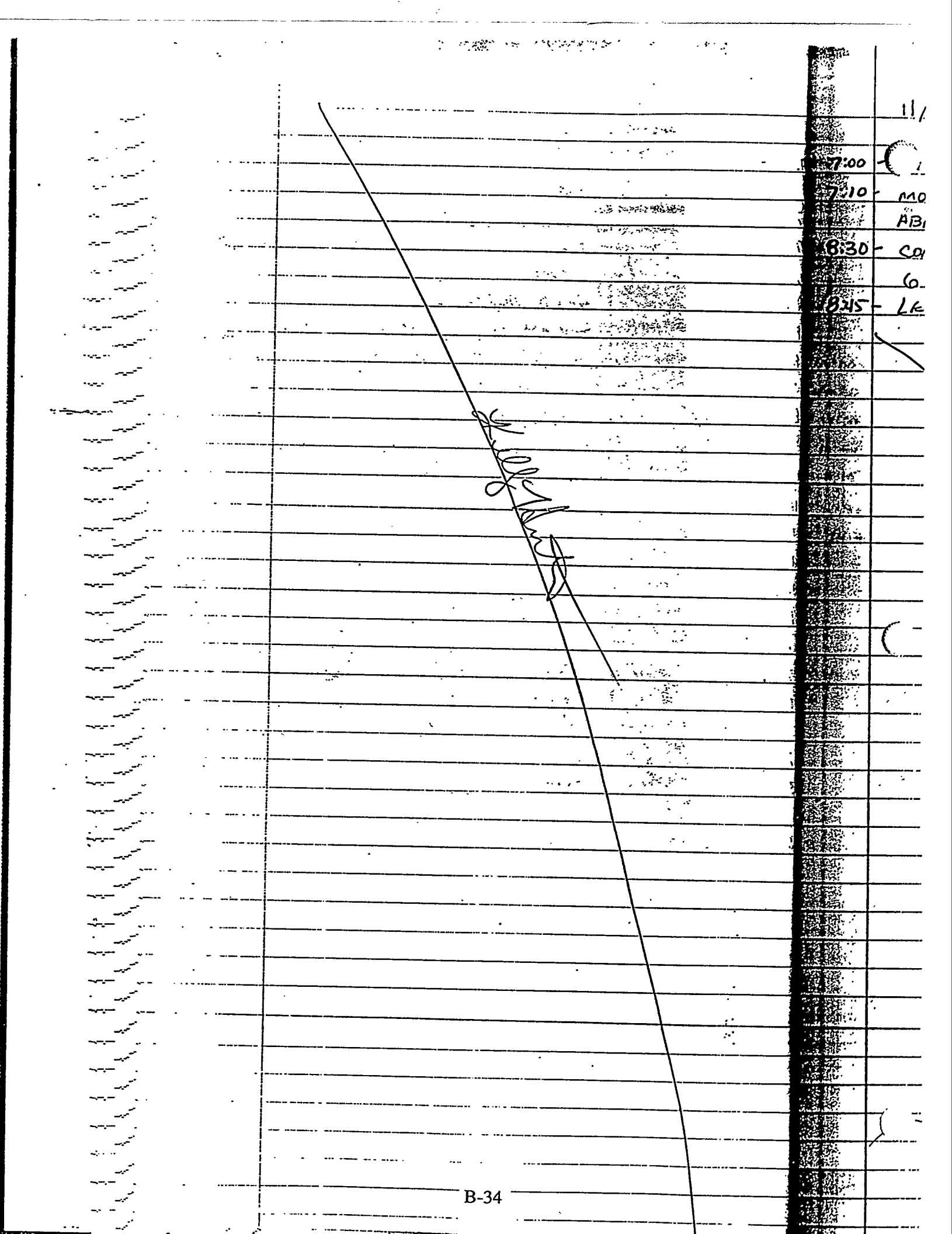
1:30 DRILLERS LEFT SITE TO GET SUPPLIES FOR GROUT

1:30 - MOVED SAMPLE/DEON STATION TO CS6G-20 LOCATION

2:45 - DRILLERS BACK ON SITE

3:00 - ABANDONED CS6G-19 USED 6 BAGS PC & 13.5 lb/gal BENT CEMENT GROUT

3:45 - LEFT SITE


11/
7:00
7:10
MO
AB
8:30
CO
6
8:45
LA

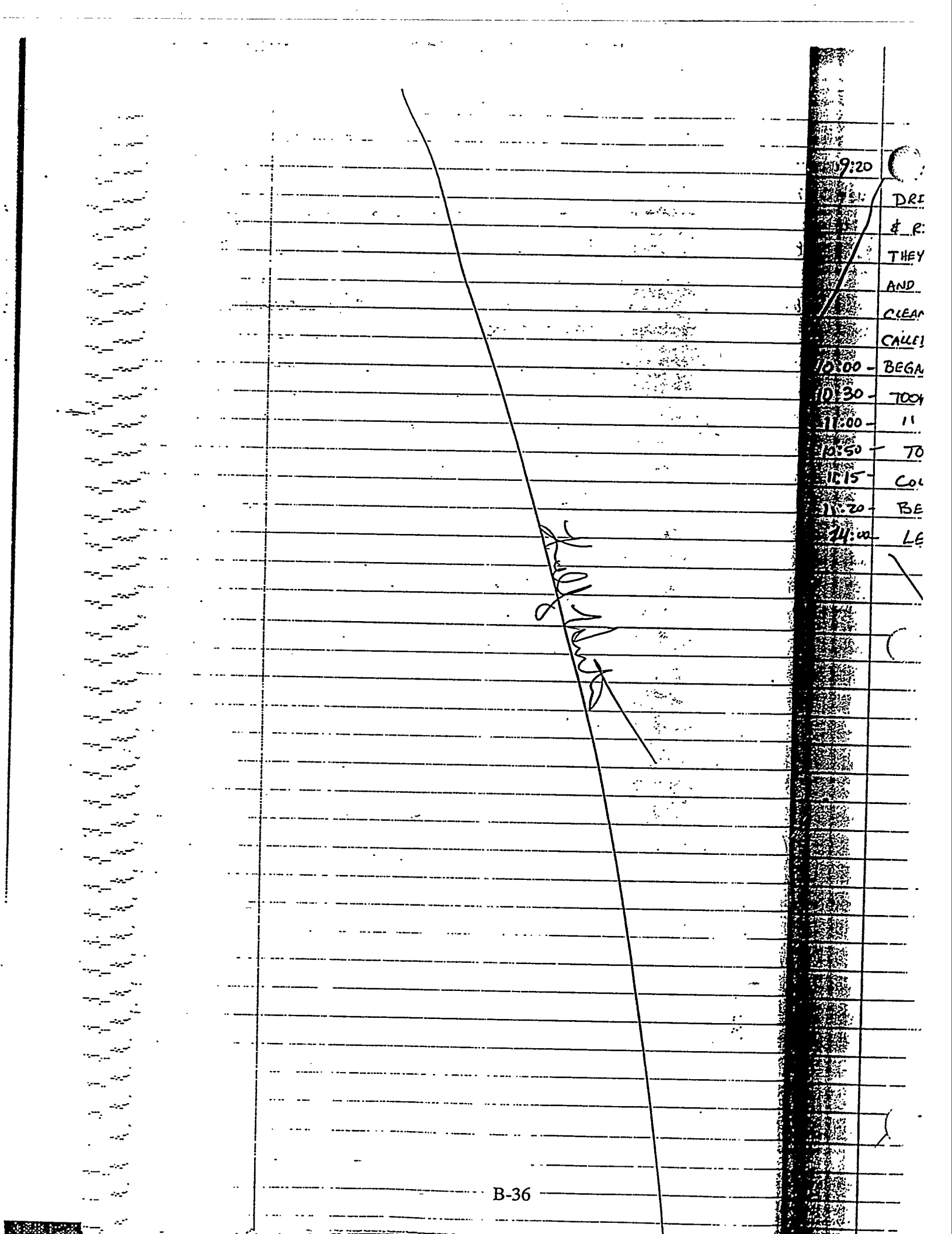
11/23/94 KH CLEAR ≈45°F

7:00 - ON SITE DRILLERS

7:10 - MOBED TO CSGG-18 LOCATION TO ABANDON

8:30 - COMPLETED ☒ BORING ABANDONMENT
6 BAGS PC, 13.5 lb/gal grout.

9:15 - LEFT SITE


9:20
DRI
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10:00 - BEGA
10:30 - TOO
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11:20 - BE
24:00 LE

11/28/94 KIT CLOUDY ≈ 70°F

(KELLY HUNTER RECORDING)

1120 ON SITE - DRILLERS ON SITE UPON ARRIVAL

DRILLERS PUT ANTI-FREEZE IN THE STEAM CLEANER

& RIG PUMP/GROUT PUMP - DUE TO EXPECTED FREEZE

THEY DRAINED ALL ANTI-FREEZE FROM THE STEAM CLEANER

AND BLEW OUT RESIDUE WITH STEAM - RAN STEAM

CLEANER ≈ 5 MIN BEFORE STEAM CLEANING AUGERS. I

CALLED WSRC JANELLE JANSON & LET HER KNOW.

1000 - BEGAN SET UP OF SAMPLING STATION.

1030 - TOOK 1st sample w/ HAND AUGER

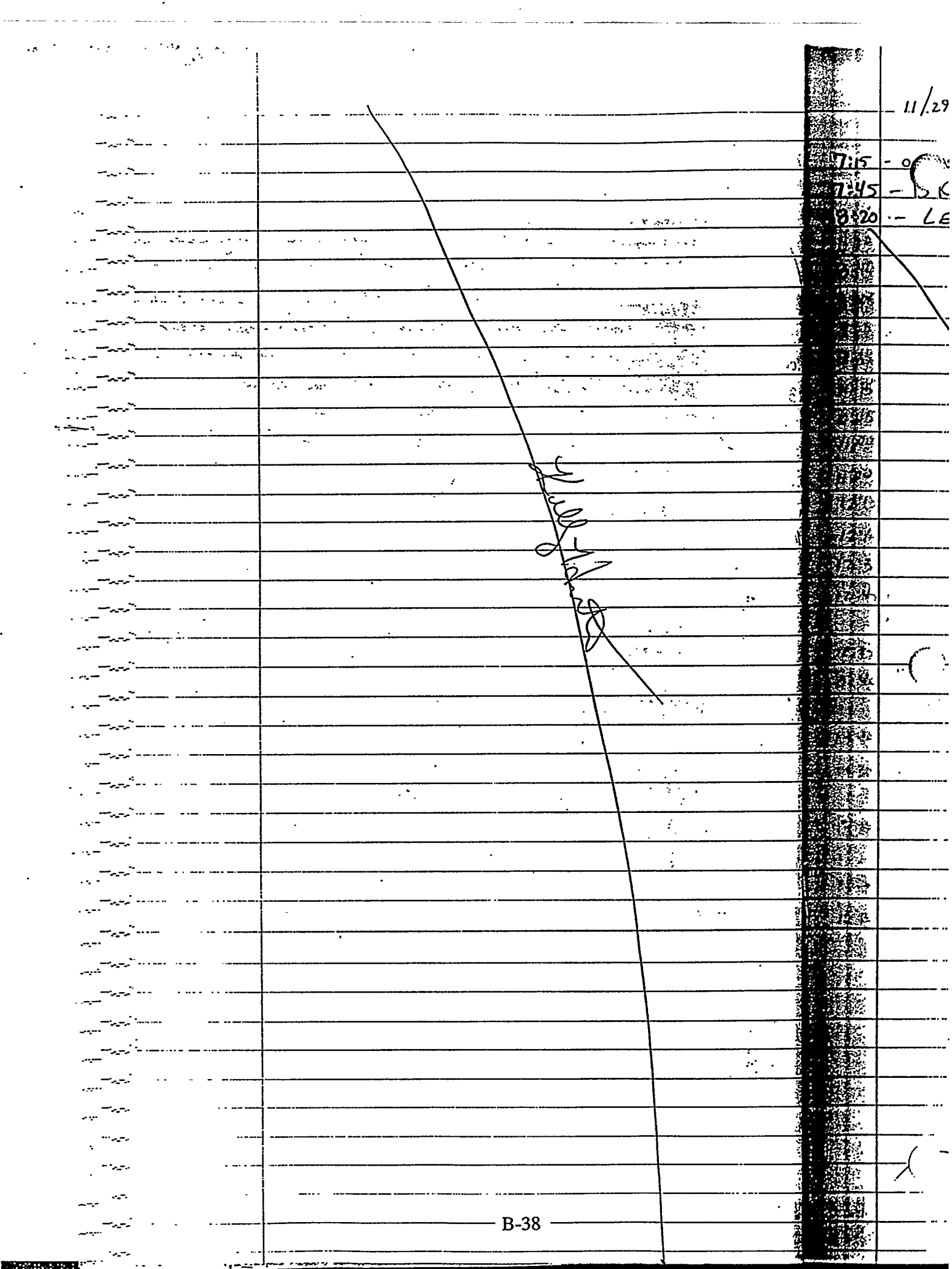
1100 - " 2nd " " " "

1150 - TOOK RINSATE BLANK HAND AUGER

1215 - COLLECTED SOIL SAMPLE FROM 2-4' BGS & SPLIT

1220 - BEGAN RAINING - STOPED DRILLING

1400 LEFT SITE CONTINUED TO RAIN


11/29
7:15 - o
7:45 - 5
8:20 - LE

11/29/94 KH CLOUDY LIGHT RAIN ≈ 60°F.

KELLY HUNTER RECORDING

15 - ON SITE - WAITING ON DRILLERS

45 - BK & Drillers ON SITE - HEAVY RAIN

20 - LEFT SITE DUE TO RAIN

11/3C

7:10 O

UPON

7:45 - Co

8:10 -

8:40 -

8:45 -

9:00 -

9:35 -

10:15 -

10:45

11:00

11:00

12:15

12:15

12:30 BOR

12:45 CHECK

43.2'

12:45 - B

13:40 - CHECKE

CASING

14:40 BAILED

14:30 - ABANDON

13.5 lb.

14:40 - CHECKED

CASING

15:30 - BAILE

16:00 - LEF

11/30/94 Kit CLOUDY ≈ 45°F

0710 ON SITE - DRILLERS & BK ON SITE UPON ARIVAL

0745 COLLECTED SAMPLE FROM 5'-7' BGS

0810 " " " 10'-12' BGS

0840 Collected Field Blank w/ DI H_2O

0845 Collected sample FROM 15'-17' BGS

0900 Collected SAMPLE " 20-22' BGS

0935 COLLECTED SOIL SAMPLE FROM 25-27' BGS

1015 " " " " 30-32' "

1045 " " " " 35'-37' "

1100 " " " " 40'-42' BGS

1105 " ~~Acetate~~ DUPLICATE 40'-42' BGS

1215 " SPLIT FROM 45'-47' BGS

1215 COLLECTED SOIL SAMPLE FROM 45'-47' BGS

1230 BORING TERMINATED

1245 CHECKED FLUID LEVEL IN WELL CBR-05

43.24 FEET BELOW TOP OF CASING

1345 BRUCE KRISTENSEN STARTED BAILING CBR-05 - & BAILED DRY

1340 CHECKED FLUID LEVEL IN CBR-06 - 50.78' FROM TOP OF CASING. & BEGAN BAILING

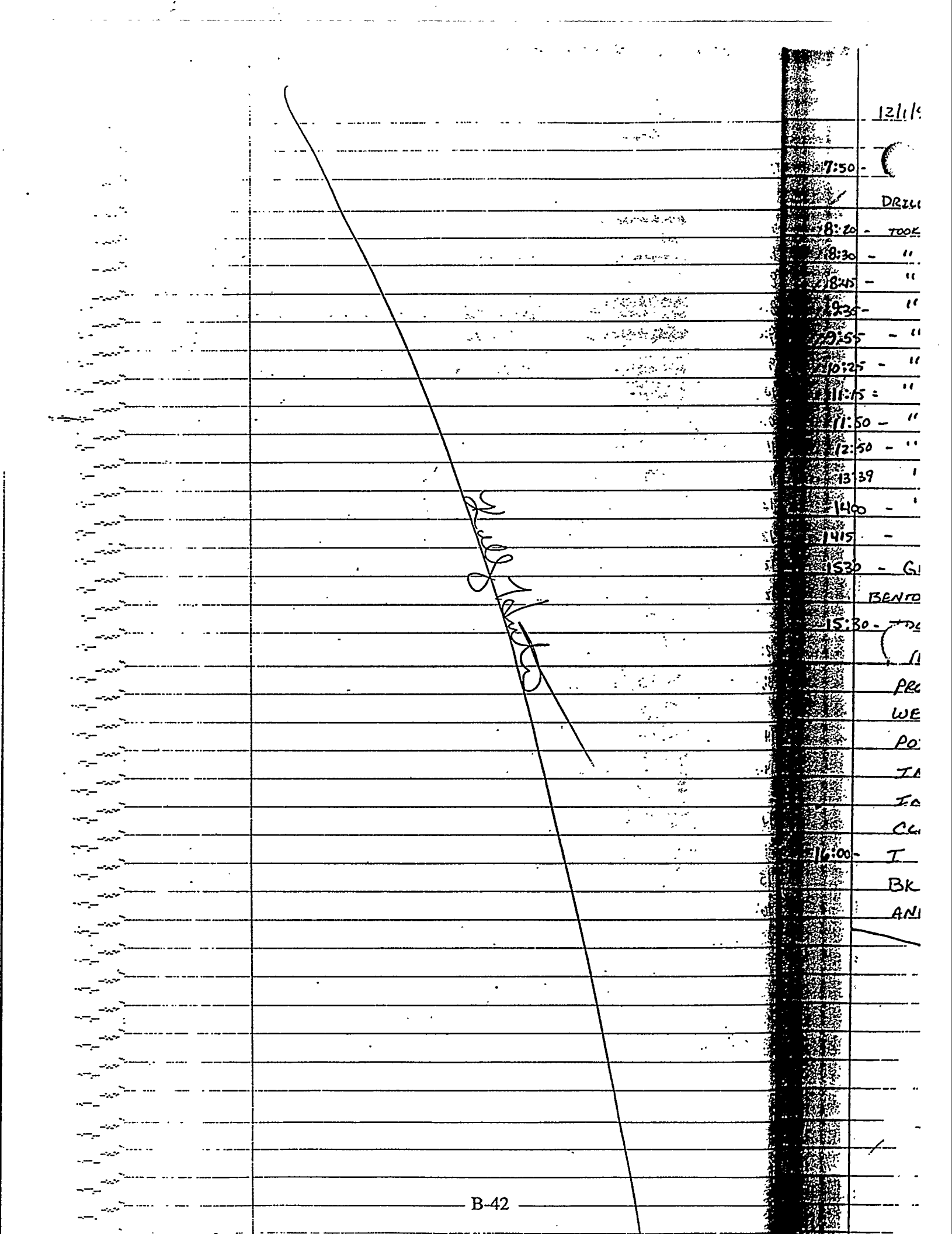
1440 BAILED DRY

1430 ABANDONED BORING w/ BENTONITE CEMENT GROUT 13.5 lb/gal. 5 BAGS PC

1440 CHECKED H_2O LEVEL IN CBR-04 41.20' BELOW TOP OF CASING

1520 BAILED 3 WELL VOLUMES ≈ 10 gal H_2O

1540 LEFT SITE


12/1/
7:50 -
DRILL
18:20 - TOOK
18:30 - "
18:45 - "
19:35 - "
19:55 - "
20:25 - "
11:15 = "
11:50 - "
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12/1/94 KH CLEAR ≈ 48°F

1350 - ON SITE BK & DRILLERS ON SITE UPON ARIVAL

DRILLERS SETTING UP ON CS6G-21 BORING

1420 - TOOK 1st SOIL SAMPLE WITH HAND AUGER 0-1'

1430 - " 2nd " " " " " 1-2'

1445 - " 3rd " " " SPLIT SPOON & RINSATE 2-4'

0235 - " 4th " " " " " 5'-7' BGS

0955 - " 5th " " " " " 10-12' BGS

1025 - " 6th " " " " " 15-17 BGS & DUPLICATE

1105 - " 7th " " " " " 20-22 BGS & SPLIT

1150 - " 8th " " " " " 25-27 BGS

1250 - " 9th " " " " " 30-32 BGS

1339 - " 10th " " " " " 35-37 BGS

1400 - " 11th " " " " " 40-42 BGS

1415 - 12th " " " " " 45-47 BGS

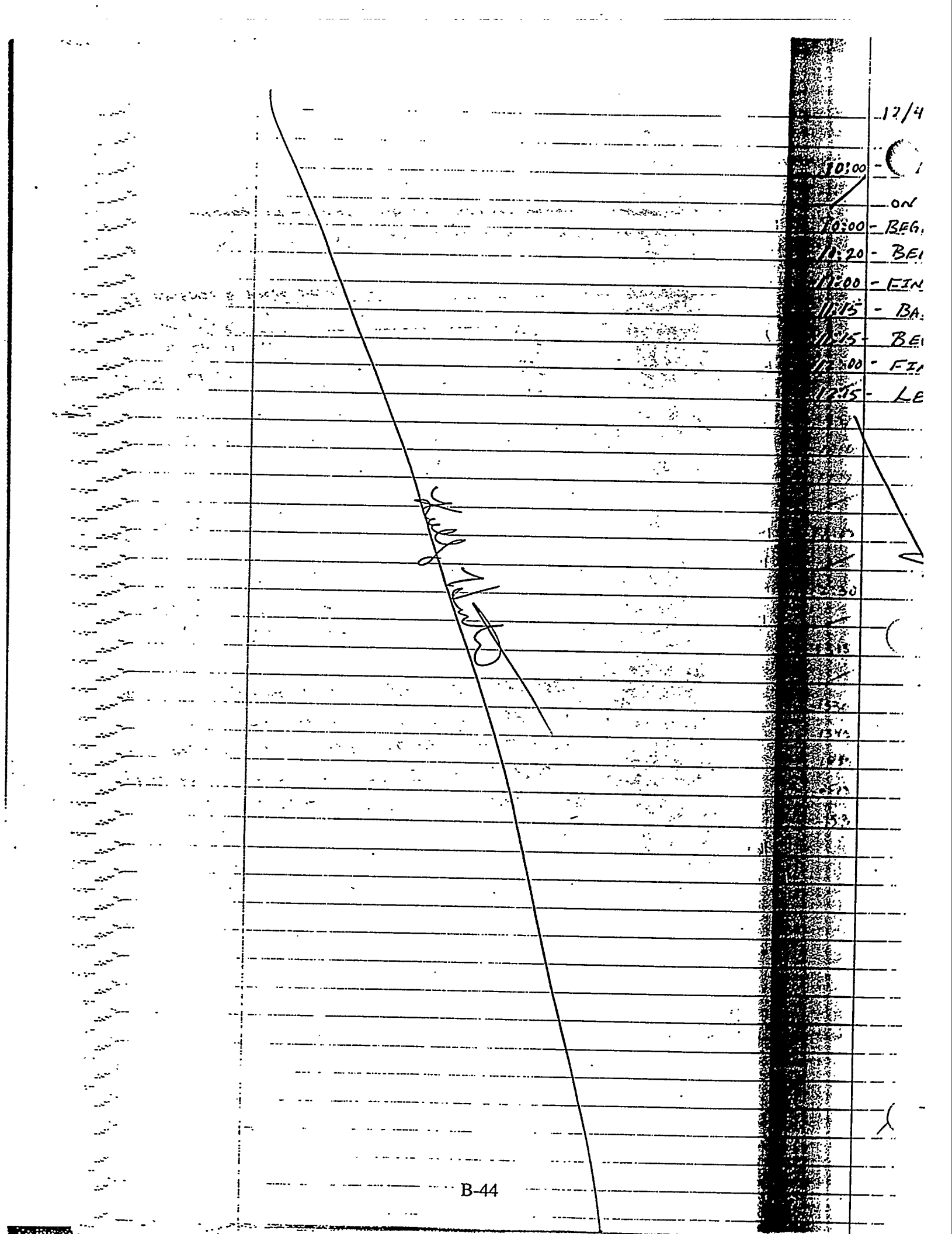
1530 - GROUTED CS6G-21 BORING TO SURFACE 5.5 BAGS OF PC BENTONITE CEMENT GROUT ~~to~~ WITH 13.5 lb/gal MIX

1530 - TOOK RINSATE SAMPLE FOR WELL CBR-TZ

AFTER WE TOOK THE SAMPLE WE NOTICED THE PROTECTIVE COVER WAS FRESHLY PAINTED ≈ 1 HOUR.

WE DECIDED NOT TO SAMPLE THE WELL DUE TO POTENTIALLY CONTAMINATING THE SAMPLE & THE INTEGRITY OF THE WELL - WILL TRY TO SAMPLE IN THE MORNING OF 12/2/94. CALLED DAVID CLARK AND NOTIFIED HIM OF THE SITUATION

1700 - I SPOKE W/ DAVE CLARK (WSRC) AND TOLD HIM BK & I WOULD BAIL THE WELLS ON SUNDAY AND SAMPLE THEM MONDAY MORNING


12/4
10:00 -
ON
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12:15 - LE
July 4th

12/4/94 KH CLOUDY ≈ 65°F

0800 - ON SITE TO PURGE WELLS FOR SAMPLING ON 12/5/94.

1400 - BEGAN BAILING CBR-05 - BRUCE KRISTIANSON

1420 - BEGAN BAILING CBR-04 - KELLY HUNTER

1500 - FINISHED BAILING CBR-05 - DRY

1515 - BAILED 10 gal OF H_2O FROM CBR-04 - 3 WELL VOLUMES

1525 - BEGAN BAILING CBR-06 -

1600 - FINISHED BAILING CBR-06 - 7.5 gal H_2O - 3 WELL VOLUMES

1615 - LEFT SITE

50

12/5

6:50 - C

7:25 - BRU

7:40 - DEC

8:00 - COL

8:50 - COLLE

CBR-

8:30 - COLL

8:40 - COLL

DU

9:45 - COLLE

10:00 - LEF

11:25 - AT

SOIL

12:15 - BACK

SAMP

12:30 - DECO

DRYI

1315 - C

AND

1330 - COLLECT

1345 - DECON

1445 - COLLEC

1515 - "

1530 LEFT

WELL

12/5/94 KH PC ≈ 65°F

KELLY HUNTER RECORDING

0700 - ON SITE TO SAMPLE WELLS

0715 - BRUCE KRISTIANSON ON SITE

0740 - DECONED SAMPLING EQUIPMENT

1000 - COLLECTED FIELD BLANK

1050 - COLLECTED A GROUNDWATER SAMPLE FROM WELL CBR-05 (CBR-T2)

1130 - COLLECTED GROUNDWATER SAMPLE FROM CBR-06 (CBR-T3)

1140 - COLLECTED GROUNDWATER SAMPLE FROM CBR-06 (CBR-T3) DUPLICATE & SPLIT

1145 - COLLECTED GROUNDWATER SAMPLE FROM CBR-04 (CBR-T1)

1100 - LEFT SITE FOR SHIPING

1225 - AT RUST LAB/TRAILER TO PREPARE FOR HAND AUGER SOIL SAMPLES

1700 - BACK ON SITE TO COLLECT HAND AUGER SOIL SAMPLES

1730 - DECONED SAMPLING EQUIPMENT - WAITING ON DRYING

1815 - COLLECTED SOIL SAMPLE CS66-28-01 FROM 0-1' BGS AND ASSOCIATED DUPLICATE

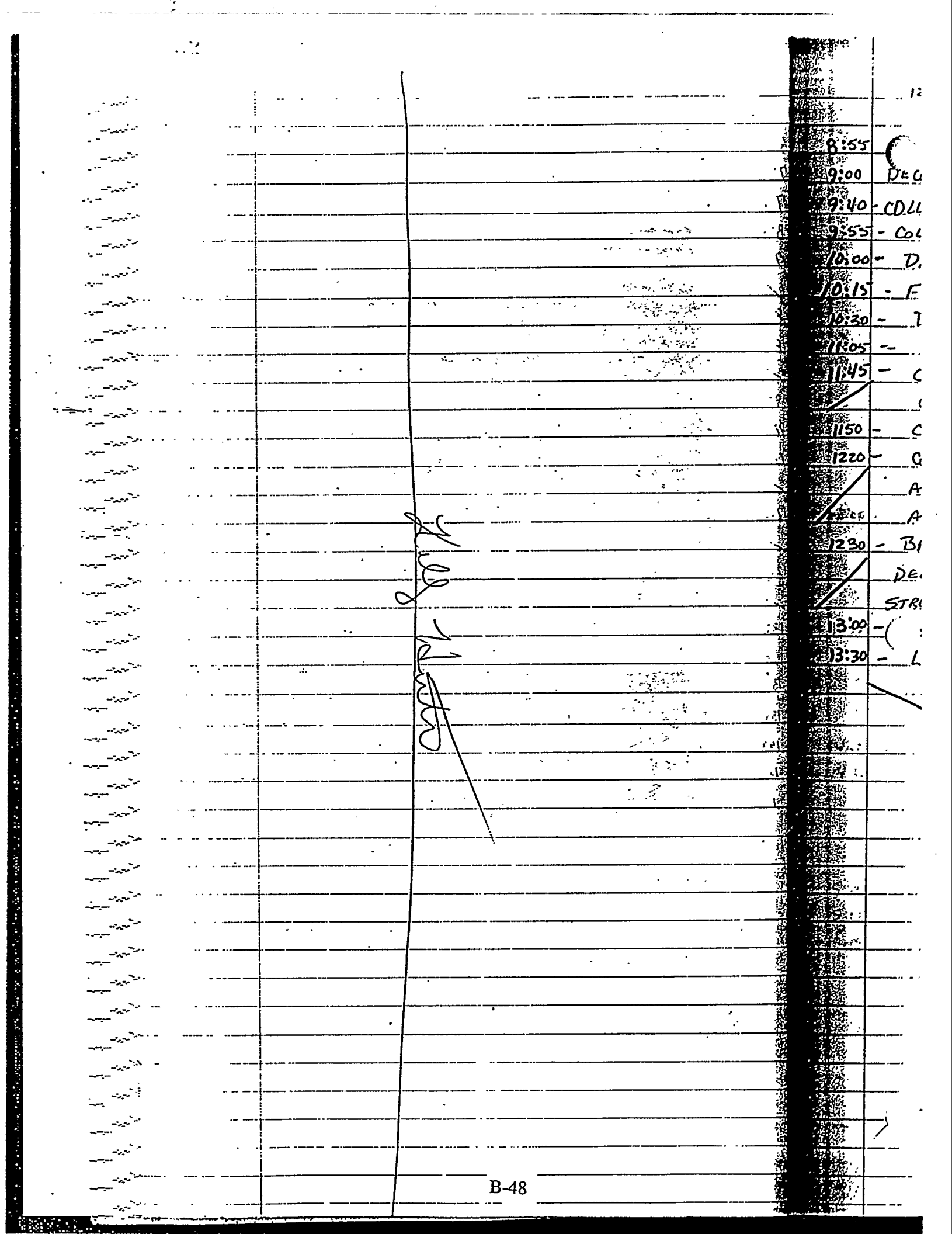
1820 - COLLECTED SOIL SAMPLE CS66-27-01 FROM 0-1' BGS

1855 - DECONED SAMPLING EQUIPMENT

1915 - COLLECTED SOIL SAMPLE CS66-26-01 FROM 0-1' BGS

1925 " " " CS66-24-01 FROM 0-1' BGS

1930 - LEFT SITE FOR TRAILER & DELIVERY SAMPLES TO WELL BUILDING


8:55
9:00
9:40 - CD
9:55 - Co
10:00 - D
10:15 - F
10:30 - I
11:05 -
11:45 - C
1150 - C
1220 - G
A
A
1230 - B
DE
STR
13:00 -
13:30 - L

12/6/94 KH CLOUDY ≈ 65°F

KELLY HUNTER RECORDING

8:55 - ON SITE

9:00 - DECONED SAMPLING EQUIPMENT

9:10 - COLLECTED SOIL SAMPLE CS6G-25-01 0-1' BGS

9:55 - COLLECTED " " CS6G-23-01 0-1' BGS

10:00 - DECONED SAMPLE EQUIPMENT

10:15 - FILLING OUT SAMPLE FORMS

10:30 - DEAN THOMAS ON SITE FOR INSPECTION

11:05 - " " LEFT SITE

11:45 - COLLECTED HAND AUGER SOIL SAMPLE FROM CS6G-22-01 FROM 0 to 1 ft BGS

11:50 - COLLECTED SAMPLE CS6G-22-02 1 to 2 ft BGS

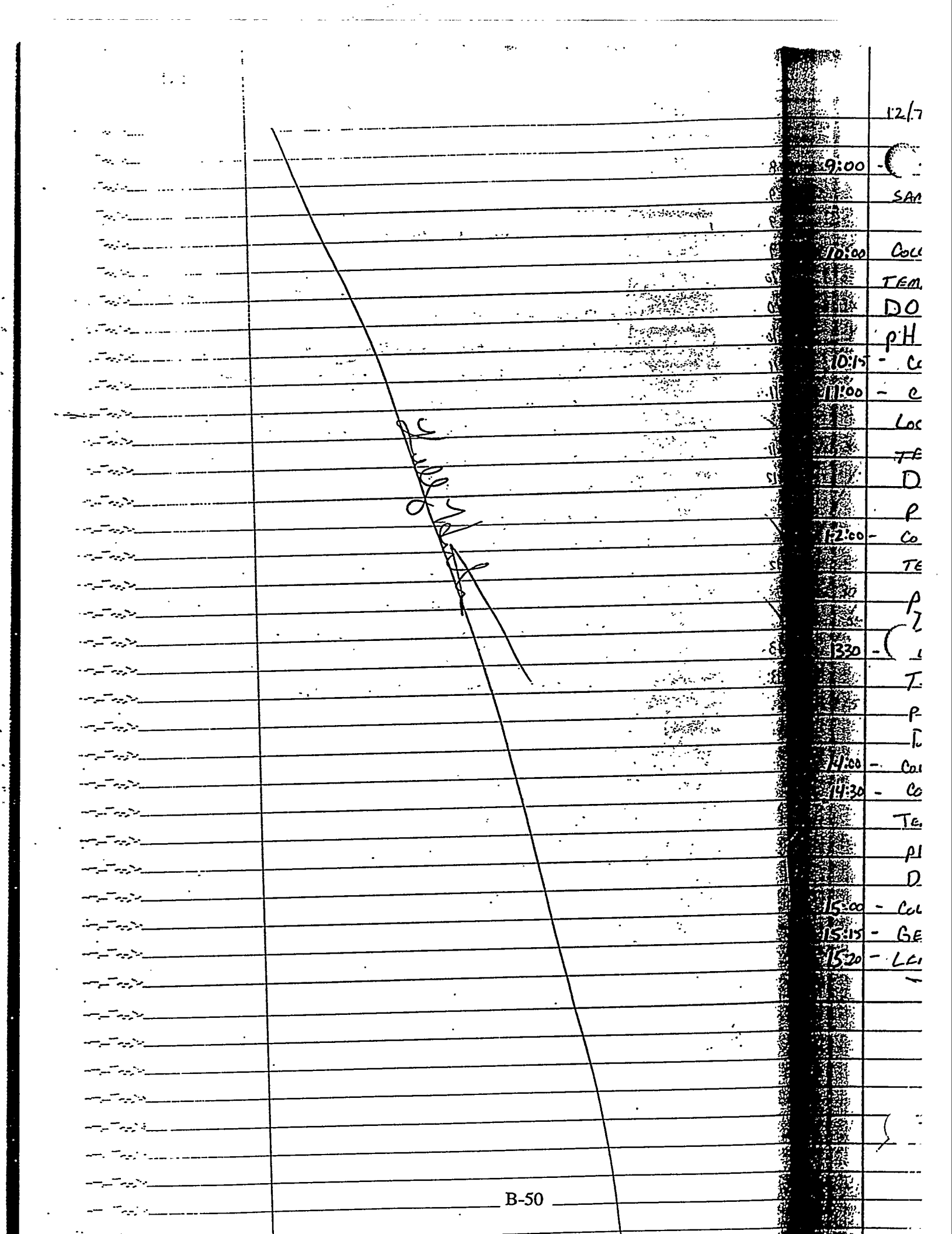
12:20 - COLLECTED SOIL SAMPLE 2 to 3.5 FT BGS AUGER REFUSAL @ 3.5' BGS - DID NOT AUGER THROUGH THE BURN MATERIAL

12:30 - BRUCE KRISTIANSON ON SITE - HE HELPED DECON / GENERAL SITE CLEANUP - IDENTIFIED STREAM SAMPLE LOCATIONS

12:00 - COLLECTED FIELD BLANK SAMPLE

13:30 - LEFT SITE

Kelly Hunter



12/7
9:00 -
SAM
10:00 Col
TEM
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pH
10:15 - C
11:00 - C
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12:00 - Co
TE
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1330 -
T
P
14:00 - Co
14:30 - Co
Te
pl
D
15:00 - Co
15:15 - GE
15:20 - LC

12/7/94 KH CLEAR ≈ 55°F

KELLY / HUNTER RECORDING

1100 - ON SITE SETUP FOR SURFACE WATER & SEDIMENT SAMPLING

1100 - COLLECTED 1ST SW SAMPLE @ CS66-29 LOCATION

TEMP 13.4°C 12/7/94 KH

DO ~~0.77.85 mg/L~~ 7.85 mg/L

pH 10.51

1215 - COLLECTED SEDIMENT SAMPLE

1300 - COLLECTED SURFACE WATER SAMPLE @ CS66-30 LOCATION

TEMP - 66°F 12/7/94

DO - ~~10.6 9.4~~ 9.4 12/7/94 KH 0.94 mg/L

pH - ~~KH 7.05~~ 12/7/94 10.5

1410 - COLLECTED SURFACE WATER SAMPLE & DUPLICATE @ CS66-31

TEMP - 73°

pH - 9.68

DO - 8.00 mg/L

1530 - COLLECTED SURFACE WATER SAMPLE @ CS66-32 location

Temp 15.8°C

pH 9.22

DO 6.63

1730 - COLLECTED SEDIMENT SAMPLE @ CS66-32

1730 - COLLECTED SURFACE WATER SAMPLE @ CS66-33 & DUPLICATE

TEMP 16.0°C

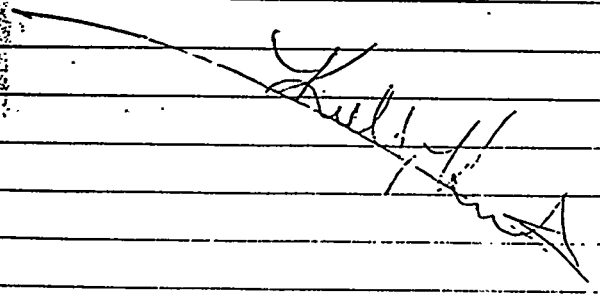
pH 6.61

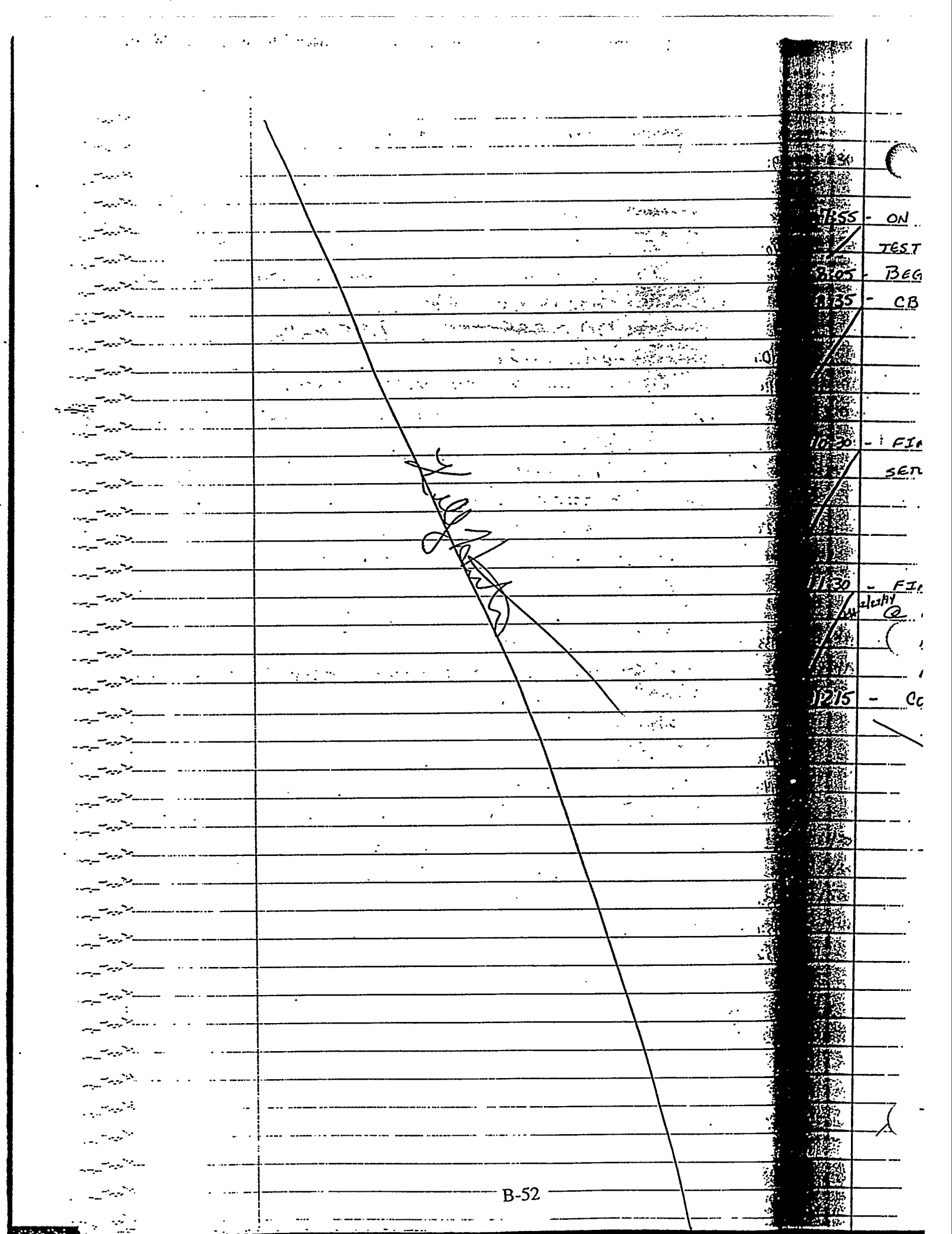
DO 5.38 mg/L

1800 - COLLECTED SEDIMENT SAMPLE @ CS66-33

1815 - GENERAL SITE CLEANUP

1830 - LEFT SITE




TEST - ON
TEST
8:05 - BEG
8:35 - CB
10:30 - FI
SEN
11:30 - FI
Clutch
12:15 - C

12/20/94 KH Clear ≈ 30°F

TRANSCRIBED ON 12/27/94 FROM NOTES TAKEN 12/20/94 - KELLY HUNTER RECORDING

ON SITE W/ RAY PLUNKETT TO PERFORM SLUG TEST ON KBR-4, CBR-5 & CBR-6

BEGAN PREPARATION OF SLUG TEST

CBR-~~5~~6 - CBR-T1

STATIC WATER LEVEL @ 50.85' ~~BTS~~ KH 12/27/94 BELOW TOC

USED A HERMIT AND DATA LOGGER

FALLING HEAD TEST RECORDED ON CHANEL 0

RISING HEAD TEST RECORDED ON CHANEL 1

FINISHED SLUG TEST FOR CBR-6 - MOBE AND SETUP FOR SLUG TEST @ CBR-4 - CBR-T3

STATIC H_2O LEVEL @ 41.37 BELOW TOC

FALLING HEAD TEST RECORDED ON CHANEL 2

RISING " " " " 3

FINISHED SLUG TEST @ CBR-4 MOBE & SETUP @ CBR-~~5~~ CBR-T2 - STATIC WATER LEVEL @ 43.13

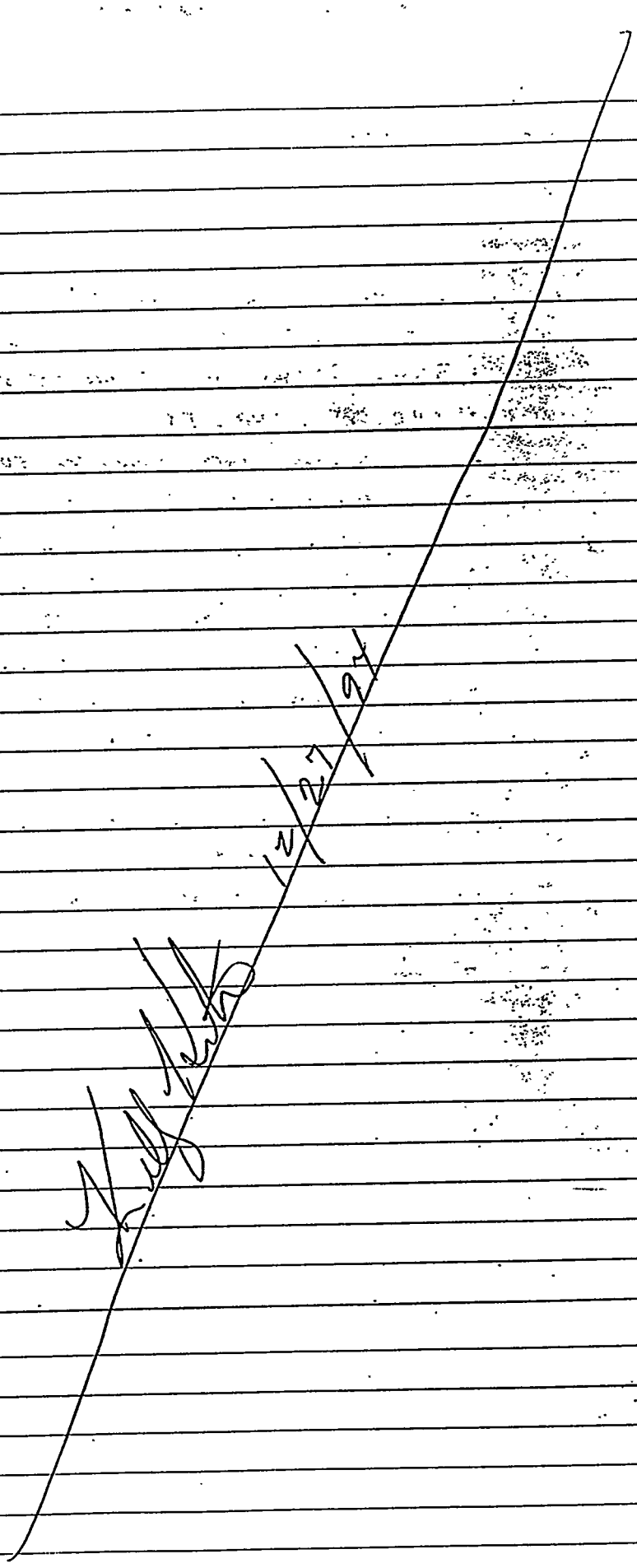
FALLING HEAD TEST RECORDED ON CHANEL 4

RISING " " " " 5

COMPLETED SLUG TEST - LEFT SITE

Kelly Hunter

58



12/
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1230- O
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CALCu
CBR
TO
TH
GR
1
310 - BRUC
1355- BAILE
1335- MOBE
19.
+7.3
1410 - T
1415- MOB
TOTAL
DE
"
1
T
1430 - BAIL
1435 - MOBE
1500 - FINISH
1500 - LEFT

12/27/94 KH CLEAR ≈ 50°F

KELLY HUNTER RECORDING

ON SITE - SET UP DECON AREA

DO NOT HAVE WATER LEVEL PROBE HOWEVER I WILL USE 12/20/94 WATER LEVELS TO CALCULATE AMOUNT OF WATER TO WITHDRAW

CBR-6/CBR-T1 - 50.85' BELOW TOC

TOTAL DEPTH OF WELL 60.40' BGS

THEREFORE WITH 2.5' STICK UP (CASING) ABOVE GROUND SURFACE = 12.05' OF WATER IN WELL

1.97 gal X 3 WELL VOLUME = 5.89 gal

BRUCE KRISTENSON ON SITE - BEGAN BAILING

BAILED 6 gal

MOBE TO CBR-T3 LOCATION

TOTAL DEPTH OF WELL ~~55.0~~ 51.78 KH ft BGS

DEPTH TO H_2O ~~43.13~~ 41.37 ft Below TOC

DEPTH TO H_2O ~~40.63~~ 38.87 KH ft BGS

~~17.35~~ 19.11 ~~4.37~~ KH' OF WATER

~~2.34~~ 3.11 gal - THREE WELL VOLUMES

BAILED 10 gal

MOBE TO CBR-T2 LOCATION

TOTAL DEPH - 55.0' BGS

DEPH TO WATER @ 43.13 ft Below TOC

" " " @ 40.63 ft BGS

14.37' OF WATER IN WELL OR 2.34 gal

THREE WELL VOLUMES 7.03 gal

BAILED 7 gal

MOBED TO CBR-T1 LOCATION TO DECON BAILERS

FINISHED ~~BAIL~~ DECON

LEFT SITE

12/28/94 ICH

KEL

0830 - ON

MONITOR

0845 - SAMPLE

0910 - MOBED

0920 - SETUP

0925 - BRUCE

BLANK

0935 - BRUCE

0930 - COLLECTE

DECONED

0940 - SETUP F

0950 - SAMPLED

1010 - MOBE. T

1015 - SETUP

1015 - THE S

WENT

1000 - DECONE

1040 - BEG

1105 - LOGED

1120 - GENERA

BAILER

20. WI

12/28/94

12/28/94 JCH CLEAR ≈ 35°F

KELLY HUNTER RECORDING

0850 - ON SITE TO COLLECT GROUNDWATER SAMPLES FROM MONITOR WELLS CBR-T1, CBR-T2, AND CBR-T3

0915 - SAMPLED CBR-T1 - DECONED BAILER USED

0930 - MOBED TO CBR-T2

0935 - SETUP FOR RINSATE SAMPLE

0945 - BRUCE KRISTENSON ON SITE TO HELP W/ RINSATE

BLANK CBR-T2E

0955 - BRUCE KRISTENSON LEFT SITE

0930 - COLLECTED RINSATE POURED DI H_2O THROUGH DECONED BAILER INTO BOTTLES

0940 - SETUP FOR SAMPLE CBR-T2

0950 - SAMPLED CBR-T2

1000 - MOBE TO CBR-T3

1015 - SETUP FOR SAMPLING & BEGAN SAMPLING

1025 - THE STRING TIED TO THE BAILER BROKE AND BAILER WENT INSIDE WELL

DECONED ANOTHER BAILER

1040 BEGAN SAMPLING CBR-T3

1055 - LOGED IN TRIP BLANK

1110 GENERAL SITE CLEANUP & LEFT SITE - WILL RETRIEVE BAILER LATER IN DAY - DELIVERING SAMPLES & COC'S TO WELL BUILDING FOR SHIPPING.

Appendix C

Field Reports for Groundwater Monitoring Wells

CBR-4
CBR-5
CBR-6

CBR-4

SRS SAVANNAH RIVER SITE

MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA/A).

CBR | 04

GENERAL

Project Name: CENTRAL SHOPS BRP

Project Manager (last name, first initial): RAY PLUNKETT

Department: GO — ENVIRONMENTAL ENGINEERING

Installation Purpose (Monitoring, Piezometer, etc.): TEMPORARY MONITORING

County: BARNWELL

Location Description: CENTRAL SHOPS BURNING RUBBLE PIT

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elev.	Top Casing Elev.	Liq. Level Pipe Elev.

DRILLING & SAMPLING

Drilling Start Date	Drilling Comp Date	Total Drilled Depth	Init. Static Water Level/Date	Total Borehole Deviation (angle/direction)
11/4/94	11/4/94	62.0	NA	NA

Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*	Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*
7 7/8" MUD ROTARY	NA	NA	NA						

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EMTC	BARNES, G	RUST E&I	HUNTER, K

Drilling & Sampling Comments (drilling muds used, source of water, lost circulation zones, etc.

GEOPHYSICAL LOGGING

Date Logged	Logging Top Depth	Logging Bottom Depth	Logging Subcontractor	Logging Truck Operator

Geophysical Logs

☐ Caliper ☐ Gamma ☐ Natural Gamma ☐ Neutron Density ☐ Resistivity ☐ Single Pt. Resistivity ☐ L&S Normal Resistivity ☐ Spontaneous Potential

Other Geophysical Logs (list) _____

Backfill Top Depth	Backfill Bot Depth	Backfill Material (include type quantity and units)

Elevations measured from height above MSL. Depths measured from ground surface to nearest 0.1 ft. * Enter an "X" if cuttings were taken.

SRS SAVANNAH RIVER SITE

MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA,NNN,AA): CBR 04

WELL INSTALLATION (WELL MATERIALS)

Date Well Installed	Installed By	Oversight	No. of Centralizers	Centralizer Type	Sieve Analysis?
11/4/94	EMTC	RUST E&I	2	STAINLESS STEEL 2" ϕ	☐ Yes ☐ No

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
CASING	2.5' AGS	40.08	PVC SCHEDULE 40	2"	FLUSH THREADED

	Top Depth	Bot Depth	Material	Diameter	Slot Size	Slot Type
SCREEN	40.16	60.16	PVC	2"	0.016"	MACHINE SLOTTED

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
SUMP	NA	NA			

	Top Depth	Bot Depth	Material and Schedule	Diameter	Cap Type
SUMP CAP	60.16	60.48	PVC SCHEDULE 40	2"	POINTED AND FLUSH THREADED

WELL INSTALLATION (ANNULAR MATERIALS)

	Top Depth	Bot Depth	Trade Name	Grain Size (mm)	Amount (sacks)	Sack Size (lbs)	Installation Method
FILTER PACK	36.60	62.0	FX 50	0.45-0.55	8 (100 lb)	100	TRIMMIE - FLUSHED W/WATER
FINE SAND SEAL	NA	—	—	—	—	—	—

	Top Depth	Bot Depth	Hydration Time (hrs)	Amount	Units and Size (sacks, buckets, etc.)	Installation Method
BENTONITE SEAL	11/10/94 ~~28.9~~ 28.9	36.60	48 hrs	2	BUCKETS	TRIMMIE

	Top Depth	Bot Depth	Grout Mix	Amount (sacks)	Sack Size (lbs)	Grout Date	Installation Method
GROUT	0	18.9	13.4 lb/gal	3.5	90	11/7/94	PRESSURE GROUT

Report Prepared By	Date	Well Accepted By	Date
KELLY HUNTER	11/10/94		

OSR 30-5
(Rev 12-89)

MONITORING WELL CONSTRUCTION DIAGRAM

DRILLING SUBCONTRACTOR EMTC

DRILLER G. BARNES

DATE OF WELL INSTALLATION 11/4/94

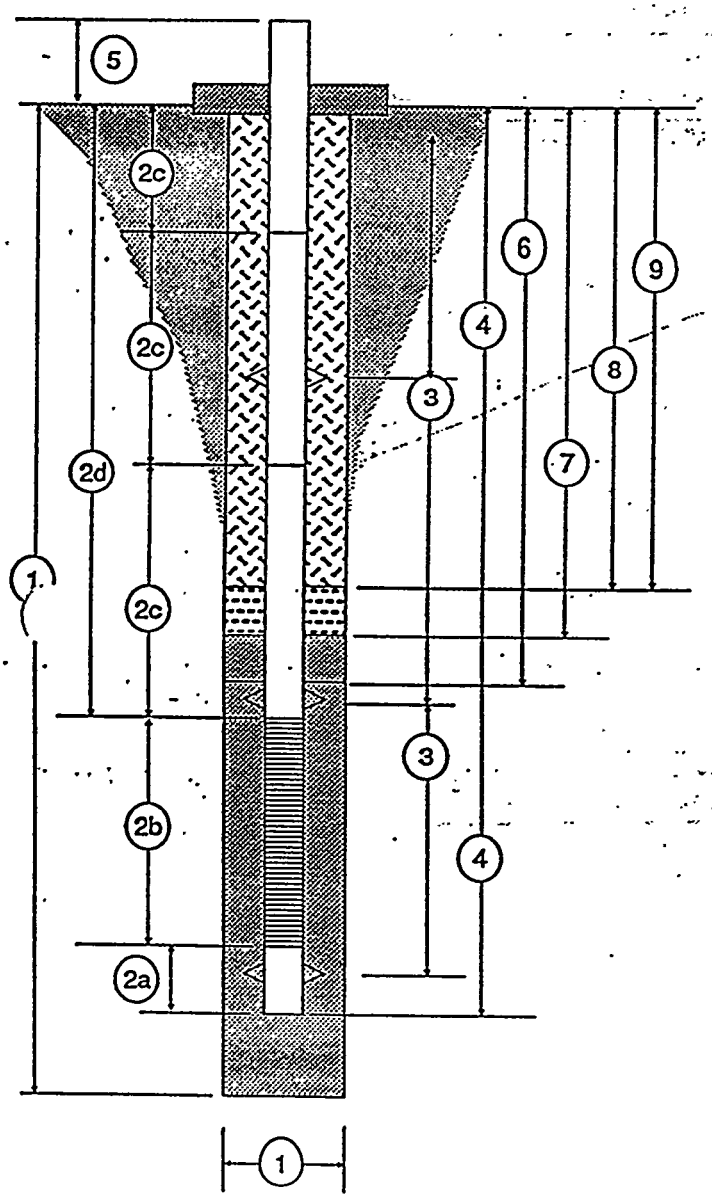
TECH. O.S./CO. NAME KELLY HUNTER / RUST E&E

WELL NUMBER CBR-04

SRS COORDINATES

SANITARY SEAL ELEVATION

NOTE: ALL MEASUREMENTS ARE FROM GROUND SURFACE AT START OF BORING – MEASUREMENTS TO NEAREST 0.1 FOOT.



1) Total Drilled Depth/Hole Diameter 62.0 / 7 7/8"

2) Casing/Screen Tally (Measured to Nearest 0.01 Foot)

(a) Sump & Plug Length 0.32

(b) Screen Length 20.08

(c) Casing Joint Lengths (Measured in Up-hole Sequence From Top of Screen) 10.06, 10.05, 10.05, 10.00, 2.74

(d) Depth to Top of Screen 40.08

3) Depths to Centralizers 19.0 & 39.0

4) Total Depth of Installed Well 60.48

5) Casing Stick Up (Standard 2.5' A.G.S.) 2.5

6) Depth to Top of Filter Pack 36.6

7) Depth to Top of Fine Sand Seal NA

8) Depth to Top of Bentonite Seal 18.9 - 48 hrs hydrated

9) Thickness of Grout 13.4 lb/gal

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division 2600 Bull Street Columbia,S.C. 29201 (803) 734-5213 Water Well Record

1. LOCATION OF WELL

County: BARNWELL COUNTY System Name: CBR-04

Latitude: Longitude:

Distance And Direction from Road Intersections

*SEE ATTACHED MAP

Street address & City of Well Location

Sketch Map:

*SEE ATTACHED MAP

2. CUTTING SAMPLES [X] Yes [ ] No

Geophysical Logs [ ] Yes (Please Enclose) [ ] No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SANDY CLAY TO	62	62
CLAYEY SAND		
* Indicate water bearing zones (use a 2nd sheet if needed)		

3. REMARKS

** ALL MEASUREMENTS ARE RELATIVE TO GROUND SURFACE

4. OWNER OF WELL:

Address DEPARTMENT OF ENERGY
AIKEN, S.C. 29801

Telephone No

Engineer J. L. JANSSEN
Address BLDG 735-A, SRP
AIKEN, SC 29801
Telephone No. 952-7648

5. WELL DEPTH (Completed) 60.48 ft. Date Started: 11/4/94 Date Completed: 11/4/94

6. DRILL METHOD MUD ROTARY

7. USE: MONITOR WELL

Public Supply-Permit No.

8. CASING THREADED

Diam. in.
Type
in. to ft. depth

Height: Above/Below (ft.)
Surface 2.5' / 60.48
Weight: NA lbs./ft.
Drive Shoe? Yes [ ] No [X]

9. SCREEN:

Type: PVC Diam 2 in.
Slot/Gauze 0.016 in. Length 20 ft.
Set Between 40.16 ft. and 60.16 ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis [ ] Yes (Please Enclose) [X] No

10. STATIC WATER LEVEL

41.20 ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface

ft. after hrs. pumping GPM
Pumping Test: [ ] Yes (Please Enclose) [X] No
Yield

12. WATER QUALITY

Chemical Analysis [ ] Yes [X] No Bacterial Analysis [ ] Yes [X] No
Please Enclose Lab Results

13. ARTIFICIAL FILTER (Gravel Pack) [X] Yes [ ] No

Installed from 62.0 ft. to 36.60 ft.
Effective size .45-.55mm uniformity coefficient < 1.7

14. WELL GROUTED? [X] Yes [ ] No

NEAT CEMENT, 6% BENTONITE

Depth From 0.0 ft. to 23.60 ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ft. direction
Type
Well disinfected upon completion [ ] Yes Type [X] No Amount

16. PUMP Date Installed not installed [ ]

Mfr. name Model no.
H.P. VOLTS Length of drop pipe ft.
Capacity gpm Pump Type

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME ENTC ADDRESS

CERT. NO.

Signed AUTHORIZED REPRESENTATIVE Date

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

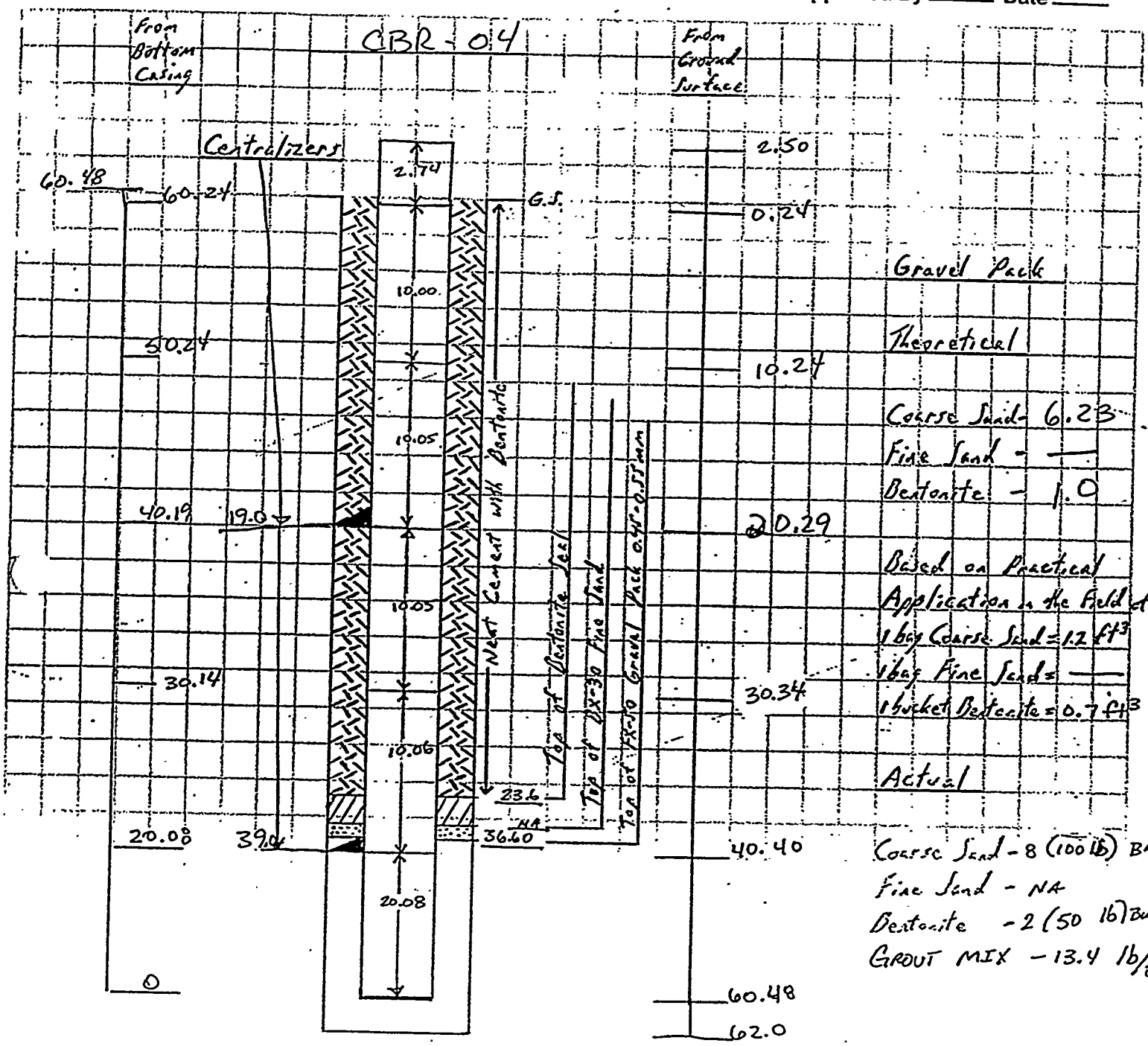
PAGE 1 OF 2

PROJECT NO.

CLIENT WSRC SUBJECT Well Construction Prepared By Kelly Date 11/4/9

PROJECT CENTRAL SHOPS BRP Reviewed By Date

Approved By Date



Gravel Pack

Theoretical

Coarse Sand - 6.23

Fine Sand - —

Bentonite - 1.0

Based on Practical Application in the Field of

1 bag Coarse Sand = 1.2 ft³

1 bag Fine Sand = —

1 bucket Bentonite = 0.7 ft³

Actual

Coarse Sand - 8 (100 lb) BAG

Fine Sand - NA

Bentonite - 2 (50 lb) Buck

GROUT MIX - 13.4 lb/g

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 2 OF 2

PROJECT NO.

CLIENT WSRC SUBJECT Casing Tally Prepared By [illegible] Date 11/4/91

PROJECT CENTRAL SHOPS BRP Reviewed By Date

Approved By Date

CBR-05

Casing Tally

5.00
10.00
10.05
10.05
10.06
45.16

Screen Zone

40.16 → 60.16

Materials List

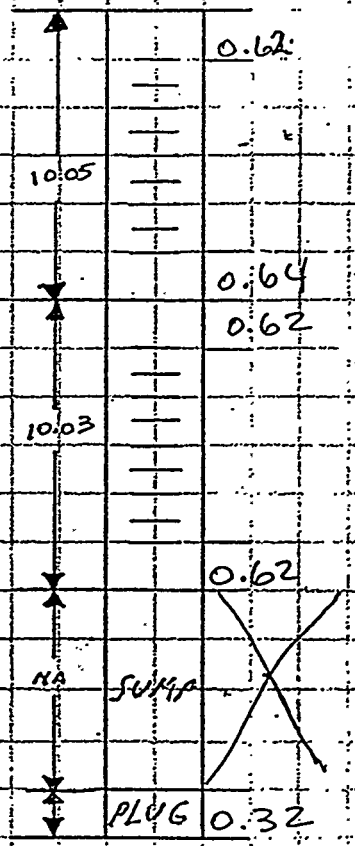
CASING - SCHEDULE 40 PVC 2" Φ

SCREEN - 0.016" SLOTTED 2" Φ PVC

BORING TERMINATED @ 62.0' BGS

- SET WELL @ 60.48' BGS
- TOP OF SCREEN @ 40.16' BGS
- TOP OF SAND @ 36.60
- TOP OF BENTONITE @ 23.3'
- GROUT TO SURFACE 13.4 lb/gal
- 2 BUCKETS OF BENTONITE 2 (50 lb)
- 8 (100 lbs) SAND
- 3.5 BAGS PC

Screen / Plug Tally



NOTE: PLACED SAND THROUGH TRIMMIE PIPE AND REMOVED 10' OF TRIMMIE PIPE AS APPROPRIATE TO ALLOW BENTONITE TO FALL TO THE TOP OF SAND. IT APPEARS THERE IS A CLAY BALL BETWEEN THE TOP OF THE SAND AND THE BOTTOM OF THE TRIMMIE PIPE. THE TOP OF THE BENTONITE WAS @ 27.5' BGS, THEREFORE LEAVING AN APPROXIMATE 5 FOOT SECTION ABOVE THE SAND PACK & BELOW THE BENTONITE SEAL WITHOUT A SEAL (VOID). BECAUSE THIS IS A PIEZOMETER AND OCCURED APPROXIMATELY 10 FEET ABOVE THE WATER TABLE WE ADDED AN ADDITIONAL BUCKET OF BENTONITE TO ENSURE AN ADEQUAT SEAL EXIST TO AVOID INTRUSION OF CEMENT GROUT. TOP OF BENTONITE @ 23.6' BGS.

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 1 OF 1

PROJECT NO.

CLIENT WSRC

SUBJECT WELL CONSTRUCTION Prepared By KH Date 11/4/

PROJECT CENTRAL SHOPS BRP Reviewed By Date

Approved By Date

CBR-04

Theoretical:

COARSE SAND

BOREHOLE DIAMETER - 7.875

BOREHOLE DEPTH -62

SET WELL @-60.48

TOP OF SAND (THEORETICAL) 38.48

ONE BAG OF SAND (100 lb) = 1.2 ft³

$V = \pi r^2 h$

$V = \pi\left(\frac{3.94}{12}\right)^2(23.52) - \pi\left(\frac{1}{12}\right)^2(22)$

$V = 7.48\ ft^3$ OR 6.23 BAGS OF SAND (100 lb)

BENTONITE

$V = \pi r^2 h = \pi\left(\frac{3.94}{12}\right)^2(2) - \pi\left(\frac{6}{12}\right)^2(2)$

$V = 0.6337\ ft^3$

∴ - 1 Bucket BENTONITE

CBR-5

SRS SAVANNAH RIVER SITE

MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA,N. A)		
CBR	05	

GENERAL

Project Name: CENTRAL SHOPS BURNING RUBBLE PIT

Project Manager (last name, first initial): RAY PLUNKETT

Department: GO - ENVIRONMENTAL ENGINEERING

Installation Purpose (Monitoring, Piezometer, etc.): TEMPORARY MONITORING

County: BARNWELL

Location Description: CENTRAL SHOPS BURNING RUBBLE PIT

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elev.	Top Casing Elev.	Liq. Level Pipe Elev.

DRILLING & SAMPLING

Drilling Start Date	Drilling Comp Date	Total Drilled Depth	Init. Static Water Level/Date	Total Borehole Deviation (angle/direction)
11/3/94	11/5/94	~~41'~~ 57	NA	NA

Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*	Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*
7 7/8" MUD ROTARY									

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EMTC	JOHN SHOPE	RUST E & I	K. HUNTER

Drilling & Sampling Comments (drilling muds used, source of water, lost circulation zones, etc.

GEOPHYSICAL LOGGING

Date Logged	Logging Top Depth	Logging Bottom Depth	Logging Subcontractor	Logging Truck Operator

Geophysical Logs

☐ Caliper ☐ Gamma ☐ Natural Gamma ☐ Neutron Density ☐ Resistivity ☐ Single Pt. Resistivity ☐ L&S Normal Resistivity ☐ Spontaneous Potential

Other Geophysical Logs (list)

Backfill Top Depth	Backfill Bot Depth	Backfill Material (include type quantity and units)

Elevations measured from height above MSL. Depths measured from ground surface to nearest 0.1 ft. * Enter an "X" if cuttings were taken.

SRS MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA,NNN,AA)		
CBR	05	

WELL INSTALLATION (WELL MATERIALS)

Date Well Installed	Installed By	Oversight	No. of Centralizers	Centralizer Type	Sieve Analysis?
11/3/94 CBR-05	EMTC	RUST E&I	2	STAINLESS STEEL	☐ Yes ☐ No

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
CASING	2.50 AGS	34.8	PVC Schedule 40	2"	FLUSH THREADED

	Top Depth	Bot Depth	Material	Diameter	Slot Size	Slot Type
SCREEN	34.8	54.8	PVC SCHEDULE 40	2"	0.016	MACHINE SLOTTED

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
SUMP	NA	NA	NA	NA	NA

	Top Depth	Bot Depth	Material and Schedule	Diameter	Cap Type
SUMP CAP	54.8	55.0	PVC SCHEDULE 40	2"	FLUSH THREADED

C-9

WELL INSTALLATION (ANNULAR MATERIALS)

	Top Depth	Bot Depth	Trade Name	Grain Size (mm)	Amount (sacks)	Sack Size (lbs)	Installation Method
FILTER PACK	32.95	57.0	FX50	0.45-0.55	7½	100	TREMIE - FLUSHED W/ H_2O

	Top Depth	Bot Depth	Trade Name	Grain Size (mm)	Amount (sacks)	Sack Size (lbs)	Installation Method
FINE SAND SEAL	NA	NA	NA	NA	NA	NA	NA

	Top Depth	Bot Depth	Hydration Time (hrs)	Amount	Units and Size (sacks, buckets, etc.)	Installation Method
BENTONITE SEAL	~~32.45~~ 29.99	32.95				

	Top Depth	Bot Depth	Grout Mix	Amount (sacks)	Sack Size (lbs)	Grout Date	Installation Method
GROUT	~~0~~	29.99	13.4 lb/gal	5.0	94	11/4/94	PRESSURE GROUTED

Report Prepared By	Date	Well Accepted By	Date
K. HUNTER	11/10/94		

OSR 30-5
(Rev 12-89)

MONITORING WELL CONSTRUCTION DIAGRAM

DRILLING SUBCONTRACTOR EMTC

WELL NUMBER CBR-05

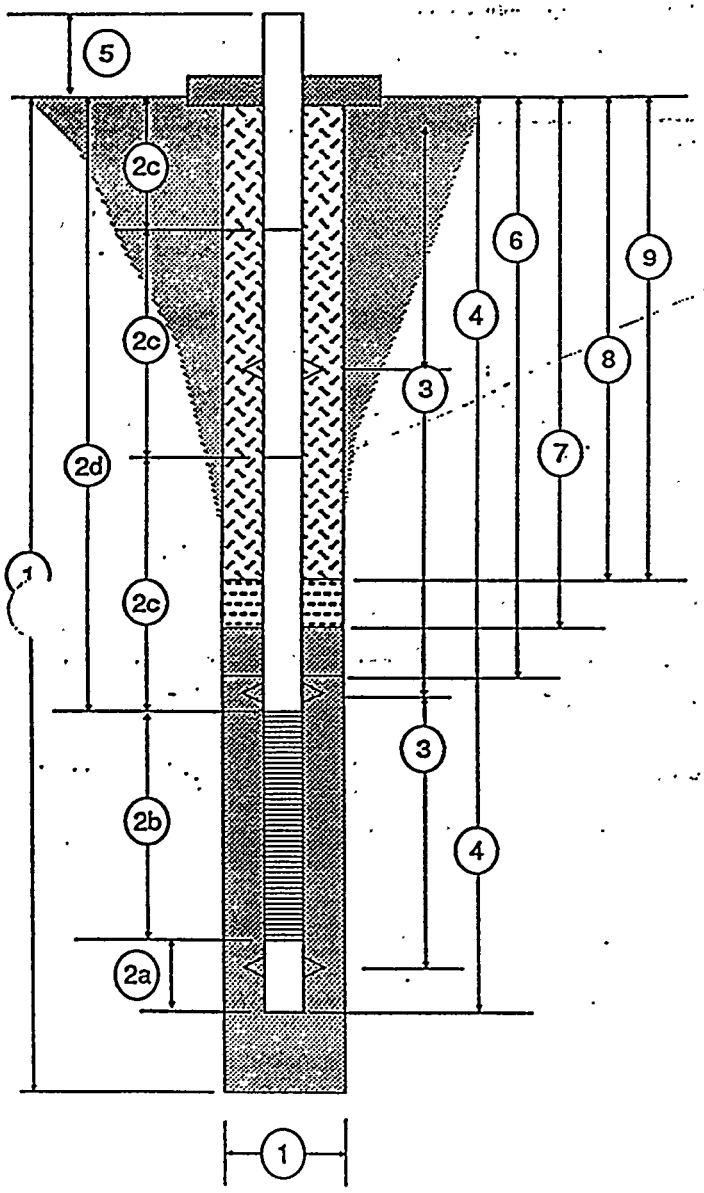
DRILLER John Shope

SRS COORDINATES

DATE OF WELL INSTALLATION 11/3/94

SANITARY SEAL ELEVATION

TECH. O.S./CO. NAME KELLY HUNTER / RUST E&I



NOTE: ALL MEASUREMENTS ARE FROM GROUND SURFACE AT START OF BORING – MEASUREMENTS TO NEAREST 0.1 FOOT.

1) Total Drilled Depth/Hole Diameter 57

2) Casing/Screen Tally (Measured to Nearest 0.01 Foot)

(a) Sump & Plug Length 0.20

(b) Screen Length 20.0

(c) Casing Joint Lengths (Measured in Up-hole Sequence From Top of Screen)

10.0; 10.0; 10.0; 5.0; 2.50

(d) Depth to Top of Screen 34.80

3) Depths to Centralizers 15.0 & 29.0

4) Total Depth of Installed Well 55.0

5) Casing Stick Up (Standard 2.5' A.G.S.) 2.5' AGS

6) Depth to Top of Filter Pack 32.95

7) Depth to Top of Fine Sand Seal NA

8) Depth to Top of Bentonite Seal 29.99

9) Thickness of Grout 13.4 lb/gal

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division 2600 Bull Street Columbia,S.C. 29201 (803) 734-5213 Water Well Record

1. LOCATION OF WELL

County: BARNWELL System Name: CBE-05

Latitude: Longitude:

Distance And Direction from Road Intersections

*SEE ATTACHED MAP

Street address & City of Well Location

Sketch Map:

*SEE ATTACHED MAP

2. CUTTING SAMPLES [X] Yes [ ] No

Geophysical Logs [--] Yes (Please Enclose) [ ] No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SANDY CLAY AND	57	57
CLAYEY SAND		
* Indicate water bearing zones (use a 2nd sheet if needed)		

3. REMARKS

** ALL MEASUREMENTS ARE RELATIVE TO GROUND SURFACE

4. OWNER OF WELL:

Address DEPARTMENT OF ENERGY
AIKEN, S.C. 29801

Telephone No

Engineer J. L. JANSSEN
Address BLDG 735-A, SRP
AIKEN, SC 29801
Telephone No. 952-7648

5. WELL DEPTH (Completed) 55 ft. Date Started: 11/3/94 Date Completed: 11/3/94

6. DRILL METHOD MUD ROTARY

7. USE: MONITOR WELL

Public Supply-Permit No.

8. CASING THREADED

Diam. 2" in. Type PVC

in. to 34.8 ft. depth

Height: Above/Below (ft.)
Surface 2.5 / 57
Weight : lbs./ft.
-Drive Shoe? Yes [ ] No [X]

9. SCREEN:

Type: PVC Diam 2 in.
Slot/Gauze 0.016 in. Length 20 ft.
Set Between 55 ft. and 35 ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis [ ] Yes (Please Enclose) [X] No

10. STATIC WATER LEVEL

— ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface

ft. after hrs. pumping GPM
Pumping Test: [ ] Yes (Please Enclose) [X] No
Yield

12. WATER QUALITY

Chemical Analysis [ ] Yes [X] No Bacterial Analysis [ ] Yes [X] No
Please Enclose Lab Results

13. ARTIFICIAL FILTER (Gravel Pack) [X] Yes [ ] No

Installed from 57 ft. to 32.95 ft.
Effective size .45-.55mm uniformity coefficient < 1.7

14. WELL GROUTED? [X] Yes [ ] No

NEAT CEMENT, 6% BENTONITE

Depth From 0.0 ft. to 29.99 ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ft. direction
Type
Well disinfected upon completion [ ] Yes Type
[X] No Amount

16. PUMP Date Installed not installed [ ]

Mfr. name Model no.
H.P. VOLTS Length of drop pipe ft.
Capacity gpm Pump Type

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME EMTC ADDRESS
CERT. NO.

Signed AUTHORIZED REPRESENTATIVE Date

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

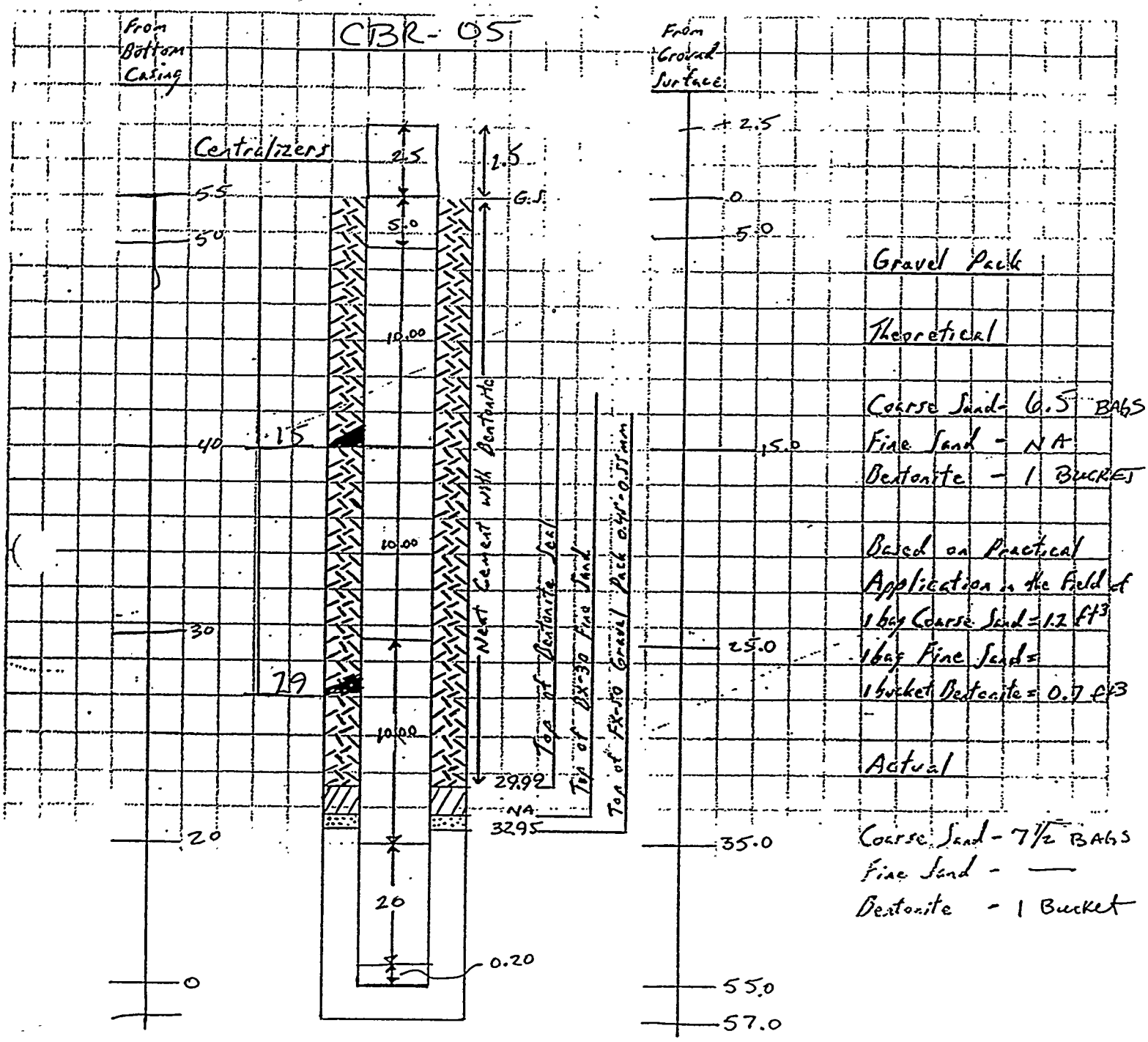
PAGE 1 OF 2

PROJECT NO. _____

CLIENT WSRC SUBJECT Well Construction Prepared By _____ Date _____

PROJECT _____ Reviewed By _____ Date _____

_____ Approved By _____ Date _____



Gravel Pack

Theoretical

Coarse Sand - 6.5 BAGS
Fine Sand - NA
Bentonite - 1 BUCKET

Based on Practical Application in the Field of
1 bag Coarse Sand = 1.2 ft³
1 bag Fine Sand =
1 bucket Bentonite = 0.7 ft³

Actual

Coarse Sand - 7½ BAGS
Fine Sand - ——
Bentonite - 1 Bucket

BORING TERMINATED @ 57' BGS
SET BOTTOM OF WELL / PLUG @ 55' BGS

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 2 OF 2

PROJECT NO. _____

CLIENT WSRC SUBJECT Casing Tally Prepared By Bill Date _____

PROJECT _____ Reviewed By _____ Date _____

_____ Approved By _____ Date _____

Casing Tally

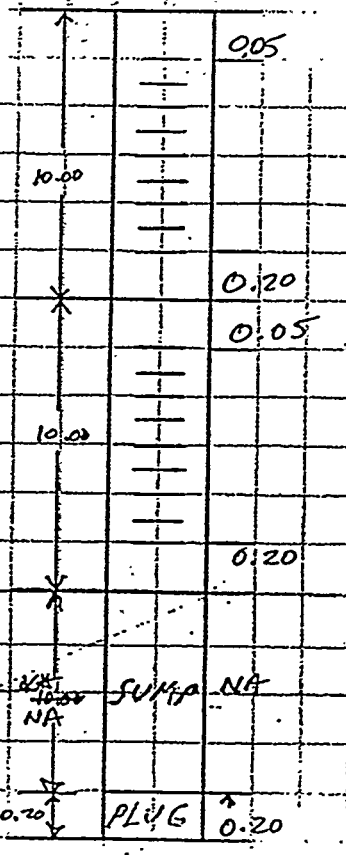
5.0 ft
2.5
10.00
10.00

Screen Zone

TOP OF SCREEN 34.80
BOTTOM OF SCREEN 54.80
BOTTOM OF PLUG 55.00
TOP OF SAND @ 32.95
TOP OF BENT @ 29.99

Materials List

Screen / Plug Tally



RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 1 OF 1

PROJECT NO. _____

CLIENT WSRC SUBJECT WELL CONSTRUCTION Prepared By KH Date 11/4/94

PROJECT CENTRAL SHOPS BRP Reviewed By _____ Date _____

_____ Approved By _____ Date _____

CBR-05

Theoretical

COARSE SAND

BOREHOLE DIAMETER 7.875

DEPTH 57'

SET WELL 55'

TOP OF SAND (THEORETICAL) 32.8'

ONE BAG OF SAND (10016) = 1.2 ft³

$V = \pi r^2 h$

$V = \pi \left(\frac{3.94}{12}\right)^2 (24.2) - \pi \left(\frac{1}{12}\right)^2 (22.2)$

$V = \pi (2.61) - \pi (0.154$

$V = 7.71 \text{ ft}^3$ OR = 6.4 BAGS OF SAND

CBR-6

SRS SAVANNAH RIVER SITE

MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA,#): CBR 06

GENERAL

Project Name: CENTRAL SHOPS BRP

Project Manager (last name, first initial): RAY PLUNKETT

Department: GO - ENVIRONMENTAL ENGINEERING

Installation Purpose (Monitoring, Piezometer, etc.): TEMPORARY MONITORING

County: BARNWELL

Location Description: CENTRAL SHOPS BURNING RUBBLE PIT

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elev.	Top Casing Elev.	Liq. Level Pipe Elev.

DRILLING & SAMPLING

Drilling Start Date	Drilling Comp Date	Total Drilled Depth	Init. Static Water Level/Date	Total Borehole Deviation (angle/direction)
11/3/94	11/3/94	62.0	NA	NA

Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*	Drilling/Sampling Method	Top Depth	Bot Depth	Diameter	*
7 7/8" MUD ROTARY									

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
FMTC	SHOPE, J	RUST E&F	HUNTER, K

Drilling & Sampling Comments (drilling muds used, source of water, lost circulation zones, etc.

GEOPHYSICAL LOGGING

Date Logged	Logging Top Depth	Logging Bottom Depth	Logging Subcontractor	Logging Truck Operator

Geophysical Logs

☐ Caliper ☐ Gamma ☐ Natural Gamma ☐ Neutron Density ☐ Resistivity ☐ Single Pt. Resistivity ☐ L&S Normal Resistivity ☐ Spontaneous Potential

Other Geophysical Logs (list) _____

Backfill Top Depth	Backfill Bot Depth	Backfill Material (include type quantity and units)

Elevations measured from height above MSL. Depths measured from ground surface to nearest 0.1 ft. * Enter an "X" if cuttings were taken.

SRS SAVANNAH RIVER SITE

MONITORING WELL INSTALLATION REPORT

WELL NUMBER (AAA,NNN,AA): CBR 06

WELL INSTALLATION (WELL MATERIALS)

Date Well Installed	Installed By	Oversight	No. of Centralizers	Centralizer Type	Sieve Analysis?
11/3/94	EMTC	RUST E&I	2	2" STAINLESS STEEL	☐ Yes ☒ No

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
CASING	2.2' AGS	40.2	SCHEDULE 40 PVC.	2"	FLUSH THREADED

	Top Depth	Bot Depth	Material	Diameter	Slot Size	Slot Type
SCREEN	40.2	60.2	PVC	2"	0.010	MACHINE SLOTTED

	Top Depth	Bot Depth	Material and Schedule	Diameter	Joint Type
SUMP	NA				

	Top Depth	Bot Depth	Material and Schedule	Diameter	Cap Type
SUMP CAP	0.20	60.4	PVC SCHEDULE 40	2"	FLUSH THREADED

WELL INSTALLATION (ANNULAR MATERIALS)

	Top Depth	Bot Depth	Trade Name	Grain Size (mm)	Amount (sacks)	Sack Size (lbs)	Installation Method
FILTER PACK	~~42.0~~ 35.50	62.0	FX50	0.45 : 0.55	9.0	100	TRIMMIE - FLUSHED W/ WATER

	Top Depth	Bot Depth	Trade Name	Grain Size (mm)	Amount (sacks)	Sack Size (lbs)	Installation Method
FINE SAND ~~SEAL~~	NA						

	Top Depth	Bot Depth	Hydration Time (hrs)	Amount	Units and Size (sacks, buckets, etc.)	Installation Method
BENTONITE ~~SEAL~~	32.50 ~~35.9~~ 32.4	35.90	30 hrs	1	BUCKET	TRIMMIE - FLUSHED W/ WATER

	Top Depth	Bot Depth	Grout Mix	Amount (sacks)	Sack Size (lbs)	Grout Date	Installation Method
GROUT	0	32.50	13.2 lb/gal	5 BAGS	90	11/4/94	PRESSURE GROUTED W/ TRIMMIE

Report Prepared By	Date	Well Accepted By	Date
K. HUNTER	11/10/94		

OSR 30-5
(Rev 12-89)

MONITORING WELL CONSTRUCTION DIAGRAM

DRILLING SUBCONTRACTOR EMTC

(LER John Shope

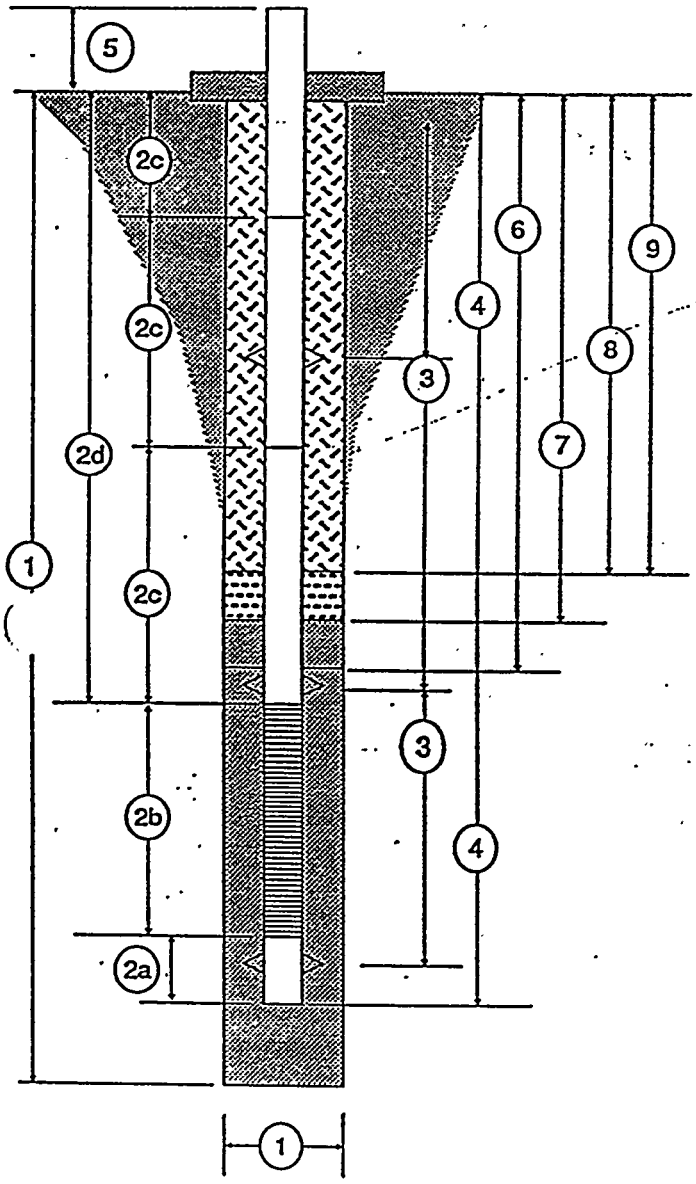
DATE OF WELL INSTALLATION 11/3/94

TECH. O.S./CO. NAME K. Hunter

WELL NUMBER CBR-06

SRS COORDINATES

SANITARY SEAL ELEVATION



NOTE: ALL MEASUREMENTS ARE FROM GROUND SURFACE AT START OF BORING – MEASUREMENTS TO NEAREST 0.1 FOOT.

1) Total Drilled Depth/Hole Diameter 77/8"

2) Casing/Screen Tally (Measured to Nearest 0.01 Foot)

(a) Sump & Plug Length 0.20

(b) Screen Length 20

(c) Casing Joint Lengths (Measured in Up-hole Sequence From Top of Screen)

9.96, 10.00, 9.90, 9.95, 2.51

(d) Depth to Top of Screen 40.2

3) Depths to Centralizers 14-15 & 28-29

4) Total Depth of Installed Well 60.40

5) Casing Stick Up (Standard 2.5' A.G.S.) 2.2

6) Depth to Top of Filter Pack 35.90

7) Depth to Top of Fine Sand Seal NA

8) Depth to Top of Bentonite Seal 32.50

9) Thickness of Grout 32.50

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ground Water Protection Division 2600 Bull Street Columbia, S.C. 29201 (803) 734-5213 Water Well Record

1. LOCATION OF WELL

County: BARNWELL System Name: CBR-06

Latitude: Longitude:

Distance And Direction from Road Intersections

* SEE ATTACHED MAP

Street address & City of Well Location

Sketch Map:

*SEE ATTACHED MAP

2. CUTTING SAMPLES [X] Yes [ ] No

Geophysical Logs [ ] Yes (Please Enclose) [ ] No

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SANDY CLAY to CLAYEY SAND	62	62

* Indicate water bearing zones

(use a 2nd sheet if needed)

3. REMARKS

** ALL MEASUREMENTS ARE RELATIVE TO GROUND SURFACE

4. OWNER OF WELL:

Address DEPARTMENT OF ENERGY AIKEN, S.C. 29801

Telephone No

Engineer J. L. JANSSEN

Address BLDG 735-A, SRP AIKEN, SC 29801

Telephone No. 952-7648

5. WELL DEPTH (Completed) 60.40 ft.

Date Started: 11/2/94

Date Completed: 11/3/94

6. DRILL METHOD MUD ROTARY

7. USE: MONITOR WELL

Public Supply-Permit No.

8. CASING THREADED

Diam. in.

Type

in. to ft. depth

Height: Above/Below (ft.)

Surface

Weight: lbs./ft.

Drive Shoe? Yes [ ] No [X]

9. SCREEN:

Type: PVC Diam 2 in.

Slot/Gauze 0.010 in. Length 20 ft.

Set Between 60.2 ft. and 40.2 ft. NOTE: MULTIPLE SCREENS USE SECOND SHEET

Sieve Analysis [ ] Yes (Please Enclose) [X] No

10. STATIC WATER LEVEL

ft. below land surface after 24 hours

11. PUMPING LEVEL Below Land Surface

______ ft. after ______ hrs. pumping ______ G.P.M.

Pumping Test: [ ] Yes (Please Enclose) [X] No

Yield

12. WATER QUALITY

Chemical Analysis [ ] Yes [X] No Bacterial Analysis [ ] Yes [X] No

Please Enclose Lab Results.

13. ARTIFICIAL FILTER (Gravel Pack) [X] Yes [ ] No

Installed from 62 ft. to 35.90 ft.

Effective size .45-.55mm uniformity coefficient < 1.7

14. WELL GROUTED? [X] Yes [ ] No

NEAT CEMENT, 6% BENTONITE

Depth From 0.0 ft. to ft.

15. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ______ ft. ______ direction

______ Type

Well disinfected upon completion [ ] Yes [X] No Type ______ Amount ______

16. PUMP Date Installed not installed [ ]

Mfr. name Model no.

H.P. VOLTS Length of drop pipe ft.

Capacity gpm Pump Type

17. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME EMTC ADDRESS

CERT. NO.

Signed ______ AUTHORIZED REPRESENTATIVE Date ______

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 1 OF 2

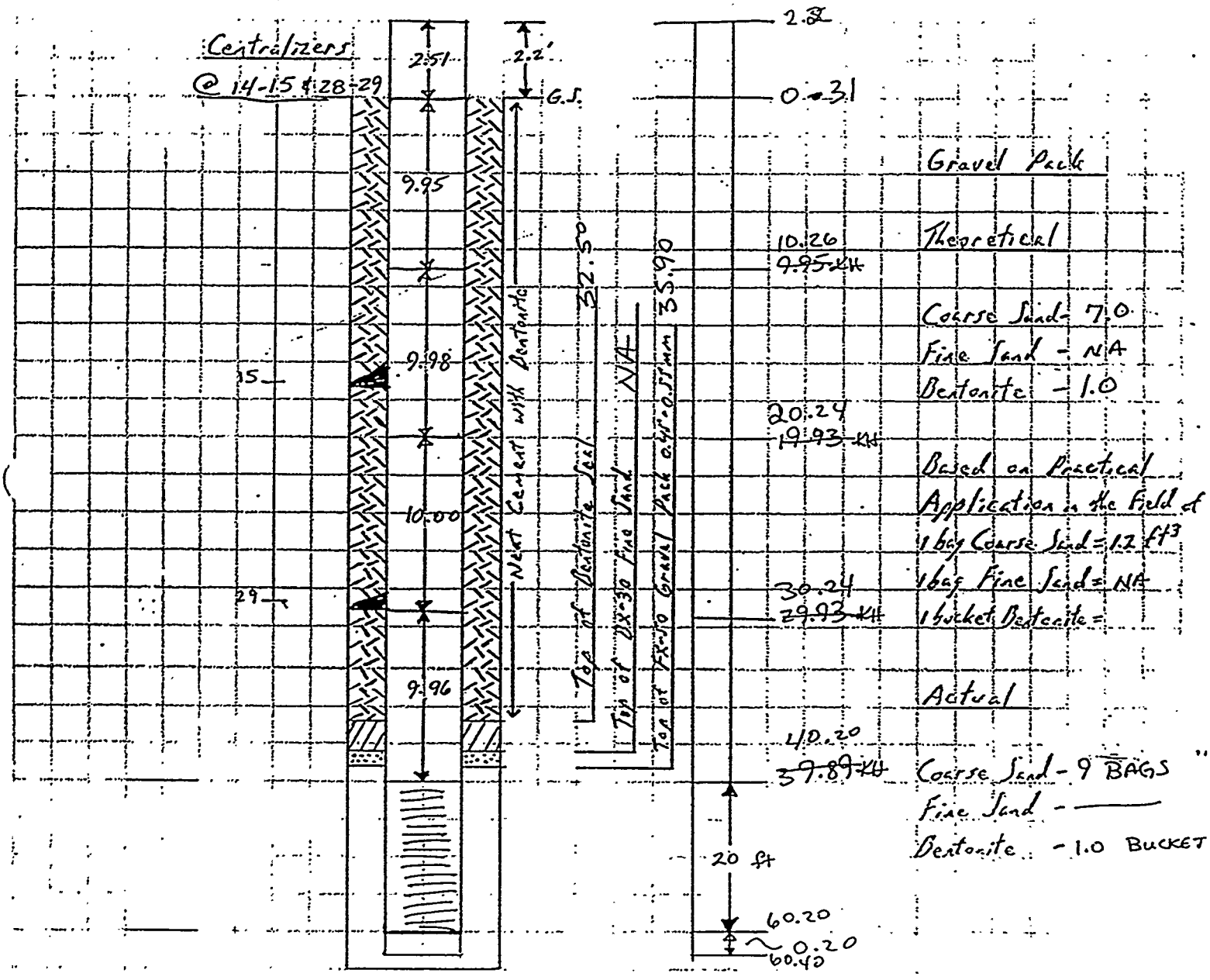
PROJECT NO.

CLIENT WSRC SUBJECT Well Construction Prepared By K. HUNTER Date 11/3

PROJECT CENTRAL SHOPS BRP Reviewed By Date

88351.000 Approved By Date

CBR-6



BORING TERMINATED @ 62 ft BGS

SET WELL @ 60.40 w/ PLUG

RUST ENVIRONMENT & INFRASTRUCTURE

CALCULATION SHEET

PAGE 2 OF 2

PROJECT NO. _____

CLIENT WSRC SUBJECT Casing Tally Prepared By Bill Date _____

PROJECT _____ Reviewed By _____ Date _____

Approved By _____ Date _____

CBR 06

Casing Tally

SCREEN - 0.010" SLOTTED 2" ϕ PVC

TOP OF SAND @ 35.90'

TOP OF BENTONITE @ 32.5'

BORING TERMINATED @ 62 ft BGS

SET WELL @ 60.40 w/ PLUG

9 (100 lb) BAGS OF SAND

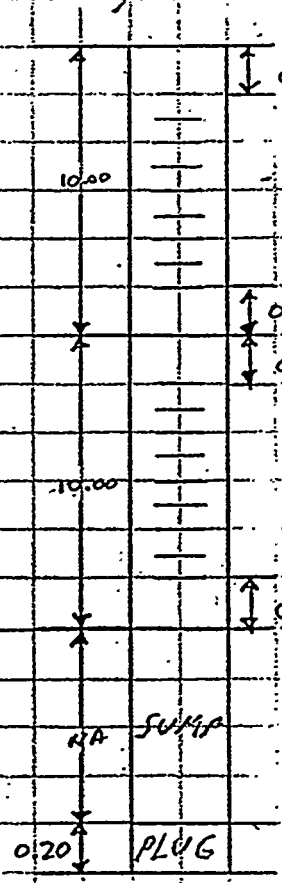
GROUT MIX 13.2 lb/gal

5 BAGS PC (90 lb)

TOP OF SCREEN @ 60.2 → 40.2

Screen Zone Materials List

Screen / Plug Tally



CBR-06

Theoretical:

COARSE SAND

BOREHOLE DIAMETER - 7.875

BOREHOLE DEPTH - 62.0

SET WELL @ - 60.40

TOP OF SAND @ - 35.90

ONE BAG. OF SAND = 1.2 ft^3

~~ONE BAG OF CEM~~

$$V = \pi r^2 h$$

$$V = \pi\left(\frac{3.94}{12}\right)^2 (26.10) - \pi\left(\frac{1}{12}\right)^2 (24.5)$$

$V = 8.30\ ft^3$ OR 6.9 BAGS OF SAND

Appendix D

Field Reports for Individual Boreholes

CS6G-11
CS6G-12
CS6G-13
CS6G-14
CS6G-15
CS6G-16
CS6G-17
CS6G-18
CS6G-19
CS6G-20
CS6G-21
CS6G-22

CS6G-11

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA,NNN,AAA): C.S.G.G | 11

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
8 FT	NA	11/14/94	11/14/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0 - 1		
"	1 - 2		
SPLIT SPOON 3"	2 - 4		
" " "	4 - 6		
" " "	6 - 8		
" " "	8 - 10		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.):
HP SCREENING OF COMPOSITE SAMPLES SCREENING WITH A ORGANIC VAPOR ANALYZER (OVA)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILLED WITH CUTTINGS	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
KELLY HUNTER	11/14/94	KELLY HUNTER	11/29/94

D-1

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/14/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: E.E.I.	
WELL NO.: CSGG-11	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			CLAY, moderate yellowish brown (10YR 4/2) med to fine sand, MOIST-WET, MED PLASTICITY (SC)	HAND AUGER 0-1
2	1			Sandy CLAY, very pale orange (10YR 8/2) TO DARK yellowish orange (10YR 6/6), med-fine sand, med-plasticity stiff-HARD (SC)	HAND AUGER 1-2
3	2			Sand, CLAY, Dark yellowish orange (10YR 6/6) very pale orange (10YR 8/2), med-fine grained rounded, med plasticity SC	SPLIT SPOON 2-4
4	3				
	4				
	5			Sandy CLAY, Light brown (5YR 5/6) med-fine grained, low plasticity (SC) HARD	N-10-14-14-30
5	6				
	7			SANDY CLAY, very pale orange (10YR 8/2) med-fine grained, rounded, high plasticity SC	
6	8				
	9				
	0			BORING TERMINATED @ 8' BGS TOOK A SPOON FROM 8'-10' BGS	
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-12

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA, NNN, AAA): CSGG | 12

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
6' BGS	NA	11/15/94	11/15/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1		
" "	1-2		
SPLIT SPOON 3"	2-4		
" " 3"	4-6		
" " 3"	6-8		

Drilling & Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

HP SCREENING OF COMPOSITE SAMPLES
SCREENING WITH OVA

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL W/ SOIL CUTTINGS	NATIVE SOIL

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/15/94	KELLY HUNTER	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BURNING RUBBLE PIT		DATE: 11/15/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CS6G-12	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			FILL: SAND silty, moderate yellowish brown (5YR 5/4), fine grained sand, moist (SM) - cobble stones @ 1' BGS	HAND AUGER FROM 0-1 AND FROM 1-3
2	1			1.0-1.5 - SILT sandy, burn material, high organic	
	2			Dusky blue (5PB 3/2) — 1.5-2.0 SAND, grayish orange (10YR 7/4), fine-med grained	SPLIT SPOON SAMPLING THEREAFTER
3	3		2.0-2.5	>SAND, silty, grayish orange (10YR 7/4), fine-med	
				2.5-3.5 - CLAY sandy, pale yellowish brown 10YR 6/2, fine-medium	
	4			medium plasticity (CL) → 3.5-4.0 CLAY sandy, mottled dark	
4				yellowish orange 10YR 6/6 & pale yellowish brown 10YR 6/2, low plasticity	
	5			RESIDUUM: CLAY, sandy mottled dark yellowish	
				orange (10YR 6/6) & pale yellowish brown (10YR 6/2)	
	6			Low plasticity (CL)	
5					
	7			SAME AS ABOVE	
	8				
	9			BORING TERMINATED @ 6' BGS	
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-13

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA, NNN, AAA): CSGG | 13

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
6' BGS	NA	11/15/94	11/15/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1		
" "	1-2		
SPLIT SPOON	2-4		
" "	4-6		
" "	6-8		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL W/ SOIL CUTTINGS	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/15/94	KELLY HUNTER	11/29/94

D-5

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BURNING RUBBLE PITS		DATE: 11/15/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CS66-13	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0	BURN MATERIAL		FILL: Clay sandy, moderate yellowish brown (10YR 5/4), fine grained → 0.5 to 1.0 BURN MATERIAL, ASH BLACK WITH ORGANICS	HAND AUGER
2	1			SAME AS 0.5 to 1.0 WITH OLD NAILS, COPPER WIRE KB	
	2			Some gravel to 15" BGS - FROM 15" to 24" BGS	
3	3			SAND, silty light olive gray (5 GY 6/1) - fine grained, rounded	SPLIT SPOON
				24" to 30" BURN MATERIAL AS DESCRIBED ABOVE	
4	4			30" to 46" CLAY, sandy - light olive gray (5Y 6/1), rounded fine-med grained - 46" to 48" RESIDUUM: CLAY, Sandy very pale orange (10YR 8/2), med-fine grained rounded low plasticity	
	5			SAME AS ABOVE 46" to 48"	
5	6				
	7			SAME AS ABOVE	
	8				
	9			BORING TERMINATED @ 6'	
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-14

SRS SAVANNAH RIVER SITE

SOIL BORING INSTALLATION REPORT

Boring Number (AAA,NNN,AAA): CSGG | 14

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
13	NA	11/16/94	11/16/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1		
" "	1-2		
SPLIT SPOON	2-4		
" "	4-6		
" "	6-8		
" "	8-10		
" "	13-15		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	Hood, H	RUST E&I	HUNTER, K

Disposition of Samples

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date

D-7

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/16/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: E.E.I.	
WELL NO.: CSGG-14	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E & I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			FILL: Silty SAND, Olive gray (5Y 4/1) fine grained, moist, (SM)	HAND AUGER 0-1'
2	1			SAA EXCEPT LIGHT Brown (5Yr 6/4)	HAND AUGER 1-2'
	2				
3	3			Clayey SAND, Light Brown (5Yr 6/4) fine grained, moist (CL)	SPLIT SPOON 2'-4'
	4			FROM 4-5' (SAA) (SAME AS ABOVE)	
4	5	BURN MATERIAL		FROM 5-6 - BURN MATERIAL, BLACK BURNED WOOD, Glass FRAGMENTS, MISC NAILS, YELLOW PLASTIC, CONCRETE RUBBLE, WET	
5	6			6-7 - BURN MATERIAL AS DESCRIBED ABOVE - 7'-8' RESIDUUM Light Brown (5Yr 5/6) SANDY CLAY WITH Very Pale Orange (10Yr 8/2) CLAY INTERBEDDED WE Sand Fin grained rounded, Dry (CL)	
6	7			SAA FROM 7-8' BGS	
	8				
	9	NOT SAMPLED			
	0				
	1				
	2				
	3			PURCHED H2O @ 12-13 BGS	
7	4			13-15 - CLAY INTERBEDDED Very Pale Orange (10Yr 8/2) and Light Brown (5Yr 5/1) - HIGH PLASTICITY, Saturated (C.H)	
	5				
	6				
	7			BORING TERMINATED @ 13 BGS	
	8				
	9				
	0				

CS6G-15

SRS SOIL BORING INSTALLATION REPORT

Boring Number (AAA NNN AAA): CSGG 15

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
10	NA	11/17/94	11/17/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0 - 1		
" "	1 - 2		
SPLIT SPOON	2 - 4		
" "	4 - 6		
" "	10-12		

Drilling & Sampling Comments
(include drilling muds used, source of water, lost circulation zones, etc.

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL BOREHOLE WITH SOIL CUTTINGS	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/17/94	K. HUNTER	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/19/94	SHEET: 1 of 1
	REFERENCE DATUM	DRILLING CONTRACTOR: E.E.F.	
WELL NO.: CSGG-15	SRP COORDINATES	DRILLER: H. Hood	
LOGGED BY: K. Hunter	COMPANY: Rust E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			FILL: Silty SAND, OLIVE GRAY (5Yr 4/1)	
	1			fine grained; MOIST (SM)	
2				1'-1.5' SAA - 1.5-2.0 Silty Sand, Dark	
	2			yellowish orange, fine grained, moist (SM)	
3				SOME METAL SHAVINGS	
	3			2-2.5 SAA	
				2.5-4.0 - RESIDUUM SANDY CLAY, very	
	4			pale orange (10 Yr 8/2) INTERBEDDED	
4				with Light Brown (5Yr 5/6) - fine grained	
	5			MOIST (CL)	
				SAA	
	6				
	7			NOT SAMPLED	
				BUT ASSUMED CLAY	
	8				
	9				
	10				
				SAA	
5	11				
	12				
	13			BORING TERMINATED @ 10' BGS	
	14				
	15				
	16				
	17				
	18				
	19				
	20				

CS6G-16

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA, NNN, AA): CSBG | 16

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
10 ft BGS	NA	11/17/94	11/17/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1		
" "	1-2		
SPLIT SPOON 3"	2-4		
" " "	4-6		
" " "	10-12		

Drilling & Sampling Comments
(Include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
E&I	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL W/ NATIVE SOIL CUTTINGS	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/17/94	K. HUNTER	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/17/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CSBG-16	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			SAND SILTY, moderate yellowish brown 10YR (5/4), fine grained moist	0-1 HAND AUGER
	1			1.0' to 1.5' SAME AS ABOVE	
2				1.5 to 2.0 SAND, SILTY, grayish black (N2)	1-2
	2			fine grained, moist (SM)	SPLIT SPOON
3				2.0 → 2.5 - SAME AS ABOVE - 2.5 - 3.5	
	3			SILT, grayish black (N2), WET	
	4			3.5 → 4.0 ~~SILT~~ CLAY Sandy, medium light gray (N6), wet moist, fine grained (CL)	
4				4.0 → 5.5 SAME AS ABOVE	
	5			5.5 → 6.0 CLAY, sandy pale yellowish brown (10YR 6/2), light brown (5YR 5/6), fine grained, HARD (CL)	
	6				
	7				
	8				
	9				
	0				
5				CLAY, sandy, w/ QUARTZ FRAGMENTS, med-fine grained, very light grey, HARD, med plasticity, (CH)	
	2				
	3				
	4			BORING TERMINATED AT 10' BGS	
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-17

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA NNN AAA): CSBG 17

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
10	NA	11/17/94	11/17/94	3¼ ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1		
" "	1-2		
SPLIT SPOON 3"	2-4		
" " "	5-7		
" " "	10-12		

Drilling & Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL W/ NATIVE SOIL CUTTINGS	NA

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
HUNTER, K	11/17/94	HUNTER, K	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/17/94	SHEET: 1 OF 1
	REFERENCE DATUM:	DRILLING CONTRACTOR:	
WELL NO.: CSGG-17	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			FILL 0'-8"- SAND, Grayish orange (10YR 7/4), fine grained MOIST - 8"-12" Sandy CLAY	RESIDUUM FROM 8"→
1	1			LIGHT BROWN (5YR 6/4) fine-med grained (CL)	
2	2			SAA FROM 8"-12"	
3	3			SAA	
	4				
	5			RESIDUUM: CLAY, INTERBEDDED. VERY PALE ORANGE (10YR 8/2) and Light brown (5YR 6/4),	
4	6			mod plasticity, MOIST, HARD (CH)	
	7				
	8				
	9				
	10			CLAY VERY PALE ORANGE (10YR 8/2)	
5	11			HIGH PLASTICITY, MOIST, HARD-VERY HARD (CH)	
	12				
	3			BORING TERMINATED	
	4			@ 10' BGS	
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-18

SRS SAVANNAH RIVER SITE

SOIL BORING INSTALLATION REPORT

Boring Number (AAA NNN AAA): CSBG 18

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation
45				

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
45	43	11/18/94	11/18/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1	SPLIT SPOON	40-42
" "	1-2	" "	43-47
SPLIT SPOON	2-4		
" "	5-7		
" "	10-12		
" "	15-17		
" "	20-22		
" "	25-27		
" "	30-32		
" "	35-37		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
PRESSURE GROUT 13.5 lb/gal	6 BAGS OF PORTLAND CEMENT & BENT BOWDER

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/23/94 KH	K. HUNTER	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/18/94	SHEET: 1 OF 3
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: C566-18	SRP COORDINATES	DRILLER: H. Hood	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			Clayey SAND, Moderate brown (5YR 4/4), fine-med grained, (CL) (MOIST)	0-1' HAND AUGER
	1				
2				Sandy CLAY, Light brown (5YR 5/6), fine grained, (CL)	1-2 HAND AUGER
	2				SPLIT SPOON
3	3			SAA	
	4				
	5			Silty SAND, w/ QUARTZ FRAGMENTS, fine gravel, Light Brown (5YR 5/6), HARD-VERY HARD, MOIST, med-coarse, rounded & angular (SP)	
4	6				
	7				
	8				
	9				
	10			Clayey SAND, w/QUARTZ FRAGMENTS, fine-coarse gravel, Grayish red purple (5RP 4/2), angular, (CL)	
5	11				
	12				
	13				
	14				
	15				
6	16			SAA	
	17				
	18				
	19				
	20				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/18/94	SHEET: 2 OF 2
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEI	
WELL NO.: CS6G-18	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	20				SPLIT SPOON
7	21			Clayey SAND, SPECKLED moderate pink (5R 7/4), Grayish pink (5R 8/2), Light Red (5R 6/6), Sand Coarse rounded, gravel w/ QUARTZ FRAGMENTS, very hard (CL)	
	22				
	23				
	24				
	25				
8	26			SAA WITH HIGHER CLAY CONTENT LESS HARD, HARD	
	27				
	28			PURCHED H_2O ZONE	
	29				
	30				
9	31			CLAY, CLEAN NO SAND, GRAYISH red purple, moist (5RP 6/2), HIGH PLASTICITY (CH) STIFF	
	32				
	33				
	34				
	35				
10	36			SAA	
	37				
	38				
	39				
	40				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/18/94	SHEET: 3 OF 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEI	
WELL NO.: CSGG-18	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40				SPLIT SPOON
11	41			SAA	
	42				
	43				
	44				
	45				
12	46			SAA W/ MICACEOUS - SATURATED LESS DENSE	
	47				
	48			BORING TERMINATED @ 45' BGS	
	49				
	50				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-19

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA,NNN,AAA): CSGG | 19

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
45	42	11/22/94	11/22/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0 - 1	SPLIT SPOON	40 - 42
" "	1 - 2	" "	45-47
SPLIT SPOON	2 - 4		
" "	5 - 7		
" "	10 - 12		
" "	15 - 17		
" "	20 - 22		
" "	25 - 27		
" "	30 - 32		
" "	35 - 37		

Drilling & Sampling Comments (Include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
E & I	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
PRESSURE GROUT 13.5 lb/gal	6 BAGS OF PORTLAND CEMENT & BENTONITE POWDER

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/23/94	K. HUNTER	11/29/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/22/94	SHEET: 1 OF 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEF	
WELL NO.: CSGG-19	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			SAND, GRAYISH ORANGE 10YR 7/4, fine grained, moist,	0-1 - HAND AUGER
2	1			SAA TO 10" - SILTY SAND, GRAYISH ORANGE, (10YR 7/4), fine grained, moist (SM)	1-2
3	2			Sandy CLAY (CL), LIGHT BROWN (5YR 5/6), pale yellowish brown (10YR 6/2), fine-grained, moist, low plasticity (CL)	2-4 SPLIT SPOON
	3				
	4				
	5			SANDY CLAY, light brown (5YR 5/6), VERY PALE ORANGE (10YR 8/2), fine-grained,	
4	6			moist, very hard (CL)	
	7				
	8				
	9				
	10			CLAY, Grayish red purple (5RP 4/2),	
5	11			interbedded very pale orange (10YR 8/2),	
	12			very hard, low plasticity, (CL)	
	13				
	14				
	15				
6	16			CLAY, Grayish red purple (5RP 4/2)	
	17			yellowish gray (5Y 8/1), very hard,	
	18			moderate plasticity, (CL), MICACEOUS	
	19				
	20				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/22/94	SHEET: 2 OF 3
	REFERENCE DATUM	DRILLING CONTRACTOR	
WELL NO.: CSBG-19	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	20				SPLIT SPOON
7	21			Sandy CLAY, moderate red (5R 4/6), medium angular, moist, (CL)	
	22				
	23				
	24				
	25				
8	26			CLAY, Pale red purple (5RP 6/2), high plasticity, moist (CH) HARD	
	27				
	28				
	29				
	30				
9	31			Sandy CLAY, moderate red (5R 4/6), low plasticity, moist, micaceous (CL)	
	32				
	33				
	34				
	35				
10	36			CLAY, Pale purple (5P 6/2), no sands, med plasticity, moist, micaceous, (CL)	
	37				
	38				
	39				
	40				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/22/94	SHEET: 3 OF 3
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CSGG-19	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40				SPLIT SPOON
11	41			Sandy CLAY, quartz fragments, pale purple (5P6/2), (CL)	
	42				
	43				
	44				
	45			(5R7/4)	
12	46			Sand, moderate pink, fine-med, saturated rounded, some quartz fragments	
	47				
	-8			BORING TERMINATED @ 45' BGS	
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-20

SOIL BORING INSTALLATION REPORT

SRS SAVANNAH RIVER SITE

Boring Number (AAA, NNN, AAA): CS667 | 20

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC ER

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS BRP

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
45	NA	12/28/94	12/30/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1	SPLIT SPOON	40-42
"	1-2	"	45-47
SPLIT SPOON	2-4		
"	5-7		
"	10-12		
"	15-17		
"	20-22		
"	25-27		
"	30-32		
	35-37		

Drilling & Sampling Comments
(Include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
EEI	HOOD, H	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
PRESSURE GROUT W/ TRIMMIE	PORTLAND CEMENT/BENTONITE SLURRY GROUT

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	11/30/94	KELLY HUNTER	12/5/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS IRP		DATE: 11/28/94	SHEET: 1 OF 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEI	
WELL NO.: CSOG-20	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0				HAND AUGER
1				Clayey SAND, Dark yellowish orange (10YR 6/6), INNER-BEDDED WITH pale yellowish brown (10YR 6/2), fine grained ROUNDED, MOIST (SC)	
2	1				
	2			Sandy CLAY, pale yellowish orange (10YR 8/6), fine grained, rounded MOIST (CL)	SPLIT SPOON
3	3				
	4				
	5			Clayey SAND, Dark yellowish orange (10YR 6/6), fine grained, moist (SC)	
4	6				
	7				
	8				
	9				
	10			CLAY, Pale yellowish yellow (10Y 8/2) moist, med plasticity (CL), Pale reddish brown (10R 5/4)	
5	11				
	12				
	13				
	14				
	15			Sandy CLAY, Dark reddish brown (10R 3/4), Very pale orange (10YR 8/2), (CL)	
6	16				
	17				
	18				
	19				
	20				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/30/94	SHEET: 2 OF 3
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CSOG-20	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E & I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	20				SPLIT SPOON
7	21			CLAY, very pale orange (10YR 8/2),	
	22			Grayish red purple (5RP 4/2), (CH)	
	23			high plasticity (CH)	
	24				
	25				
8	26			SAA.	
	27				
	28				
	29				
	30				
9	31			SAA	
	32				
	33				
	34				
	35				
10	36			SAND, moderate orange pink (10R 7/4),	
	37			fine grained	
	38				
	39				
	40				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 11/30/94	SHEET: 3 OF 3
	REFERENCE DATUM	DRILLING CONTRACTOR: EEI	
WELL NO.: CSBG-20	SRP COORDINATES	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40				SPLIT SPOON
11	41			Sandy SILT, Very pale orange (10YR 8/2), fine grained, STIFF (SM)	
	42				
	43				
	44				
	45			SAA	
12	46				
	47				
	-8			BORING TERMINATED @ 45' BGS	
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-21

SRS SOIL BORING INSTALLATION REPORT

SAVANNAH RIVER SITE

Boring Number (AAA NNN AAA): CSBG 21

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BURNING RUBBLE PIT	RAY PLUNKETT	WSRC ER

Boring Purpose	County	Location Description
SOIL SAMPLING	BARNWELL	CENTRAL SHOPS AREA

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
45	NA	12/1/94	12/1/94	3 1/4 ID HSA

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0-1	SPLIT SPOON	40-42
"	1-2	"	45-47
SPLIT SPOON	2-4		
"	5-7		
"	10-12		
"	15-17		
"	20-22		
"	25-27		
"	30-32		
"	35-37		

Drilling & Sampling Comments (include drilling muds used, source of water, lost circulation zones, etc.)

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
LEI	HOOD, M	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
PRESSURE GROUT — TRIMMIE	PORTLAND CEMENT BENTONITE SLURRY GROUT

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
K. HUNTER	12/1/94	K. HUNTER	12/5/94

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 12/1/94	SHEET: 1 of 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEI	
WELL NO.: CSGG-21	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3 1/4 ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
1	0			RESIDUUM:	
	1			Sandy CLAY, Dark yellowish orange (10YR 6/6), moderate red (5R 6/4), some peat, fine grained, moist (CL)	HAND AUGER
2	2			SAA, NO PEAT	SPLIT SPOON
3	3			SAA, NO PEAT	
	4				
	5			Sandy CLAY, Very pale orange (10YR 8/2), Light Brown (5YR 5/6), fine grained, DAMP, VERY HARD, (CL)	
4	6				
	7				
	8				
	9				
	10				
5	11			SAA	
	12				
	13				
	14				
	15			CLAY, Very pale orange (10YR 8/2), Light Brown (5YR 5/6), pale red purple (5RP 6/2), VERY HARD, DAMP (CH)	
6	16				
	17			HIGH PLASTICITY	
	18				
	19				
	20				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 12/1/94	SHEET: 2 OF 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EEI	
WELL NO.: CSGG-21.	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	20				SPLIT SPOON
7	21			CLAY, Grayish red purple (5RP 4/2), HIGH PLASTICITY, DAMP, VERY HARD, (CH)	
	22				
	23				
	24				
	25				
8	26			CLAY, yellowish gray (5Y 8/1), Grayish red purple (5RP 4/2), HIGH PLASTICITY DAMP, VERY HARD, (CH)	
	27				
	28				
	29				
	30				
9	31			CLAY, very pale orange (10YR 8/2), HIGH PLASTICITY, DAMP, VERY HARD, (CH)	
	32				
	33				
	34				
	35				
10	36			CLAYEY SAND, WHITE (N9), fine grained, ~~low~~ DAMP, HARD (CL)	
	37				
	38				
	39				
	40				

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 12/1/94	SHEET: 3 OF 3
	REFERENCE DATUM:	DRILLING CONTRACTOR: EGI	
WELL NO.: CSBG-21	SRP COORDINATES:	DRILLER: H. HOOD	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: 3¼ ID HSA	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	40				SPLIT SPOON
	41			SAA	
	42				
	43				
	44				
	45			SAA	
	46				
	47				
	8			BORING TERMINATED @ 45	
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

CS6G-22

SRS SAVANNAH RIVER SITE

SOIL BORING INSTALLATION REPORT

Boring Number (AAA NNN AAA): CSGG | 22

GENERAL INFORMATION

Project Name	Project Manager	Department
CENTRAL SHOPS BRP	RAY PLUNKETT	GO - ENVIRONMENTAL ENGINEERING

Boring Purpose	County	Location Description
SOIL BORING	BARNWELL	CENTRAL SHOPS BURNING RUBBLE PIT

SRS North Grid Coordinate	SRS East Grid Coordinate	Latitude (decimal degrees)	Longitude (decimal degrees)	Ground Elevation

DRILLING & SAMPLING INFORMATION

Total Drilled Depth	Static Water Level	Drilling Start Date	Drilling Completion Date	Drilling Method
3.5	NA	12/6/94	12/6/94	HAND AUGER - STAINLESS STEELE

Sample Type	Sampling Interval	Sample Type	Sampling Interval
HAND AUGER	0 - 1		
" "	1 - 2		
" "	2 - 3.5		

Drilling & Sampling Comments
(include drilling muds used, source of water, lost circulation zones, etc.

Drilling Company	Driller (last name, first initial)	Oversight Company	Oversight (last name, first initial)
NA	NA	RUST E&I	HUNTER, K

Disposition of Samples: GENERAL ENGINEERING LABORATORIES

ABANDONMENT

Method of Abandonment	Materials Used in Abandonment
BACKFILL WITH CUTTINGS	SOIL CUTTINGS

APPROVALS

Abandonment Verified By	Date	Boring Installation Report Prepared By	Date
[signature]	12/6/94		

OSR 30-3

FIELD GEOLOGIC LOG

PROJECT: CENTRAL SHOPS BRP		DATE: 12/6/94	SHEET: 1 OF 1
	REFERENCE DATUM	DRILLING CONTRACTOR: NA	
WELL NO.: CSGG-22	SRP COORDINATES	DRILLER: NA	
LOGGED BY: K. HUNTER	COMPANY: RUST E&I	DRILLING METHOD: HAND AUGER	

RUN NUMBER	DEPTH, FEET	LITHOLOGY	PERCENT RECOVERY	SAMPLE DESCRIPTION	DRILLING COMMENTS
	0			FILL	HAND AUGER
1				Sandy CLAY, moderate reddish orange (10R 6/6), and Pale Red (10R 6/2).	
2	1			SAA TO 18" - 18"-24" BURN MATERIAL	
	2			GRAVEL, SILTY, SAND, MISC nails, wood	
3				particles & metal fragments; Black,	
	3			saturated	
	4	BURN MATERIAL			
	5				
	6			REFUSAL @ 3.5' BGS	
	7				
	8				
	9				
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	0				

Appendix E

Daily Sign-In/Out Logs and Work Zone Entry/Exit Logs

Daily Sign-In/Out Logs

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: 88351.000
PROJECT NO.: CENTRAL SHOPS BRP
SITE LOCATION:
HSO: K. HUNTER
DATE: 11/2/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
11:00	15:00	KELLY HUNTER/RUST	Kelly J. Hunter	WELL INSTALLATION
11:00	15:00	John Shope/EMTC	John Shope	Drill
11:00	15:00	Gene Borne/EMTC	Gene Borne	"
11:00	15:00	ISAAC Barnes/EMTC	Isaac Barnes	"
11:00	16:05	Dave Clark/WSRC	David Clark	oversight
11:00	12:05	R. PLUNKETT/WSRC	RALPH	Proj. Mgr.
11:00		J. M Simmons EED/SR		oversite
11:00	12:00	Terry Killeen WSRC EPD	Terry Killeen	Site Inspection
11:00	12:00	C. DAN ROGERS WSRC EPD	C. Dan Rogers	Site Inspection

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~1208I~~ NDA 98351.000
SITE SAFETY OFFICER: *K. Hunter*
DATE: *11/3/94*
PAGE NO.: *1 of 1*

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
~~9~~:25	1700	Kelly Hunter	RUST	well installation
7:30	1700	Gene Barnes	EMTC	Drill
7:30	1700	Jonathan Sharpe	EMTC	Drill
7:30	1700	Isaac Barnes	EMTC	Drill
8:00	16:30	Dave Clark	WSRC	oversight
9:00	9:10	Darryl Jenkins	WSRC	RCD
9:00	9:25	Elaine Bennett	WSRC	safety
9:00	9:25	Brian K. Lewis	WSRC	safety
9:38	9:45	Janelle Janssen	WSRC	progress status rpt.
9:40	10:00	James W McGraw	WSRC	visit water
10:10	10:40	R Plunkett	WSRC	PROJ MGR
2:02	2:30	M. Simmons	ERD/DOE	oversite
2:15	3:00	Chet Nichols	WSRC	Mobil12/logbook
~~8:30~~		~~M. Simmons~~ Signed in	ERD/DOE	

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~1208F~~ NDH 003357.002
SITE SAFETY OFFICER: *Kelly Hunter*
DATE: 11/4/94
PAGE NO.: 1 OF 1

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
7:30	1550	K. Hunter	RUST	Well Installation
830	1550	C Baicey	EMTC	drill well
7:50	1550	T Barnes	EMTC	drill
7:50	1550	G Dennes	EMTC	"
7:30	2:00	D. Clark	WSRC	oversight

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~12081~~ NDH 99351.000
SITE SAFETY OFFICER: *K. HUNTER*
DATE: *11/14/94*
PAGE NO.: =

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
10:25	17:05	KELLY HUNTER	RUST E&I	SOIL BORING OVERSITE
12:45	17:05	Charles Creighton	EE&T	
12:15	17:05	Harold E Hall	E.E.T	Soil Boring
12:15	17:05	BRUCE KRISTIANSEN	RUST E+I	OVERSITE
10:25	13:15	RAY PLUNKETT	WSRC	PROJ MGR
1:00	16:00	Dave Clark	WSRC	Tech oversight
10:3				

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: *12081 MDN 000357.000*
SITE SAFETY OFFICER: *K. HUNTER*
DATE: *11/15/94*
PAGE NO.: *1*

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
7:05	16:00	K. HUNTER	RUST	SOIL BORING
8:35	2:30	D CLARK	WSRC	Oversight
7:00	15:00	C CRENSHAW	EEI	SOIL BORING
7:20	15:00	A WOOD	EET	SOIL BORING
7:05	15:30	B. Kristenson	RUST E&I	" "
9.55	10:20	S. CREEK	WSRC EPD	OVERSIGHT
10:33	2:30	R. Plunkett	WSRC	PROJ MGR
10:30	11:25	L. Smith	WSRC	RA
9:30	11:25	Laura Haselow	WSRC	RA
9:30	11:25	Nickie Palmer	WSRC	RA
1:20	2:15	Donna Brumley	DOE	oversite
1:20	2:15	mike Simmons	DOE-ER	oversite
2:10	2:30	Sharon Fulton	WSRC/ERD	Support

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~12081~~ 98357.000
SITE SAFETY OFFICER: K. HUNTER
DATE: 11/16/94
PAGE NO.: 1

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
6:58	14:00	KELLY HUNTER	RUST E&I	SOIL BORING
7:00	14:00	HAROLD HOLD	E.E.I.	SOIL BORING
7:00	14:00	CHARLES CRENSHAW	EEI	SOIL BORING
9:15	13:00	Dave Clark	WSRC	oversight
9:55	13:50	Laura Haselow	WSRC	Background identification
9:55	13:50	Nickie Palmer	WSRC	"
9:55	13:50	Vergil Rogers	WSRC	"
0700	1400	R. KRITTENBRINK	RUST E&I	OVERSITE BORING

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~1208I~~ MDN 98357.000
SITE SAFETY OFFICER: *K. HUNTER*
DATE: *11/17/94*
PAGE NO.: *1 OF 1*

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
7:20	16:00	KELLY HUNTER	RUST E&I	SOIL BORING
0720	16:00	B. KRISTIANSEN	RUST E&I	SAMPLING
7:00	16:00	H. HOOD	E.E.I.	Sampling & Drilling
7:00	16:00	C. Arenburg	E.E.I.	Sampling & Drilling
2:10	3:00	Steve Hoover	WSRC/EPD	V.S.T.

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~1208I~~ MDN ~~6966~~ 6966.35).000
SITE SAFETY OFFICER: *K. HUNTER*
DATE: *11/18/94*
PAGE NO.: *1 OF 1*

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
7:00	1500	KELLY HUNTER	RUST E&I	SOIL BORINGS
7:35	9:35	R Plunkett	WSRC	PROJ MGR
7:35	9:35	D. Clark	WSRC	OVERSIGHT SCS
7:00	14:00	H. Hood	E.E.I.	Drilling
7:00	14:00	C Mercham	E.E.I.	Drilling
9:00	9:35	Phillip Eckhoff	SRFS	Informal Meeting with RUST
12:20	12:40	Louise Hazelton	WSRC	Field visit
11:20	12:40	Mark Aussenegg	RUST	Field Visit
11:20	12:40	Steve Dillard	RUST E&I	Field visit
11:20	12:40	KATHRYN JACOBS	RUST E&I	Field Visit
11:20	12:40	Vergil Rogers	WSRC	Field Visit
11:20	12:40	LARRY NEAL	RUST E&I	Field Visit
0730	1500	B. KRISTIANSEN	RUST E&I	SOIL BORINGS

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~12081~~ MDA 99351.006
SITE SAFETY OFFICER: K. HUNTER
DATE: 11/22/94
PAGE NO.: 1

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
7:00	1545	E.E.I ~~Supervisor~~	E.E.I	Drilling
7:00	1545	~~Chuck Jenkins~~	EEI.	DRILLING
0700	1545	BRUCE KRISTIANSEN	~~RUST CAT~~	SAMPLING
07:10	1545	KELLY HUNTER	RUST E&I	SAMPLING
07:30	1545	Dave Clark	WSRC	oversight

Note: This form is to be completed on a daily basis by all personnel working on the site.

DAILY SIGN-IN/OUT LOG

PROJECT: *Central Shops BRP, 631-6G RI*
PROJECT LOCATION: *Central Shops*
PROJECT NO.: ~~1208I~~ MDH ~~0999~~ 51.000
SITE SAFETY OFFICER: K. HUNTER
DATE: 11/28/94
PAGE NO.: 1 OF 1

TIME IN	TIME OUT	NAME	FIRM	PURPOSE ONSITE
9:20	1400	K. HUNTER	RUST E&I	SOIL BORING
9:20	1400	G. CARNAHAN	EEI	DRILLING
0920	1400	R. KRISTIANSEN	RUST E-I	SAMPLING
09:20	1400	A. WOOD	E.E.I	DRILLING

Note: This form is to be completed on a daily basis by all personnel working on the site.

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: 42057 MDN 00235.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 11/30/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
7:10	1600	KELLY HUNTER / RUST	Kelly Hunter	SOIL BORINGS
7:00	1600	HAROLD HOOD / E.E.T.	Harold E. Hood	Drilling
7:00	1600	CHARLES Combs EET	Charles Combs	Drilling
0700	1600	BK CHRISTIANSEN RUST	B K Christiansen	SAMPLING
~~0800~~				
1:00	3:30	Dave Clark / WSEC	Dave Clark	oversight

Note: This form is to be completed on a daily basis by all personnel working on the site.

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: CENTRAL SHOPS RAP
PROJECT NO.: ~~12681~~ MDH 90035.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 12/1/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
7:55	1600	KELLY HUNTER/RUST E&I	Kelly Hunter	SOIL BORING
0800	1600	B KRISTIANSEN/RUST	B Kristiansen	SAMPLING
0730	1600	HAROLD ADAMS/C.E.I	Harold Adams	DRILLING
7:00	1600	CHARLES CRENSHAW/C.E.I	Charles Crenshaw	DRILLING
08:00	10:00	Dave Clark/USACE	Dave Clark	VISITOR

Note: This form is to be completed on a daily basis by all personnel working on the site.

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: CENTRAL SHOPS
PROJECT NO.: 12087MDH 00357.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 12/4/04
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
1000	1215	B. KRISTIANSEN / RUST	B Kristiansen	SAMPLING
1000	1215	K. HUNTER / RUST E&I	Kelly Hunter	SAMPLING

Note: This form is to be completed on a daily basis by all personnel working on the site.

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: 12081.MDN.690357.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 12/5/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
7:25	1600	B. KRISTIANSEN / RUST	B. Kristiansen	SAMPLING
6:50	1515	K. HUNTER / RUST E&I	Kelly Hunter	SAMPLING

Note: This form is to be completed on a daily basis by all personnel working on the site.

RUST ENVIRONMENT & INFRASTRUCTURE

DAILY SIGN-IN/OUT LOG

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: ~~12081~~ MDN 098357.680
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 12/6/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM	SIGNATURE	PURPOSE ONSITE
0855	1330	KELLY HUNTER/RUST E&I	Kelly Hunt	SOIL SAMPLING
1030	11:05	DEAN THOMAS / WSRC	Dean Thomas	INSPECTION
1238	1330	B. KRISTIANSEN/RUST	B Kristiansen	TRAINING

Note: This form is to be completed on a daily basis by all personnel working on the site.

Work Zone Entry/Exit Logs

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CS BRP
PROJECT NO.: 12051 NDA 990857.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 11/17/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
7:00	16:00	E.E.I.	Harold E. Howe		
7:00	16:00	EEI	Charles Arrington		
7:00	16:00	~~E.E.I~~ W. EH			

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG
(JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS IRP, 631-6G RI
PROJECT NO.: CENTRAL SHOPS 04357.000
SITE LOCATION: 12081
HSO: K. HUNTER
DATE: 11/22/92
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
7:00		E.E.I	Harold Hood		
7:00		EEI	Charles Grenbow		
0700		Bruce Kristiansen	Bruce Kristiansen		
~~0730~~		~~Dave DRC 11/22/94~~			

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS BKP
PROJECT NO.: 88351.000
SITE LOCATION:
HSO: K. HUNTER
DATE: 11/2/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
11:00	15:00	KELLY HUNTER/RUST	Kelly Hunter		D
11:00	15:00	Jonathan Stage/EMTC	Jonathan Stage	—	D
1100	15:00	Gene Barnes/EMTC	Gene Barnes	—	D
11:00	15:00	Isaac Barnes	Isaac Barnes	—	D

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: 12081 –
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 11/3/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
7:20	1645	KELLY HUNTER/RUST	Kelly Hunter	—	D
7:30	1645	JONATHAN SHOPE/SMTC		—	D
730	1645	ISAAC BARNES	Isaac Barnes	—	D
730	1645	GENE BARNES/SMTC	Gene Barnes	—	D
8:00	1645	DAVE CLARK/WSRC	Dave Clark		D
~~16:45~~					

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CS BRP
PROJECT NO.: 12081
SITE LOCATION: CENTRAL SHOPS
HSO: K. Hunter
DATE: 11/4/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
8:30	1330	Kelly Hunter	Kelly Hunter		D
830	1330	C Bailey	C Bailey		D
8:30	1330	T Barnes	T Barnes		D
830	1330	C Barnes	C Barnes		D

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS, 631-6G RI
PROJECT NO.: CENTRAL SHOPS
SITE LOCATION: 12081
HSO: K. HUNTER
DATE: 11/14/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
12:15	17:05	E.E.T.			D
12:15	17:05	E.E.T.			D
12:15	17:05	RUST E&I			D
12:10	17:05	RUST E-I			D

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG (JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: 88351.000
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 11/22/94
PAGE NO.: 1 of 1

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
7:00	1330	E.E.I.	[signature]		
0700	1330	B. KRISTIANSEN / RUST	[signature]		
0700	1330	C. RENSHAW / EEI	[signature]		

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

RUST ENVIRONMENT & INFRASTRUCTURE

WORK ZONE ENTRY AND EXIT LOG
(JOB EXPOSURE REPORT)

PROJECT: CENTRAL SHOPS BRP
PROJECT NO.: 12081
SITE LOCATION: CENTRAL SHOPS
HSO: K. HUNTER
DATE: 11/30/94
PAGE NO.: _____ of _____

TIME IN	TIME OUT	NAME/FIRM (Printed)	SIGNATURE	HNU/OVA READINGS (IN BREATHING ZONE)	LEVEL PPE (D/C/B)
7:00	1230	E.E.T.	Harold E. Heed		
7:00	1230	EET	Charles Cordes		
0700	1230	B. Kristinsen/Rust	B Kristinsen		

Note: This form is to be completed on a daily basis by all onsite personnel working within the controlled work zone.

Appendix F

Well Development Forms

CBR-4
CBR-5
CBR-6

CBR-4

DEVELOPMENT SHEET

WELL # CBR-T3

DEVELOPED BY Frank Cooper

DEVELOPMENT OVERSIGHT RUST

DATE STARTED 9 NOV 94

STARTING WATER LEVEL 29 ft

STARTING FLOW METER READING N/A

STARTING WELL YIELD (AFTER BAILING) A 35 Gal P Hr

DATE FINISHED 14 NOV 94

FINAL WATER LEVEL 41,5

FINAL FLOW METER READING N/A

TOTAL VOLUME OF WATER REMOVED 425

FINAL WELL YIELD 35

HOURS BAILED 4 1/2

HOURS PUMPED N/A

HOURS BLOWN 6 1/2

HOURS OTHER Swabbing 1

COMMENTS

FORM MUST BE TURNED IN THE FIRST WORKING DAY AFTER DEVELOPMENT IS COMPLETED
EVERY LINE MUST BE COMPLETED. PLACE NA (NOT APPLICABLE) IN EACH LINE THAT IS NOT FILLED OUT WITH DATA

OSR 30-4

SAVANNAH RIVER PLANT WELL DEVELOPMENT REPORT

PROJECT: PJ-4			DRILLING SUBCONTRACTOR: EMTC
WELL NO.: CBRT3	DRILLER: Frank C.	S.C. CERTIFICATION NO.: 969	DATE STARTED: 9 NOV 94 / DATE FINISHED: 14 NOV 94
SWP COORDINATES: J Janssen	OVERSIGHT FIRM: RUST		DEVELOPMENT METHODS: Swabbing / AIR Lift / Bailing
TOTAL DEVELOPMENT TIME: 12	SITE HYDROGEOLOGIST:		

DATE/TIME 94	DISCHARGE RATE (GPM) ±	VOL. PURGED (GALLONS)	WATER TEMP. (°C)	pH	SPECIFIC CONDUCTANCE (μMHOS/CM)	TOTAL DISSOLVED SOLIDS (PPM)	COLOR/ TURBIDITY	SAND CONTENT (PER CENT)	REMARKS
9 NOV							Light		water level 26 ft
730							BROWN	..	murky water
1100	30	110							Clear no w Bailer
							CLEAR BROWN		
10 NOV	94								
200	35								Added water
430	35	197.5							50 Gal water
									Truck
11 NOV	94								water level 36 ft
715	35.								Add Aprox 30 Gal
1100	35	320							of water & swabbed.
14 NOV	94								
200	35								water level 32.5 ft
250	35	425							
									water level 41.5 ft
14 NOV		425	TOTAL						

WELL DEVELOPMENT

Well number CBR 1T3 1 1 Developed by Frank Cooper

Date started 9/11/94 Date completed 14/NOV/94

Oversight RUST

DEVELOPMENT METHOD:

	Hours	Results
Bailing	W. 4½	110 Gal no sands
Swabbing and surging	1	
Air lift	Th 3 F 3½	
Pumping	∅	
Total hours	12	

Type and quantity of additives (including water) placed in well during development:
Aprox 30 Gal of water did not seem to help.

Estimated volume of water removed during development (gal) 425

	pH	Conductivity	Turbidity	Water Level
Start of development				29ft/2M
End of development				-41.5
Well yield (gpm)	Ap. 3/4			

Well development comments Water does not CLEAR up.

Verified by _____ Date ___/___/___

Report prepared by _____ Date ___/___/___

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WELL DEVELOPMENT FORM

WELL: CBR T-3 DATE STARTED: 9 NOV 94 DATE FINISHED: 14 NOV 94 PAGE 1 OF 4

LOCATION: C Lay Lot TIME STARTED: 7:30 TIME FINISHED: 1500

TYPE OF DEVELOPMENT						WATER QUALITY					COMMENTS
DATE	TIME	BAILING	AIRLIFT	PUMPING	SWABBING	MUDDY	MILKY	SANDY	CLEAR	SANDFREE	COMMENTS
9 NOV 94	730	✓				✓					DOES NOT CLEAR UP
10 NOV 94	100 - 430		✓		✓		✓				DOES NOT CLEAR UP
11 NOV 94	715 - 800		✓		✓						Clear brown
14 NOV 94	1250	✓			✓				✓		HAD TO ADD WATER during AIR LIFT
14 NOV 94	1430	✓			✓				✓		

TOTAL NUMBER OF HOURS DEVELOPMENT 9 1/2 RIG USED 9 INSPECTORS SIGNATURE: "

NAME OF DEVELOPER: Frank Cooper

F-4

CBR-5

DEVELOPMENT SHEET

WELL # CBR-T2

DEVELOPED BY Frank Cooper

DEVELOPMENT OVERSIGHT RUST

DATE STARTED 9 NOV 94

STARTING WATER LEVEL 41ft

STARTING ~~FLOW METER READING~~ Bailing ½ Gal

STARTING WELL YIELD (AFTER BAILING) _____

DATE FINISHED 14 NOV 94

FINAL WATER LEVEL 30 ft.

FINAL FLOW METER READING N/A

TOTAL VOLUME OF WATER REMOVED 157 Gal

FINAL WELL YIELD 4.30 GPH

HOURS BAILED 3½

HOURS PUMPED N/A

HOURS BLOWN 2

HOURS OTHER swabbing 1

COMMENTS Had to Add water to well could not Air lift

FORM MUST BE TURNED IN THE FIRST WORKING DAY AFTER DEVELOPMENT IS COMPLETED. EVERY LINE MUST BE COMPLETED. PLACE NA (NOT APPLICABLE) IN EACH LINE THAT IS NOT FILLED OUT WITH DATA.

OSR 30-4

SAVANNAH RIVER PLANT WELL DEVELOPMENT REPORT

PROJECT: PJ4			DRILLING SUBCONTRACTOR: EMTC
WELL NO: CBR-T2	DRILLER: Frank C.	S.C. CERTIFICATION NO.: 969	DATE STARTED: 9 NOV 94 / DATE FINISHED: 14 NOV 94
SRP COORDINATES: J JANSEN	OVERSIGHT FIRM: RUST		DEVELOPMENT METHODS: Bailing Swab / Air Lift
TOTAL DEVELOPMENT TIME: 8	SITE HYDROGEOLOGIST:		

DATE/TIME 94	DISCHARGE RATE (GPM)	VOL. PURGED (GALLONS)	WATER TEMP. (°C)	pH	SPECIFIC CONDUCTANCE (µMHOS/CM)	TOTAL DISSOLVED SOLIDS (PPM)	COLOR/ TURBIDITY	SAND CONTENT (PER CENT)	REMARKS
9 NOV.							Reddish		Water level 41 ft
1:15	30	30							
3:00	30	60					Reddish		Water level 48 ft
10 NOV		∅							Water level Air lift
1100	∅	0		unknow					want lift water
1200	∅	∅							adding water
11 NOV	94								
1:30	1	61							
3:30	1	62					Reddish		Water level 44 ft
									filled well water
									don't help any
									swabbed Air lift
14 NOV	9ft								Water level 44 ft
9:00	30	92							Swabbing & Bailing
12:00	30	122							Water Clearing up
	30	152							Bailed 10 more gal
									well is Clear

152 TOTAL

F-6

WELL DEVELOPMENT

Well number CBR 111 T12 Developed by Frank Cooper

Date started 9 /NOV/ 94 Date completed 14 /NOV/ 94

Oversight RUST

DEVELOPMENT METHOD:

	Hours	Results
Bailing	3 1/2	PH 6.14
Swabbing and surging	1 1/2	
Air lift	3	NO water Calling water TRUCK
~~Pumping~~		
Total hours	8 HRS	

Type and quantity of additives (including water) placed in well during development:
Water Aprox 50 Gal total

Estimated volume of water removed during development (gal) 150 Gal

	pH	Conductivity	Turbidity	Water Level
Start of development	6.14			41 ft 5in
End of development				- 50 ft
Well yield (gpm)	30 GPH			

Well development comments Could not air lift, bailed good & Cleaned

Verified by _____ Report prepared by _____

Date ___/___/___ Date ___/___/___

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WELL DEVELOPMENT FORM

WELL: CBR-T2 DATE STARTED: 9NOV 94 DATE FINISHED: 14 NOV 94 PAGE 1 OF 4

LOCATION: C TIME STARTED: 115 TIME FINISHED: 1200

		TYPE OF DEVELOPMENT					WATER QUALITY					COMMENTS
DATE	TIME	BAILING	AIRLIFT	PUMPING	SWABBING		MUDDY	MILKY	SANDY	CLEAR	SANDFREE	COMMENTS
NOV 94	115	✓							✓ Red			water level 41 ft
NOV 94	305	✓							Red.			water level 50 ft.
NOV 94	1400		✓									water level 45 ft
NOV 94	1200											
NOV 94	130											water level 44 ft
NOV 94	350		✓									No water
NOV 94	900	✓			✓							well CLEARED
NOV 94	1200	✓			✓							no Red Clear sample
												water level 50 ft.

TOTAL NUMBER OF HOURS DEVELOPMENT 8 / 6 RIG USED 9 INSPECTORS SIGNATURE: _____

NAME OF DEVELOPER: Frank Cooper

CBR-6

DEVELOPMENT SHEET

WELL # CBR - T1

DEVELOPED BY Frank Cooper

DEVELOPMENT OVERSIGHT RUST

DATE STARTED 9 NOV 94

STARTING WATER LEVEL 48ft

STARTING ~~FLOW METER READING~~ Bailing 1/5 Gal

STARTING WELL YIELD (AFTER BAILING) 15

DATE FINISHED 14 NOV 94

FINAL WATER LEVEL 53.5

FINAL FLOW METER READING N/A

TOTAL VOLUME OF WATER REMOVED 202

FINAL WELL YIELD 35 GPH

HOURS BAILED 2 HR.

HOURS PUMPED N/A

HOURS BLOWN ~~0~~ 3 1/2

HOURS OTHER Swabbed 1 HR.

COMMENTS Had to add water to well could not air lift

FORM MUST BE TURNED IN THE FIRST WORKING DAY AFTER DEVELOPMENT IS COMPLETED. EVERY LINE MUST BE COMPLETED. PLACE NA (NOT APPLICABLE) IN EACH LINE THAT IS NOT FILLED OUT WITH DATA.

OGR 30-1

SAVANNAH RIVER PLANT WELL DEVELOPMENT REPORT

PROJECT: PJ 4			DRILLING SUBCONTRACTOR: EMTC
WELL NO.: CBR-T1	DRILLER: Frank Cooper	S.C. CERTIFICATION NO.: 969	DATE STARTED: 9 NOV 94 / DATE FINISHED: 14 NOV 94
SRP COORDINATES: J J ANDERSEN	OVERSIGHT FIRM: RUST		DEVELOPMENT METHODS: BAILING / SWAB AIR lift
TOTAL DEVELOPMENT TIME: 6 1/2	SITE HYDROGEOLOGIST		

DATE/TIME	DISCHARGE RATE (GPM)	VOL. PURGED (GALLONS)	WATER TEMP. (°C)	pH	SPECIFIC CONDUCTANCE (μMHOS/CM)	TOTAL DISSOLVED SOLIDS (PPM)	COLOR/TURBIDITY	SAND CONTENT (PERCENT)	REMARKS
9 NOV	94	CUM TOTAL					LIGHT		Water level 48 ft
1100	1/3						BROWN	..	USE 40 ft Bailer
1200		15							SLOW RECHARGE
1'00		35					LIGHT BROWN		Water level 53 ft
10 NOV	94								Water level 50 ft
1000	"	8							Can not Air lift
1100		8							any water f Sample
11 NOV	94								Water level 49 ft
11:15									Filled well water
1.2.15	4	39							Will not Clean up
1'30	4	43							NOT GeHing 5 Gal PER Hr
14 NOV									Water level 47.5 ft
300		35							
445		35							Water level 53.5
		202	TOTAL						

F-10

WELL DEVELOPMENT

Well number CBR TIL Developed by Frank Dougar

Date started 9 NOV 94 Date completed 14 NOV 94.

Oversight RUST

DEVELOPMENT METHOD:

	Hours	Results
Bailing	2	Light Sand
Swabbing and surging	.1	
Air lift	3.5	No water / calling for water truck
Pumping	0	
Total hours	6 1/2	

Type and quantity of additives (including water) placed in well during development:
None, Slow to Recharge, filled well up 4 TIME Appox 60 Gall. water

Estimated volume of water removed during development (gal) 20.2

	pH	Conductivity	Turbidity	Water Level
Start of development	6.25			48ft / 33.5
End of development				
Well yield (gpm)	4 Gal Per HR			

Well development comments Slow Recharge. water level 47 feet. filled well with water swabbed to min ml changes

Verified by _____ Date ___/___/___

Report prepared by _____ Date ___/___/___

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WELL DEVELOPMENT FORM

WELL: CBR T1 DATE STARTED: 9 NOV 94 DATE FINISHED: 14 NOV 94 PAGE 1 OF 4

LOCATION: C. AREA TIME STARTED: 11.00 - 1.00 TIME FINISHED: 5.00

TYPE OF DEVELOPMENT						WATER QUALITY					COMMENTS
DATE	TIME	BAILING	AIRLIFT	PUMPING	SWABBING	MUDDY	MILKY	SANDY	CLEAR	SANDFREE	COMMENTS
NOV 94	11 00	✓				✓					water level 48 ft
NOV 94	1.00	✓					✓				water level 53 ft
NOV 94	4.00		✓								NO WATER, extracted
"	"		✓				✓				VERY LITTLE WATER
											4 Gal 1 HR.
1 NOV	3.00	✓			✓						
	4.45	✓			✓						CLEANED UP Good but not CLEAR.

TOTAL NUMBER OF HOURS DEVELOPMENT 8 HRS RIG USED 9 INSPECTORS SIGNATURE: _____

NAME OF DEVELOPER: Frank Coffey

11 00 - 1.00 2 HRS.

F-12

Appendix G

Groundwater Sampling Information

Phase I (12/5/94)

CBR-4
CBR-5
CBR-6

Appendix G
Summary of Groundwater Sampling
Phase I (12/15/94)

Sample Location	Sample Number	Date Sampled	Sample ID Number	Analyte Code	Identifier
CBR-5	01	12/5/94	102519	2,3	Normal
CBR-5	01E	12/1/94	103798	2,3	Rinsate
CBR-5	01C	12/5/94	102520	2,3	Field Blank
CBR-4	01	12/5/94	102521	2,3	Normal
CBR-4	01A	12/5/94	102522	2,3	Duplicate
CBR-4	01D	12/5/94	102522	2,3	Split
CBR-6	01	12/5/94	103799	2,3	Normal

Analyte Codes for Groundwater Sampling:

2. TCL/TAL w/TIC
3. Tritium

QA/QC Sample Codes:
A Duplicate sample
C Field Blank
D Split sample
E Rinsate blank

Phase II (12/28/94)

CBR-4
CBR-5
CBR-6

Appendix G
Summary of Groundwater Sampling
Phase II (12/28/94)

Sample Location	Sample Number	Date Sampled	Sample ID Number	Analyte Code	Identifier
CBR-5	01	12/28/94	102560	2,3	Normal
CBR-5	01E	12/28/94	102561	2,3	Rinsate
CBR-4	01	12/28/94	102562	2,3	Normal
CBR-6	01	12/28/94	102559	2,3	Normal

Analyte Codes for Groundwater Sampling:

2. TCL/TAL w/TIC
3. Tritium

QA/QC Sample Codes:
E Rinsate blank

Appendix H

Field Permeability Testing

Falling and Rising Head Slug Tests For:

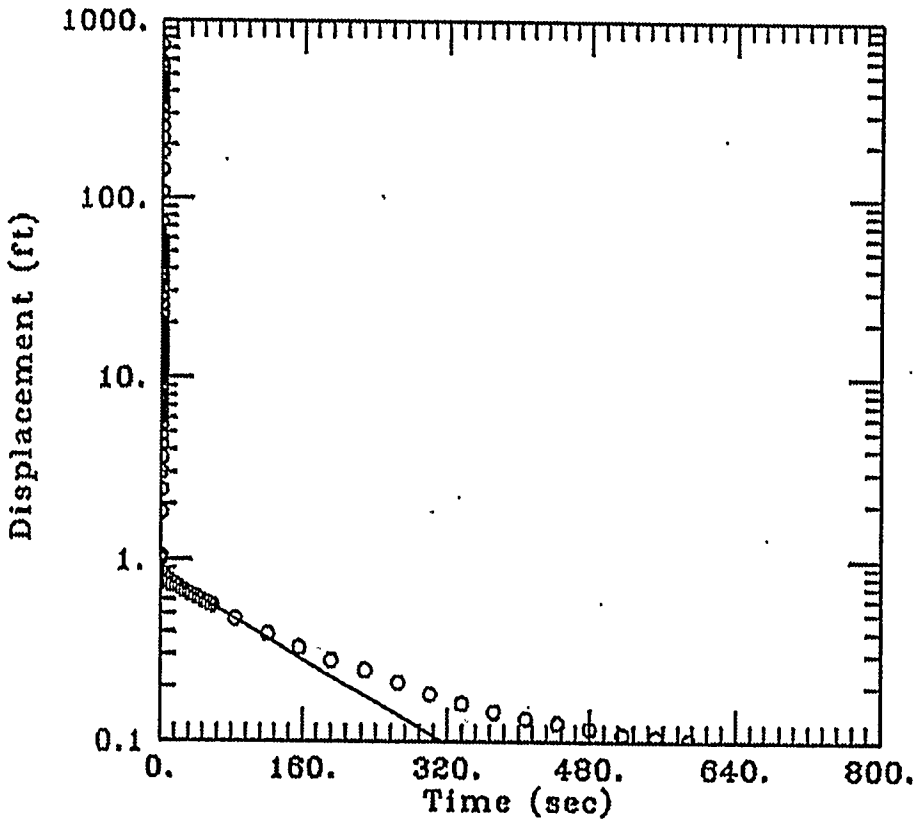
CBR-4

CBR-5

CBR-6

CBR-4

CBR-04 RISING HEAD TEST



DATA SET:
A:4RISE.AQT
01/22/95

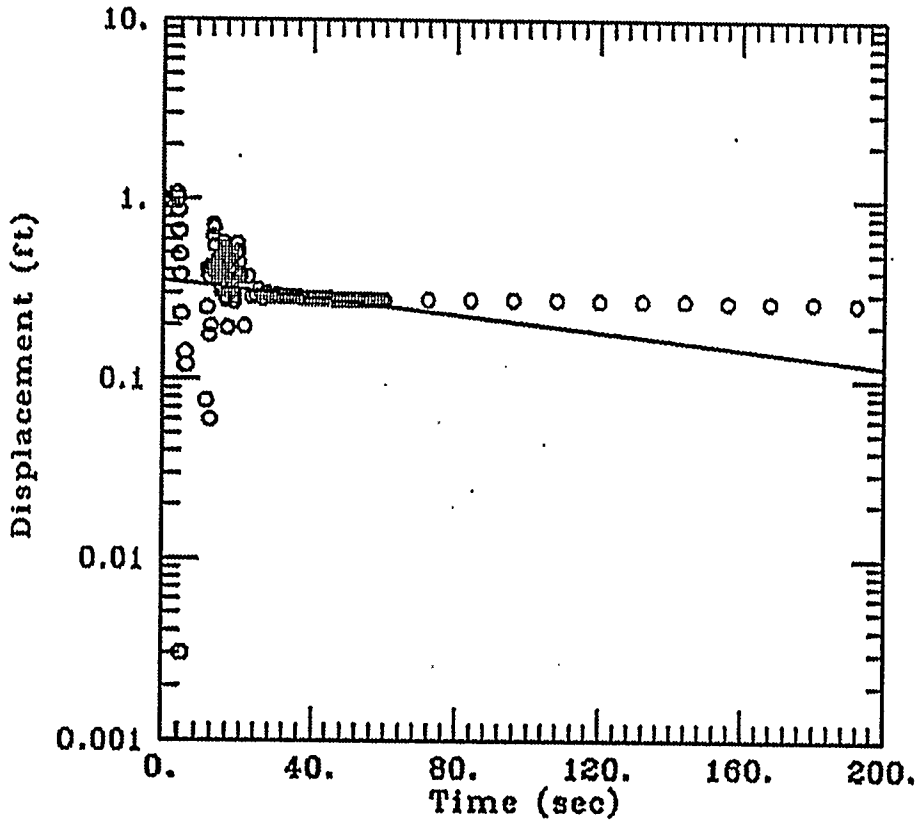
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 3.1899E-06 ft/sec
y0 = 0.8251 ft

TEST DATA:
H0 = 1. ft
rc = 0.0033 ft
rw = 0.3281 ft
L = 20. ft
b = 100. ft
K = 21.61 ft

CBR-5

CBR-05 FALLING HEAD TEST



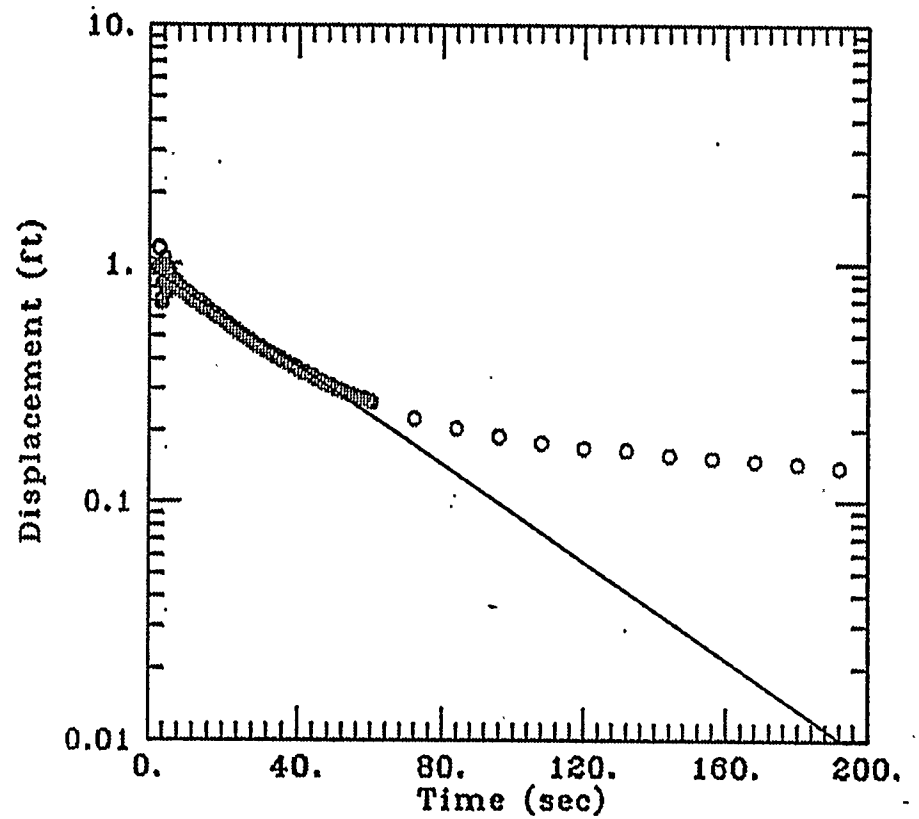
DATA SET:
A:5FALL.AQT
01/22/95

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 3.1881E-06 ft/sec
y0 = 0.3542 ft

TEST DATA:
H0 = 1. ft
rc = 0.0833 ft
rw = 0.3281 ft
L = 14.37 ft
b = 100. ft
R = 14.37 ft

CBR-05 RISING HEAD TEST



DATA SET:
A:5RISE.AQT
01/22/95

AQUIFER TYPE:
Unconfined

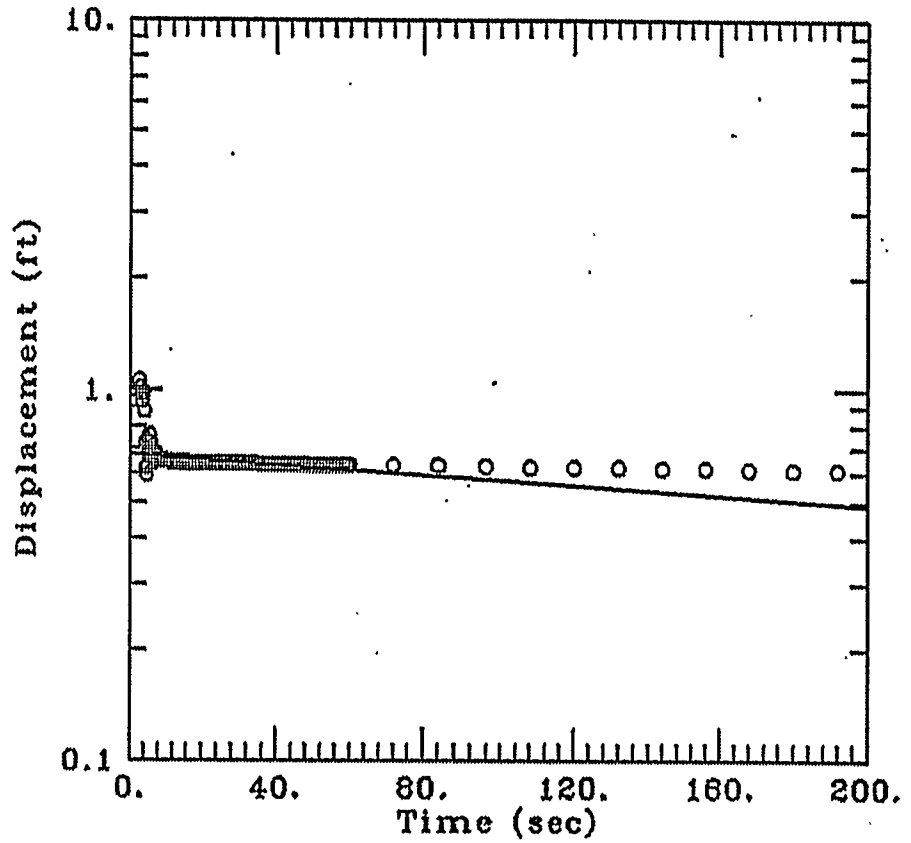
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 1.3770E-05 ft/sec
y0 = 0.9591 ft

TEST DATA:
H0 = 1. ft
rc = 0.0033 ft
rw = 0.3281 ft
L = 14.37 ft
b = 100. ft
K = 14.37 ft

CBR-6

CBR-06 FALLING HEAD TEST



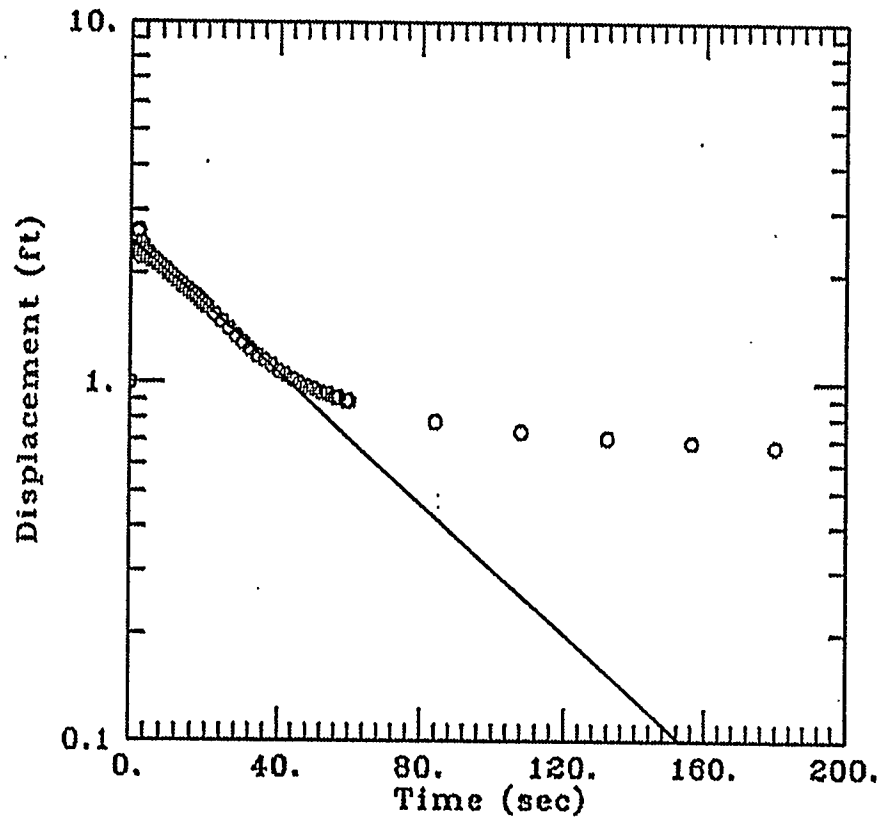
DATA SET:
A:6FALL.AQT
01/22/95

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 9.6826E-07 ft/sec
y0 = 0.6761 ft

TEST DATA:
H0 = 1. ft
rc = 0.0833 ft
rw = 0.3281 ft
L = 13.65 ft
b = 100. ft
R = 13.65 ft

CBR-06 RISING HEAD TEST



DATA SET:
A:6RISE.AQT
01/22/95

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 1.2597E-05 ft/sec
y0 = 2.46 ft

TEST DATA:
H0 = 1. ft
rc = 0.0033 ft
rw = 0.3281 ft
L = 13.65 ft
b = 100. ft
K = 13.65 ft

Appendix I

Surface Water/Sediment Sampling Information

Field Readings for Surface Water/Sediment Sampling
12/7/94

Sample Number	Surface Water Temperature	Dissolved Oxygen (mg/l)	pH
CS6G-29	13.4°C	7.85	10.51
CS6G-30	66°F	9.40	10.50
CS6G-31	73°F	8.00	9.68
CS6G-32	15.8°C	6.63	9.22
CS6G-33	16.0°C	5.38	6.61